Investigações Experimentais

Special Survey

on 2024 Floods in Rio Grande do Sul

IBGE
Instituto Brasileiro de Geografia e Estatística

Ministry of Planning and Budget
Brazilian Institute of Geography and Statistics - IBGE
Directorate of Surveys
Division of Population and Social Indicators

Investigações Experimentais

Estatísticas Experimentais

Special Survey on 2024 Floods in Rio Grande do Sul

IBGE

Rio de Janeiro
2026

Brazilian Institute of Geography and Statistics - IBGE

Av. Franklin Roosevelt, 166 - Centro - 20021-120 - Rio de Janeiro, RJ - Brasil

ISBN 978-85-240-4719-0

These statistics are classified as experimental and should be used with caution, as they are new statistics still being tested and evaluated. They are developed and published in order to engage users and stakeholders in the assessment of their relevance and quality.

Due to the editorial schedule, the original publication has not undergone the complete editorial production process.

Cover

Department of Publishing – GEDI/Center for Information Documentation and Dissemination - CDDI

DADOS INTERNACIONAIS DE CATALOGAÇÃO NA PUBLICAÇÃO (CIP)
Gerência de Biblioteca, Informação e Memória do IBGE

Special Survey on 2024 Floods in Rio Grande do Sul / IBGE, Division of Population and Social Indicators. - Rio de Janeiro : IBGE, 2026.
x p. - (Investigações experimentais. Estatísticas experimentais).

ISBN 978-85-240-4719-0

1. Rio Grande do Sul. 2. Inundações. 3. Mudanças climáticas. 4. Indicadores sociais. 5. Política pública. 6. Estatística. I. IBGE. Coordenação de População e Indicadores Sociais. II. Série.

CDU 504.4:556.166(816.5)
SOC

Ficha elaborada por Gerlaine Braga - CRB-7/6659

Table of Contents

Conventions

-	Numerical data equal to zero not resulting from rounding;
..	Not applicable to numerical data;
...	Numerical data not available;
x	Numerical data omitted to prevent individualization of information;
0; 0,0; 0,00	Numerical data equal to zero resulting from rounding of an originally positive numerical data; and
-0; -0,0; -0,00	Numerical data equal to zero resulting from rounding of an originally negative numerical data.

Foreword

The Brazilian Institute of Geography and Statistics – IBGE presents an innovation with this Special Survey on 2024 Floods in Rio Grande do Sul – PEERS, aimed at producing information collected from households on the impacts of this extreme climate event and assessing the affected population's perceived quality of life after the disaster.

In addition to investigating the socioeconomic characteristics of the affected residents, the survey advanced towards a deeper understanding of the damage and of the degrees of severity experienced, also providing information on the type of support needed and received and on the opinion about prevention and recovery measures. Therefore, PEERS, as originally conceived, has the potential to provide elements for the formulation of public policies targeted at climate change, ensuring that they will be effective to prevent and face such phenomena, mitigate their effects and facilitate recovery after damage.

A lack of precedent characterizes this statistical survey, which, for the first time, measured impacts and actions in the context of natural disasters considering the groups affected by them. International guidelines and experiences have been studied and adapted to the observed event. The novelty of this study includes data collection by the IBGE fully conducted by telephone, with numbers selected from the list of households interviewed in the 2022 Population Census. Additionally,

new methods for the selection, control and expansion of the sample were incorporated into the survey, which is now being released on an experimental basis.

The data presented herein are available for consultation in the format of tables of results on the PEERS page on the IBGE portal.

.

Gustavo Junger da Silva
Director of Surveys

Introduction

The climate event that affected Rio Grande do Sul in 2024 was considered the worst natural disaster in the history of the state and one of the greatest in Brazil, being marked by extremely heavy rainfall concentrated in few days, causing inundations, floods, torrents and landslides[1]. The phenomenon was considered unique for its intensity and territorial coverage, by far surpassing previous records and jeopardizing essential infrastructure such as hospitals, roads and the airport. The tragedy affected different population strata, with effects that were not only environmental, but also social and economic.

More than an isolated climate phenomenon, this catastrophe evidenced the urgent need for rapid action, not only in support of the affected population but also in terms of recovery and prevention. For that reason, knowing the magnitude of the impacts of this event is fundamental for the elaboration of structural public policies that can effectively mitigate the lasting damage, and for devising strategies for similar situations that might occur in the future.

The Special Survey on 2024 Floods in Rio Grande do Sul - PEERS corresponds to the IBGE's share in the workforce established to support the state of Rio Grande do Sul after the climate disaster of 2024. The survey was designed to enable the construction of indicators aimed at measuring the effects of heavy rains on the affected population.

The conceptual and methodological definitions for the conduction of this survey had as their reference international recommendations

[1] Global warming, intensified by the emission of greenhouse gases and by the change in land use, has caused significant changes in ocean-atmosphere interactions. These transformations have a direct repercussion on wind circulation patterns and humidity distribution, thus resulting in significant changes in the rainfall regime. Consequently, there is observable increase in the frequency and intensity of extreme precipitation events, including both scarcity and excess, as a clear sign of the structural impacts of climate change on global environmental and socioeconomic systems.

for the development of Environment Statistics in case of climate disasters, aligned with the Sendai Framework for Disaster Risk Reduction 2015-2030 (United Nations, 2015), with discussions and actions within the scope of the United Nations Statistical Commission (United Nations, 2018;2019). PEERS, more directly, reflects the documents Household Surveys During Multiple Crises (World Bank, 2023) and Navigating Multiple Crises, Staying the Course on Long-Term Development (World Bank, 2022), which deals with the adaptation of household surveys to assess the impacts of multiple shocks, such as pandemics, conflicts and natural disasters. The conception and planning of the survey drew heavily on a detailed study of the international experience with other climate events, especially the Katrina hurricane, which swept over New Orleans, in the United States, in 2005. Publications by the World Bank have provided definitions, guidance and instructions for the elaboration of household surveys to assess impacts of climate shocks. They suggest, among other directives, flexible approaches to data collection, such as virtual interviews.

The Katrina Hurricane was one of the most destructive climate events in the history of the United States. The existing studies and surveys about the impacts of this catastrophe are mainly concentrated in the analysis of the profile of the affected population, in the effects on their physical and mental health, in the physical damage of the affected region and households, and in the process of displacement and relocation of the population (GROEN; POLIVKA, 2008; SASTRY, 2009). The population's quality of life before and after the hurricane was also investigated, together with reports about the main challenges faced in the post-disaster period (KAISER FAMILY FOUNDATION, 2007).

From the perspective of national actions and references, PEERS adopts as a guideline the Classification of Statistical Information – version 1.0 (CIE-1.0), which gathers national production and demands, and included in this new edition a domain that corresponds to environment statistics (IBGE, 2015). Therefore, environmental data started to be categorized with the same degree of relevance of traditional sociodemographic and economic information. The new domain was detailed in topics established according to the Framework for the Development of Environment Statistics (United Nations, 2013), which is a conceptual and statistical milestone developed by the United Nations to organize and strengthen the production of environmental information in the countries.

Regarding this step, PEERS is also in dialogue with the text for discussion Environment and Climate Change Statistics: Recommendations and Initiatives (IBGE, 2024), conceived by the Directorate of Geosciences.

Therefore, the survey design was defined after international recommendations and experiences, and national norms, also having as a basis reports elaborated by governmental bodies, coverage of the climate event by different media and field observations carried out by the teams from the IBGE State Superintendency of Rio Grande do Sul.

The survey was also supported by the solid experience of the IBGE in the conduction of household surveys, being worth mentioning that the modules investigating the living conditions of the families affected by the floods were based on the study and discussion of methods for subjective approaches adopted in Consumer Expenditure Surveys (IBGE, 2024).

After two test phases, in which the knowledge and experiences of the IBGE's Center for Computer Assisted Telephone Interviews (CETAC) and State Superintendency of Rio Grande do Sul (SES-RS) teams recommended the improvement of questionnaires, of editing and of data capture systems and procedures, the telephone-based survey was conducted by CETAC, with the fundamental and continuous cooperation of SES-RS.

The PEERS results now released show information relative to the general characteristics of the affected residents, the impacts of rain on their lives, households and surroundings, work and study conditions before and after the event, as well as to the perceived quality of life in the post-disaster period and to the knowledge of prevention and recovery measures.

The variables dealt with in the survey questionnaire are: Impacts of floods on households: inundation and access, physical damage, interruption of water, electricity and Internet supply, damage to vehicles and/or losses of high-value goods (furniture, household appliances, work equipment, electronic devices); Impacts of floods on the surroundings, neighborhoods and streets near the households: damaged households, flooded streets, destroyed or blocked roads, broken bridges, street conditions (garbage, lighting, security), and public transportation; Household occurrences and impacts of floods on the lives of residents: rescue (means of transportation used, people responsible for the rescue), medical support and hospitalization/Healthcare unit, evacuation, damaged or lost documents, commuting (work/school/daycare or healthcare services), social life and/or spending time with family or friends, and physical or mental health.

Other topics investigated in the survey stand out, such as: Profile of the affected population: date of birth/age and level of schooling in April 2024, color or race, level of schooling, information on current dwelling and reason for moving out, household income in April 2024; Education and work before and after floods; Assessment of current quality of life (if better or worse after the floods), access to healthcare services, water supply, electricity, lighting, garbage collection, street cleaning, water drainage, sewerage, and mass transportation; Public financial aid related to floods; and Prevention and recovery (knowledge of adopted measures and opinion about recovery works).

This publication brings technical notes with methodological considerations about the survey, a brief analysis of results and a glossary with the concepts considered essential for the understanding of indicators and connections observed.

Finally, it should be noted that PEERS is the result of a collective and cross-cutting effort that gathered several IBGE directorates and divisions, and that constitutes a response to the growing demand for environment statistics in a climate crisis context. This work culminated in the elaboration of a specific methodology, supported by international recommendations, to generate indicators that allow us to understand the effects of the extreme event that occurred in Rio Grande do Sul, and reaffirm the commitment of the technical team in charge to its planning and execution.

Technical notes

Data collection instruments

A PEERS used two exclusively electronic questionnaire models – the original and a complementary one – to collect information. An illustrative version of the questionnaires is available for consultation on the IBGE portal.The interview with the informant started using the original version, which refers to the residents of the households between April and May 2024 and the situations faced in their lives, their homes and their surroundings during the floods. If at least one of these residents were no longer living with the informant on the date of the interview, a new questionnaire – called complementary – was generated. A new form was elaborated for each household consisting of persons no longer residing with the informant. Both models encompassed questions about education, labor market and assessment of quality of life and sufficiency of income in 2025 against the period prior to the floods. The definitions of Resident informant and Complementary resident informant are in the Glossary.

Sampling plan

The sampling plan of the Special Survey of 2024 Floods in Rio Grande do Sul – PEERS was planned to estimate impacts on the area of coverage designed for the survey.

This survey adopted telephone-based data collection and used the Population Census as a sampling frame.The survey sampling plan was defined as a stratified sample with random selection of households. The main aspects of the plan are detailed as follows

Scope of the survey

The target population of the survey consisted of households and residents of permanent private households in the area of geographic coverage in April and May 2024.

The geographic coverage of the survey was defined after three main references: 1) the most impacted area by the climate event, delimited according to the mapping carried out by a group of institutions - National Institute for Space Research (INPE), National Center for Monitoring and Early Warning of Natural Disasters (CEMADEN), Federal University of Rio Grande do Sul (UFRGS), Brazilian Army, State of Rio Grande do Sul, National Water Agency (ANA), Geological Service of Brazil - (SGB) and Brazilian Air Force (FAB) (INPE et al., 2024); 2) Immediate and Intermediate Geographic Regions[1] , regional divisions of Rio Grande do Sul established by the IBGE and used for the organization and dissemination of statistics; and 3) state decrees that listed the municipalities that have declared a state of public calamity and emergency.Therefore, the selection of municipalities followed the criteria below:

- Municipalities that have declared a state of public calamity[2] ;
- Municipalities that have declared a state of emergency[3] ; with more than five thousand residents and at least 2% of their households in the most impacted area;
- Municipalities that have declared a state of emergency; with less than five thousand residents and at least 5% of their households in the most impacted area; and
- Municipalities located in the Immediate Regions of Rio Grande do Sul and that have declared a state of public calamity or emergency with at least 1% of their households located in the most impacted area.

A total of 133 municipalities have been included in the survey. The complete list of these localities, organized by Intermediate and Immediate Regions, is available in Annex 1.

Sampling frame

The sampling frame was formed by the households interviewed in the 2022 Population Census. Only Occupied Permanent Private Households were eligible. As the telephone-based interview was the method adopted, the selection included only households with a registered telephone number in the census operation.

In the area of coverage of the survey, there were 2,454,570 Occupied Permanent Private Households in the 2022 Population Census, of which 2,011,187 had a registered telephone, that is, approximately 81.9% of the total.

---

[2] An Immediate Region corresponds to the regional division of Brazil that has its main reference in the urban network. These areas are structures organized around urban centers to fulfill immediate needs of the populations, such as: purchase of durable and non-durable goods; job search; search for healthcare and education services; and rendering of public services such as customer service stations of the National Social Security Institute – INSS, of the Ministry of Labor and of judicial services, among others. And the Intermediate Geographic Regions organize the territory, connecting Immediate Geographic Regions by means of a higher-order central hub, distinguished by public and private management flows and by the presence of more complex urban functions (IBGE, 2017). More information on the methodology of regional division into Intermediate and Immediate Regions can be found at: https://biblioteca.ibge.gov.br/index.php/biblioteca-catalogo?view=detalhes&id=2100600

[3] The State Government of Rio Grande do Sul specified the Municipalities reached by the climate event of heavy rainfall and that declared a state of public calamity, by means of decrees published in the Official Gazette (RIO GRANDE DO SUL, 2024).

[4] The State Government of Rio Grande do Sul specified the Municipalities reached by the climate event of heavy rainfall and that declared a state of emergency, by means of decrees published in the Official Gazette (RIO GRANDE DO SUL, 2024).

Sample stratification and size determination

Two levels of geographic stratification have been adopted.

The first level of stratification of the survey took into consideration the municipality (in the case of densely populated municipalities) or groups of municipalities in one same Immediate Region, in the case of sparsely populated ones. Then, 57 initial geographic strata were formed.

A second level of geographic stratification was created, separating households inside and outside the most impacted area by events in each initial stratum (mapped by the previously described groups of institutions). Then, a total of 114 final strata were formed.

The size of the sample was defined to enable operationalization by means of a telephone-interview hub in the data collection period of three months while also accommodating a high non-response rate, expected for interviews conducted over the telephone and observed in the survey test.

At first, this sample had 35 thousand households, but after allocation the final total was 33,930 households.

Allocation of households and sample selection

Following sample size determination, the households were allocated in three different stages:

- **1st Allocation:** carried out in the Immediate Regions of Rio Grande do Sul (see Annex 1) – Proportional to the number of permanent private households in each area;
- **2nd Allocation:** carried out in initial geographic strata (Municipality or group of municipalities) – Proportional to the number of households in the most affected area considering limits of the sample fraction (a minimum of 0.25% and a maximum of 25%);
- **3rd Allocation:** carried out in the 114 final strata – allocation of the same size in both strata (households in the most affected area and in households outside the most affected area).

A systematic selection controlled by municipality in the strata with more than one municipality was carried out.

It was impossible to contact some municipalities during the data collection period. In others, where contact was possible, the interview did not take place, either because the household was no longer part of the area of coverage of the survey or for other reasons.

Sample sizing considered tests carried out and experiences in telephone-based surveys to which the call answering rates are low. This sample size and the effort of the CETAC and SES teams ensured estimates with high-precision levels within the usual parameters observed in the IBGE surveys.

Chart 1 presents figures referring to the conclusion of data collection.

Chart 1 - Status of PEERS final data collection

Data collection status	Households
Total	**33 930**
Incorrect telephone number	4 377
Non-answered calls	23 451
Entrevistas concluídas	6 102
Complete interviews	4 311
Questionnaire partially filled out	615
Refusal	845
Household out of Survey profile	331

Source: IBGE, Directorate of Surveys Division of Population and Social Indicators, Special Survey on 2024 Floods in Rio Grande do Sul.

Calculation and adjustment of sample weights

After the data collection, it was possible to calculate the sample weights associated with each household/person participating in the survey.

As the reference for the Population Census was July/August 2022, the residents who were no longer living in the selected households in the period of reference of the survey had their households removed from the sample.

The initial weight was calculated within each final stratum.The adjustments that followed can be divided into three steps: coverage adjustment, contact adjustment and non-response adjustment.

The initial weight $w_{ih}^{(0)}$ do domicílio i do estrato h of the housing unit i of stratum h was obtained in each stratum by:

$$w_{ih}^{(0)} = \frac{N_h}{n_h}$$

Where N_h is the total number of households in the stratum h and n_h the effective sample size of the stratum h.

The adjusted weight $w_i^{(aj)}$ was obtained by means of three successive adjustments.

$$w_i^{(aj)} = w_{ih}^{(0)} \times g_i^{(C)} \times g_i^{(K)} \times g_i^{(R)},$$

Where:

$g_i^{(C)}$ is the coverage adjustment for telephones registered in the household i

$g_i^{(K)}$ is the adjustment for lack of contact with the household by telephone

$g_i^{(R)}$ is the adjustment for non-response of the household i given there was a telephone contact.

Each adjustment factor was built according to propensity scores estimated using logistic regression and applied through score stratification, as observed in Lee and Valliant (2008, Section 8.3.4).

a)Coverage adjustment

The adjustment of coverage intends to weigh the units in the sampling frame that had a phone number associated with them, to reach the expanded total of households. The indicating variable is described as follows:

$$C_i = \begin{cases} 1, \textit{ if the household has a registered telephone} \\ 0, \textit{ the opposite} \end{cases}$$

The probability of a household being covered in the sampling frame is estimated according to a logistical model. Given the set of auxiliary variables X_i, it follows that:

$$Pr\,(C_i = 1 | X_i) = \text{logit}^{-1}(X_i^{T\beta})$$

The auxiliary variables used were: number of bathrooms, urban or rural household, type of enumeration area and total of residents. The estimated probabilities $\hat{p}_i^{(C)}$ are used to put the households in order. Ten adjustment classes were created using propensity score quantiles. The coverage adjustment factor for stratum s_{1j} was defined as:

$$g_{s_{1j}}^{(C)} = \frac{N_{s_{1j}}}{n_{s_{1j}}}, \text{j} = 1,...,10.$$

Where $N_{s_{1j}}$ s the total number of units in the sampling frame and $n_{s_{1j}}$ the total of units covered in segment s_{1j}.

b)Contact and non-response adjustment

The process of data collection imposes successive losses that should be corrected. For that reason, one or two logistic regression models are adjusted to estimate the probability for contact and response by the household. These probabilities are used to arrange the households in order and generate two new segmentations (s2 and s3). In these models, the auxiliary variables used were number of bathrooms, urban or rural household, type of enumeration area, total of residents, presence of residents aged 60 years and over and ranges of income of the householder.

The second adjustment factor, $g_{s_2}^{(K)}$ (contact adjustment), is applied to units that have a telephone and is intended to correct losses resulting for the impossibility of contacting the household. Using the losses corrected by coverage $(w_i^{(C)} = w_i^{(0)} \cdot g_i^{(C)})$, the factor for each segment s_2 is calculated by the ratio between the sum of weights of all the households of the sample in each segment (A_{s2}) with telephone and the sum of the weight of units with which contact was established:

$$g_{s_{2j}}^{(K)} = \frac{\Sigma_{i \in A_{s_{2j}}} w_i^{(C)}}{\Sigma_{i \in \text{Contato} | A_{s_{2j}}} w_i^{(C)}}, \text{j} = 1,...,10.$$

In the third stage, the non-response adjustment factor $g_{s_{3j}}^{(R)}$ is applied. It focuses on units for which contact was successfully established but the interview was not completed for a given reason. Using the weights accumulated up to the contact stage $(w_i^{(K)} = w_i^{(C)} \cdot g_i^{(K)})$,the adjustment factor for stratum s3 is defined as the ratio between

the sum of the weights of all contacted units and the sum of the weights of the units that effectively answered the survey:

$$g_{s_{3j}}^{(R)} = \frac{\sum_{i \in \text{Contato} | \text{A} s_{3j}} w_i^{(K)}}{\sum_{i \in \text{Resposta} | \text{A} s_{3j}} w_i^{(K)}}, \text{j} = 1,...,10.$$

The final adjusted weight, $w_i^{(aj)}$, incorporates the probability composed of coverage, contact and response, ensuring that the final group of interviews carried out properly represents the target population.

Calibration of sample weights

The adjusted weights were calibrated by ranking using the Deville and Särndal method. Calibration requires that weighted totals coincide with marginal population values known as geographic post-strata and combinations of sex and age. In formal terms, we seek a set of calibrated weights, $w_i^{(aj)*}$ that satisfies:

$$\sum_{i \in s} w_i^{(aj)*} \ Z_i = T_Z,$$

Where Z_i are categorical auxiliary variables and T_Z their known population totals.

As geographic post-strata, eight Intermediate Regions of Rio Grande do Sul have been chosen (see Annex 1). Therefore, the first marginal value was composed of the population totals estimated for these areas (considering the 133 municipalities only). The second marginal value was composed of the estimates of population totals by sex and age for the area of geographic coverage of the survey as a whole, using quinquennial classes and an upper limit of 80 years of age and over

Population estimates were provided by the IBGE's Population and Social Indicators Division and refer to the date of May 1, 2024.

Data editing and imputation

PEERS has undergone several stages of editing and imputation which were required to validate its consistency, as data came from several areas and at different times.

The first stage, conducted by the CETAC team, consisted of questionnaire checking, by identifying and correcting inconsistent data. Possible errors were detected by a computer program and the editing process was carried out progressively and systematically until the system stopped indicating pending issues.

Another editing process carried out by both the CETAC team and the PEERS management was the analysis of informants' answers for the items of the questionnaire with the option "Other" to be specified. The items were B02.9 (Other impact not mentioned); B03.9. (Other occurrence not mentioned); C09. (Other Place); and D09.7 (Other reasons not related to the floods). If those items had any answers that could be reassigned to previously asked questions, the data were corrected accordingly. To this end, the interview recordings for each questionnaire identified as a candidate for modification of the aforementioned variables were reviewed.

The PEERS management also carried out the editing of the aggregated data consistency by means of previously defined indicators in the phases of Survey planning and designing.

In the second editing stage, the imputation process was carried out by CANCEIS (Canadian Census Edit and Imputation System) software, developed by Statistics Canada. CANCEIS uses the hot deck imputation method, where the value of a record with a detected error is replaced by the value of a donor record belonging to the same survey. Donors are those that have not violated any of the established editing rules. For the selection of potential donors, CANCEIS uses the nearest-neighbor method. Similarity between donor and recipient records is measured using distance functions for a predetermined set of variables, which may have different weights in the similarity calculation. The final donor is selected from a set of nearest neighbors for each recipient.

PEERS data were divided into 3 distinct imputation modules: two for the imputation of household data (blocks B and C of the questionnaire in one module and blocks F and G in another module) and one for personal data (blocks D and E).

Data collection

Data collection took place between September 15, 2025, and February 27, 2026, using a new methodology for data capture. For the first time at the IBGE, a household survey was carried out entirely through computer-assisted telephone interviews.

CETAC, responsible for collecting data in IBGE surveys, uses the "Computer-AssistedTelephone Interviewing" - CATI technique (SSO-OES, 2007). In this modality, the Telephone Survey Agent (APT) used specific software to carry out the data collection. The calls were made from the number (21) 2142-0123, with the data being immediately recorded in the system database.

Most of the informants identified in the sampling frame were sent the Survey Informant Letter by mail, informing them about the nature, purpose, and veracity of the PEERS survey, before being contacted by the IBGE. By calling 0800 721 8181 or emailing peers@ibge.gov.br, respondents could schedule a date and time for the interview or verify the identity of the data collection agent.

The PEERS data collection was widely publicized by a launch event in Porto Alegre, attended by the press and authorities, as well as by regular ad campaigns on the radio, TV, newspapers, social media, and advertisement pieces displayed at bus stations and on commuter trains, ensuring that the population would be aware of the survey and respond to the IBGE's inquiries.

At the beginning of data collection, some difficulties were observed, the main one being the low number of calls answered by residents (Table 1). It is believed that the low response rate may have been attributable, in part, to respondents' lack of awareness of the Institution's official telephone number (21 2142-0123), combined with concerns about the increasing prevalence of scams and fraud. Despite the strategies adopted to publicize the number, residents were reluctant to answer the calls, as they were not sure that the number displayed on their cell phone screen was from the IBGE. On the other hand, residents who answered the call were generally receptive to the survey.

When the call was answered, but the resident initially refused to answer the questionnaire, the Agent was expected to continue the persuasion process, by presenting structured arguments and reinforcing the importance of providing information to portray the impacts of the climate event occurred.

With the aim of increasing the call response rate, CETAC partnered with the team from the State Superintendency of Rio Grande do Sul, which used the routes

of its household surveys to publicize the survey. Throughout the data collection, this cooperation increased, and some technicians from the branches to which the municipalities belonged in the PEERS survey began visiting the sample households and informing them about the Survey and the phone that would be used in the interview. Often CETAC agents would be contacted at the same time as the visit so that the interview could be conducted through CATI.

Given the logistical challenges previously mentioned, another tool used by the team to increase the call response rate was the use of WhatsApp. This resource changed the approach dynamics by allowing asynchronous communication. Respondents were able to answer requests, schedule interviews, and validate information at the most convenient time for them, thus increasing participation in the survey.

The use of WhatsApp also enabled survey agents to keep a stable and continuous communication channel with residents in locations that did not have conventional landline telephones or had unstable mobile phone signals, with prevalence of exclusive connectivity through local Internet networks.

Training of supervisors and survey agents

During the preparation phase for PEERS, supervisors and survey agents were trained and had lectures on the disaster in Rio Grande do Sul, providing context on the climate event, its geographic coverage and impact. In addition, questionnaire items and the system used were presented, while group dynamics and exercises simulating real situations were also offered as training activities. Special distance-learning training (DLT) was also administered on how to approach respondents by phone, from contact planning and interview steps to empathy and active hearing, specially fit for an event which had caused such severe impact on people's lives.

During data collection, there were some conversation rounds to reinforce concepts and methods for survey supervisors and agents.

Dissemination of results

The PEERS tabulation plan was structured based on the general and specific objectives set for the survey during planning phase, which were translated into the variables investigated and the indicators defined. For its final elaboration, the sampling design potentialities and the analysis of the estimate precision were considered.

The preliminary analysis of the precision of the estimates in the Tabulation Plan outside the standards established by the IBGE (IBGE 2021, 2024), both at the dissemination level of Intermediate Regions and for the answer categories of the variables investigated in the Survey, indicated the need for aggregation in two situations, in order to:

1) join together information about the Intermediate Regions (RIs) of Uruguaiana, Ijuí and Passo Fundo, since their local samples are relatively small; and

2) aggregate variables into levels other than the ones investigated in the questionnaire depending on the data-crossing proposed, namely: total monthly household income ranges; color or race; level of schooling; assessment of the structural condition of the household after the floods; main reason for changing addresses after

the floods; and the different locations where residents spent one or more nights due to the floods.

As a result, in order to align the data presented with the best dissemination practices adopted herein, 27 tables were generated, organized as follows: 21 for the set of 133 municipalities covered by the survey and six specific tables for the following Intermediate Regions (IR): 1. Porto Alegre; 2. Caxias do Sul; 3. Santa Cruz and Lajeado; 4. Pelotas; 5. Santa Maria; and 6. Uruguaiana, Ijuí, and Passo Fundo. It should be noted that, as the precision of the estimates fell outside the established standards, due to relatively small local samples, it was necessary to aggregate the information from the RI of Uruguaiana, Ijuí, and Passo Fundo so that the data presented would be in accordance with the best dissemination practices adopted for this work. Annex 1 presents the list of Intermediate Regions, Immediate Regions, and municipalities of Rio Grande do Sul included in PEERS.

Both the result tables and those containing the correspondent coefficients of variation are available on the IBGE portal.

The analysis of the precision of estimates obtained by PEERS has followed the norms proposed in the document Guidelines on How to Deal with Imprecise Estimates (IBGE, 2024), which establishes how the Institute's surveys should proceed in order to make it clear to users how information is used. In this sense, in addition to the dissemination of the coefficients of variation (CV) in a separate tabulation plan, each result table cell with a CV between 15% and 50% is indicated and accompanied by a footnote.

Analytical comments are presented in two parts, the first with analyses regarding the total area covered by the survey and the second exploring results from the Intermediate Regions. For the two geographies, main characteristics of the residents, household damage and damage in the surroundings and the different difficulties faced by the population during the rainfall were a highlight. Concerning the data collection period, the updated socioeconomic conditions and the perception or opinion about improvements and preventive measures were examined.

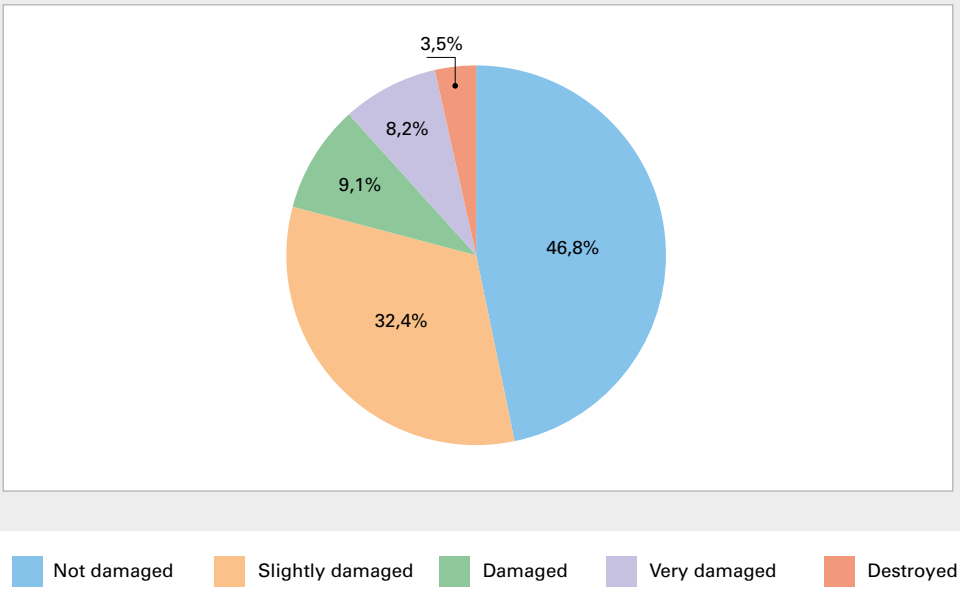
Result analyses

PEERS was developed to meet two general objectives: to enhance knowledge of the impacts of the floods on the population residing in the most affected municipalities and to identify their living conditions at the time of data collection, compared to the period preceding the floods. The specific objectives were based on international experiences, but also on reports from government agencies, coverage by various media outlets, and local observations by the IBGE teams from the State Superintendency of Rio Grande do Sul. These goals guided the initial conception of the tabulation plan, the design of the questionnaire, and also facilitated the organization of the result analysis. Thus, the survey sought: to identify and characterize the affected population; to check the impossibility of accessing their home during the rains and permanent changes of address due to them; regarding school attendance and participation in paid work, to verify their interruption and resumption after the floods; to observe the extent of damage to the homes and surroundings and to the lives of residents, as well as protective measures demanded and adopted; to investigate socioeconomic conditions before and after the rains, including comparative subjective assessment; to collect the residents' opinion and perception regarding recovery and prevention measures adopted after the climate event.

The analyses of the results presented herein have been organized into two parts: the first comprises the observation of information for all municipalities covered by the survey, and the second refers to a smaller sample, focused on the Intermediate Regions included in PEERS. In both sessions, in addition to the graphs and tables included in the text, there are comments related to the result tables of PEERS available on the IBGE portal.

Graph 1 shows the proposed categories for the assessment and shows that around half (53.2%) of homes suffered some degree of structural damage as a result of the floods. The most frequently observed degree of damage was "slightly damaged" (32.4%). No structural damage occurred in 46.8% of homes.

Graph 1 - Percentage distribution of DPPs by degrees of assessment of the structural status of households after the floods - Survey coverage area - Rio Grande do Sul - April and May 2024

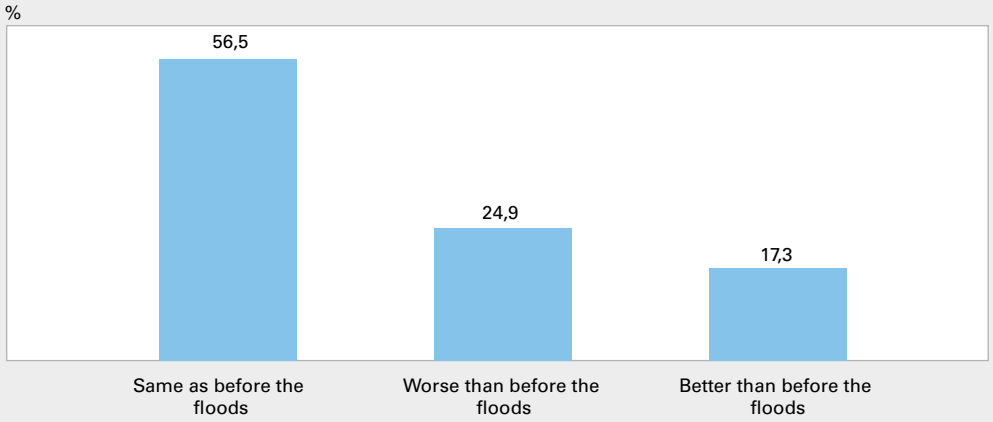


Source: IBGE, Directorate of Surveys Division of Population and Social Indicators, Special Survey on 2024 Floods in Rio Grande do Sul.

Furthermore, for 2,047,938 households (88.0%), at least one impact on the household, whether structural or not, was reported. Regarding the effects caused by heavy rains in the neighborhood and surrounding streets, 1,599,669 households (68.7%) reported at least one (Table 1).

Table 2 presents the total number of residents in the survey area, estimated at 6,333,727. Of these, 24.9% resided in households where general living conditions at the time of data collection were worse than those experienced in the month prior to the floods, exceeding the percentage of those who reported improvements in their households (17.3%). Those who reported that their quality of life remained the same corresponded to the majority of residents (56.5%), as shown in Graph 2. Considering that the occurrence of neutral responses is a characteristic observed in surveys that aim to capture subjective viewpoints, the prevalence of the reported feeling of worsening has important analytical value.

Graph 2 - Percentage distribution of residents in DPPs, by assessment of general quality of life in the data collection period - Survey coverage area - Rio Grande do Sul - April and May 2024



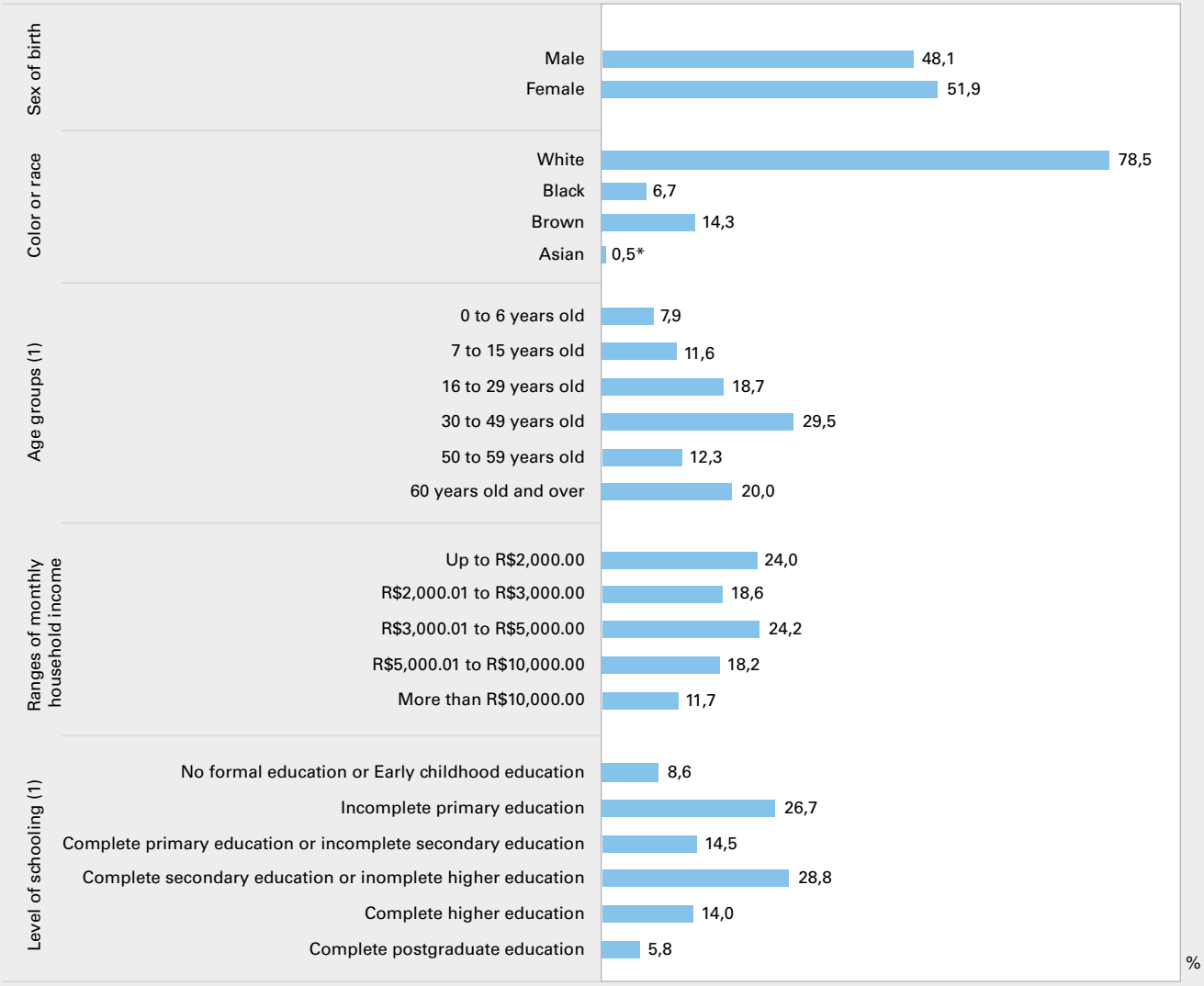
Source: IBGE, Directorate of Surveys Division of Population and Social Indicators, Special Survey on 2024 Floods in Rio Grande do Sul.
Note: 1. Comparison made with the month before the floods
2. The answer categories do not add up to 100.0% as they do not include those who answered "I don't Know".

The resident population in households who reported knowledge of the preventive measures applied after the floods stood at 2,438,297 (38.5%). Regarding the opinion on their satisfaction as to the recovery works carried out in the areas hit by the floods, the positive answer in relation to these measures reached 41.0% of the residents (2,594.761). Such results suggest the need for more effective communication with the population, both to inform about the measures and to make these measures closer to the wishes of those hit by the climate event (Table 2).

Characterization of the surveyed population

Considering the monthly household income of the residents by the time of the floods, it is worth highlighting that 4,231,602 or 66.8% of the total were concentrated in the income range of up to R$5,000.00, as shown in Graph 3.

Graph 3 - Percentage distribution of residents in DPPs, by selected characteristics
Survey coverage area - Rio Grande do Sul - April and May 2024



Source: IBGE, Directorate of Surveys Division of Population and Social Indicators, Special Survey on 2024 Floods in Rio Grande do Sul.
*Estimates with coefficient of variation in the C range, more than 15% up to 30%. (1) Relative to April 2024.
Note: Answer categories do not add up to 100.0% as they do not include those who answewred "I don't know" for level of schooling and "No income" or "I prefer not to inform" for ranges of monthly household income.

Regarding the sex of birth, 51.9% of persons were female and 48.1%, male. Considering the variable color or race, the white category prevailed, recording 78.5%, followed by the brown category, 14.3%. The residents who self-declared being black corresponded to 6.7%. The age distribution in the survey areas indicated proximity between the percentage of residents aged up to 15 years (19.5%) and those aged 60 and over (20.0%).

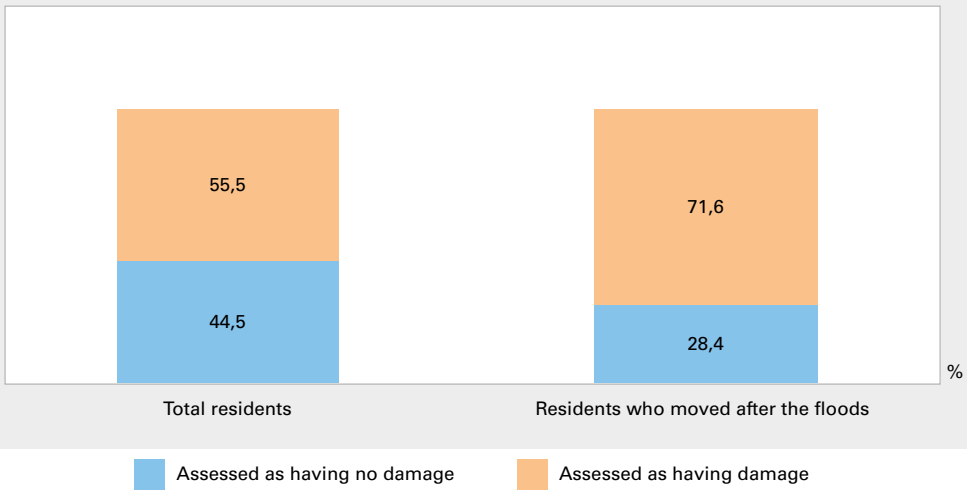
Graph 3 also shows that of the total investigated residents, 28.8% reported having either completed the secondary education level or had incomplete higher education (1,822,001).

Place of residence

In relation to the place of residence after the climate disaster, 14.6% of individuals changed addresses, corresponding to an amount of 922,233 (Table 2). In this group, 28.3% lived in households with income up to R$2,000.00 (Table 14). Data indicate a concentration of residents who changed addresses after the floods in the lowest range, since, in the total income distribution of the population, they corresponded to 24.0%.

According to Graph 4, 71.6% of the residents changed their addresses after the climate disaster and lived in households in which perceived structural damage due to the floods was reported.

Graph 4 - Percentage distribution of residents, by assessment of existence of structural damage in the household after the floods, according to the total of residents who moved - Survey coverage area - Rio Grande do Sul - April and May 2024



Source: IBGE, Directorate of Surveys Division of Population and Social Indicators, Special Survey on 2024 Floods in Rio Grande do Sul.

Address change motivated by climate disaster was reported by 37.9% of those residents that moved, corresponding to 349,366 or 5.5% of the total residents in the surveyed households. In this scenario, in which the floods led to change of addresses, 90.6% of the individuals lived in households in which some structural damage was reported resulting from the floods (Table 15).

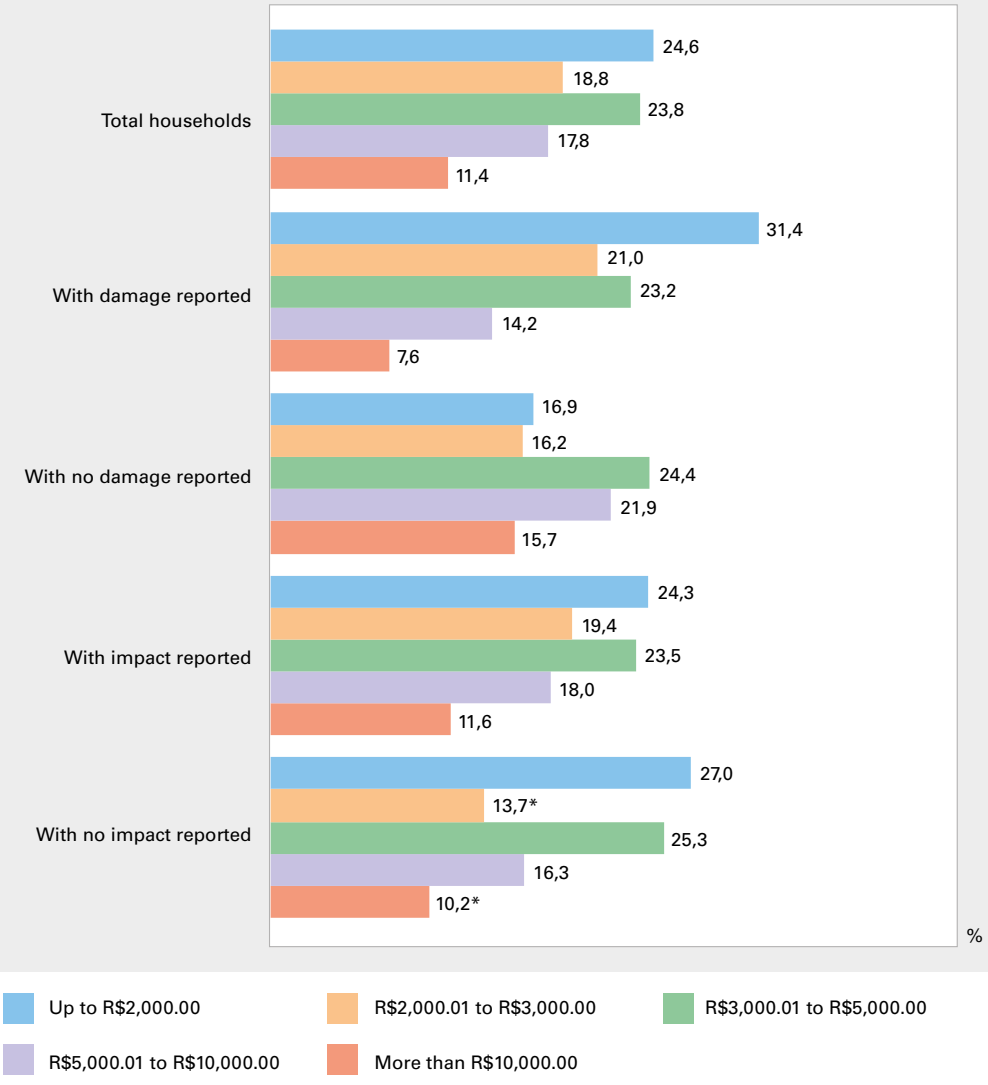
Damage and impact on households

Graph 4 also shows that the total percentage of residents in households with reported structural damage stood at 55.5%. The analysis of the distribution of households with structural damage, by monthly household income, indicated in Table 4, shows higher concentration in the range up to R$2,000.00, which encompasses 31.4% of the households. Among those who did not report any structural damage, the share was 16.9%. Both percentages are very different from the one that corresponds to the total of households of the same income range (24.6%). The share of households with income above R$10,000.00 and that suffered structural damage resulted in 7.6% (Graph 5). Although this is a lower percentage than that of households where there was no

structural damage, this figure confirms that the floods also affected households in more stable socioeconomic conditions.

Conversely, the distribution of households reporting different impacts, whether structural or not, replicated the income profile of the total number of households - another indication that the floods affected, although with some specificities, different socioeconomic ranges (Graph 5)

Graph 5 - Percentage distribution of DPPs, by ranges of total monthly household income, according to the existence of impacts and assessed structural status of the household due to the floods - Survey coverage area - Rio Grande do Sul - April and May 2024



Source: IBGE, Directorate of Surveys Division of Population and Social Indicators, Special Survey on 2024 Floods in Rio Grande do Sul.
*Estimates with coefficient of variation in the C range, more than 15% up to 30%.
Note: Answer categories do not add up to 100.0% as they do not include those who answered "No income" or "I prefer not to inform".

According to Graph 6, the most frequently reported occurrences in households resulting from rainfall in the survey were: interruption of water supply (66.3%), electricity (66.3%), and Internet (61.5%). As for the distribution of income ranges of the

households affected by the three types of interruptions, there are patterns similar to those seen in the set of the households analyzed by the Survey (Tables 5 and 7).

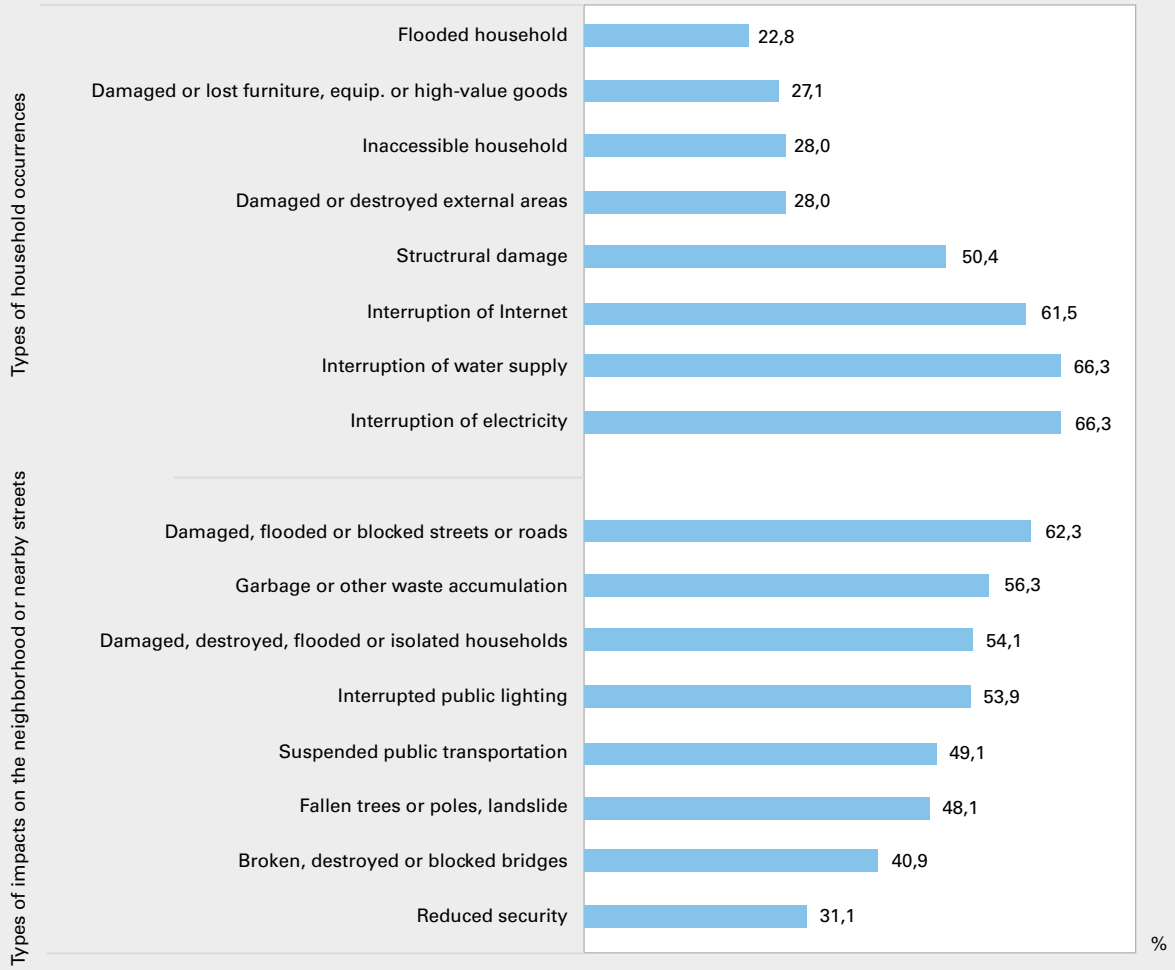
The analysis of Tables 5 and 7 indicates that, in the income range of up to R$2,000.00, some occurrences related to the floods in the households presented a distinct participation than that observed for the total households (24.6%), standing above 30%. Such occurrences were: inaccessible household (34.1%); flooded household (35.5%); structural damage (31%); damaged or lost furniture, appliances, work equipment, electronic devices or other high-value goods (34.5%) and household with damaged or destroyed external areas (31.4%).

Damage in household surroundings

Table 5 shows that the existence if impacts caused by the floods in the neighborhood and in the nearby streets was reported by 68.7% of the estimated total number of households. By examining those impacts by income ranges, the distribution was similar to that resulting from the total number of households, ratifying once again that the floods produced effects in the neighborhoods of different socioeconomic spheres. Households with income up to R$3,000.00 corresponded to 45.4% of those residences in which there was flood impact in their surrounding areas, a percentage similar to that of the total households in this income range (43.4%). Considering the households which presented some structural damage together with those with problems caused by the rainfall in the surrounding areas, the percentage was 65.6%. When there was no report of impact in the neighborhoods or nearby streets and the household was assessed as damaged in the physical structures, the proportion corresponded to 25.7% (Table 5).

As seen in Graph 6, the type of impact most frequently reported in relation to the consequences of the floods in the neighborhoods and surroundings was the existence of damaged, flooded or blocked streets or roads, 62.3%. Also exceeding 50%, the highlights were: garbage and other waste accumulation (56.3%); damaged, destroyed, flooded or isolated households (54.1%) and interruption of public lighting (53.9%).

Graph 6 - Proportions of DPPs that suffered any kind of occurrence or impact caused by the floods in the household and in the neighborhood or nearby streets, according to occurrences and impacts - Survey coverage area - Rio Grande do Sul - April and May 2024



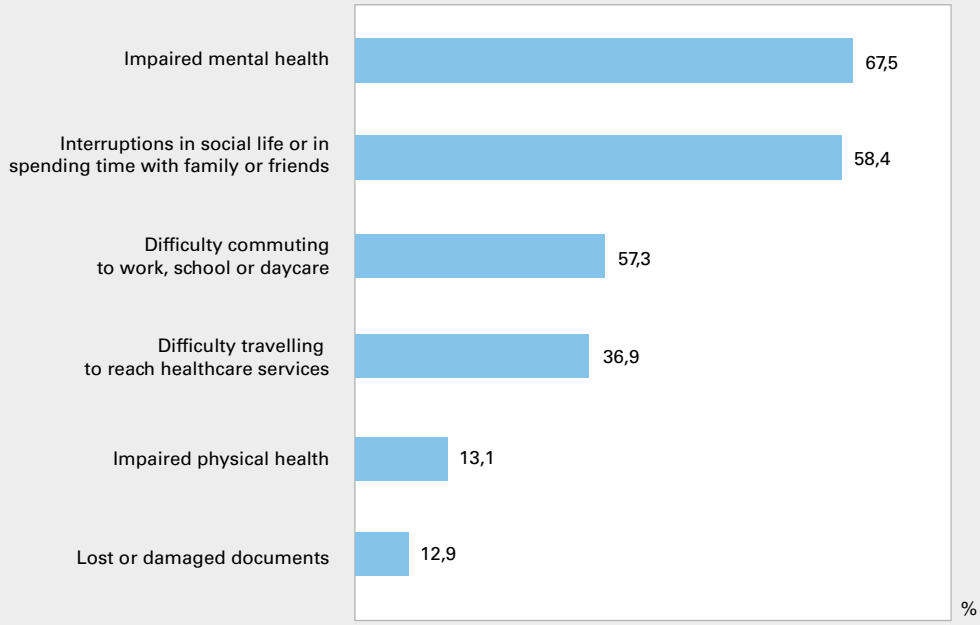
Source: IBGE, Directorate of Surveys Division of Population and Social Indicators, Special Survey on 2024 Floods in Rio Grande do Sul.

According to Table 8, among the households reporting impact in their surroundings, the percentage of those assessed as having some damage in the physical structure reached indices above 67% for all occurrences, higher values than the total figure of the area surveyed, 53.2% (Table 5).

Impacts suffered by persons

In order to capture how the floods affected the personal lives of the residents, PEERS estimated, for impacting situations due to the heavy rains, the total number of households in which at least one resident suffered such impacts. The biggest percentages corresponded to the following occurrences: impaired mental health (67.5%); interruptions in social life or in spending time with family or friends (58.4%) and difficulty commuting to work, school or daycare (57.3%) (Graph 7).

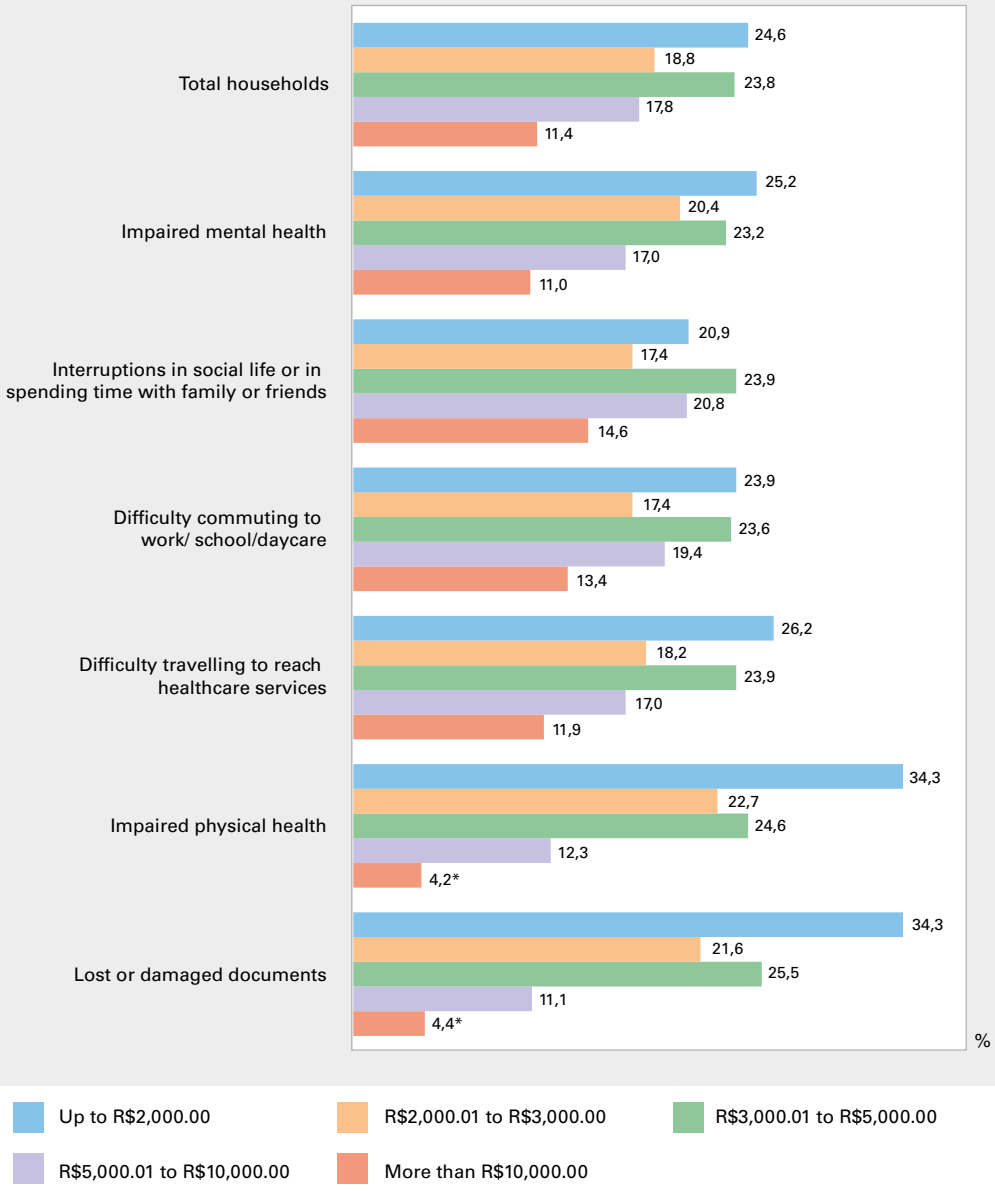
Graph 7 - Porportion of DPPs, by types of impacts caused by the floods in the personal lives of a resident - Survey coverage area - Rio Grande do Sul - April and May 2024



Source: IBGE, Directorate of Surveys Division of Population and Social Indicators, Special Survey on 2024 Floods in Rio Grande do Sul.

Considering these situations faced by residents distributed according to household income ranges, as shown in Graph 8, there was concentration in the range up to R$2,000.00, for lost or damaged documents (34.3%) and impaired physical health (34.3%). Analyzing the other impacts recorded, also by the household income perspective, the shares are similar to the general result, reinforcing once again the extent to which the floods caused trouble to the lives of households and individuals from different income ranges

Graph 8 - Proportion of DPPs, by total number of households and ranges of total monthly household income, according to types of impact caused by the floods in the personal life - Survey coverage area - Rio Grande do Sul - April and May 2024



Source: IBGE, Directorate of Surveys Division of Population and Social Indicators, Special Survey on 2024 Floods in Rio Grande do Sul.
Estimates with coefficient of variation in the C range, more than 15% up to 30%.
Note: Answer categories do not add up to 100.0% as they do not include those who answered "No income" or "I prefer not to inform".

According to Table 9, in the households assessed as having some structural damage after the heavy rains, whose residents reported having faced occurrences in their personal lives due to the floods, all types of impact suffered presented percentages above the general average of the Survey, which was 53.2%. The largest percentages were seen in the following cases: lost or damaged documents (95.3%) and impaired physical health (85.3%). The others exceeded 60%: difficulty travelling to reach healthcare services (69.6%); impaired mental health (65.2%); difficulty commuting to work, school or daycare (63.9%) and interruptions in social life or in spending time with family or friends (61.4%).

Measures and support offered or available to face the floods

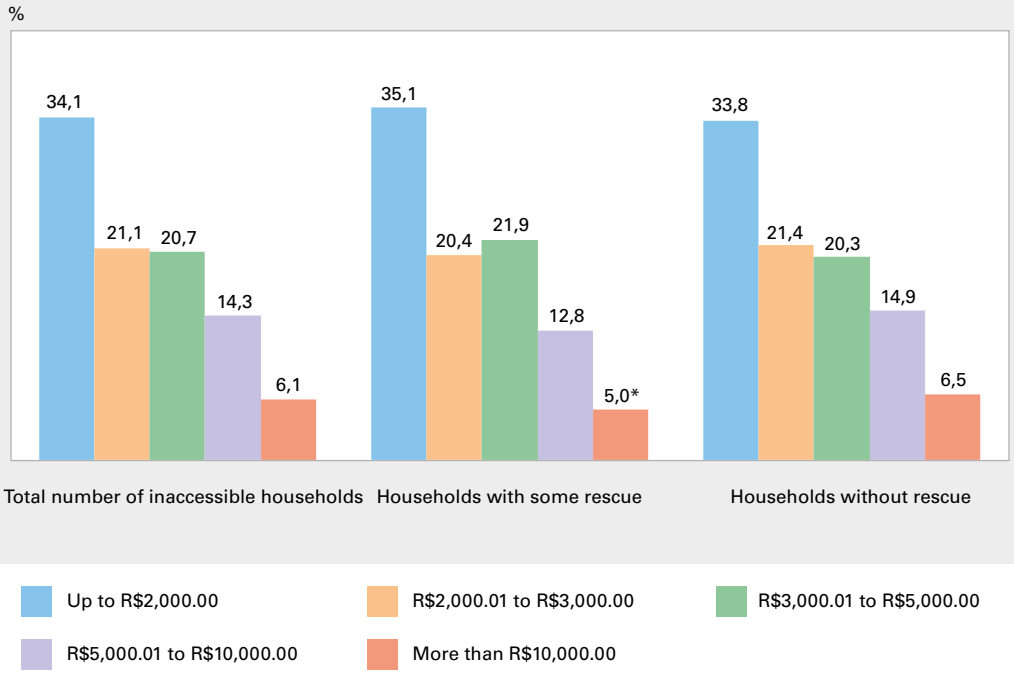
Regarding palliative measures, the survey investigated the financial assistance paid by public entities to unsheltered families due to flooding. To this end, informants were asked if any resident of the household received this cash transfer between April and May 2024. In 484,221 households, at least one resident reported receiving this aid, representing 20.8% of the total (Table 5). The analysis of these beneficiary households, according to income, showed that 52.9% were in the income range of up to R$3,000.00. It is worth noting that in the distribution of all households, this percentage reached 43.4%. In households with income above R$10,000.00, this rate was 4.7%. It should be emphasized that in households where public financial aid was paid and some structural damage was reported, the proportion reached 88.7% (Table 5).

Moreover, according to Table 5, health assistance due to the floods was needed by at least one resident out of 196.293 households (8,4%) and 56.1% of them had incomes up to R$3,000.00, showing concentration in the less favored ranges. Also, in that same condition, the proportion of households with registered structural damage was high (86.5%).

The rescue of residents was surveyed for inaccessible households, adding up to 652,107, or 28.0% of the total estimated households in PEERS (Tables 1 and 12). Within this group of households, those with income up to R$3,000.00 accounted for 55.2% (Graph 9), and those where residents reported the existence of some structural damage due to the floods represented 88.2% (Table 12).

Among the households with at least one rescued resident, the analysis of income distribution is similar to that of all households inaccessible due to heavy rains (Graph 9). Regarding those inaccessible households that reported structural damage in the household and had at least one rescued resident, the percentage was 95.7% (Table 12)..

Graph 9 - Percentage distribution of inaccessible DPPs, by rescue carried out in the household, according to ranges of total monthly household income - Survey coverage area - Rio Grande do Sul - April and May 2024



Source: IBGE, Directorate of Surveys Division of Population and Social Indicators, Special Survey on 2024 Floods in Rio Grande do Sul.
*Estimates with coefficient of variation in the C range, more than 15% up to 30%.
Note: Answer categories do not add up to 100.0% as they do not include those who answered "No income" or "I prefer not to inform".

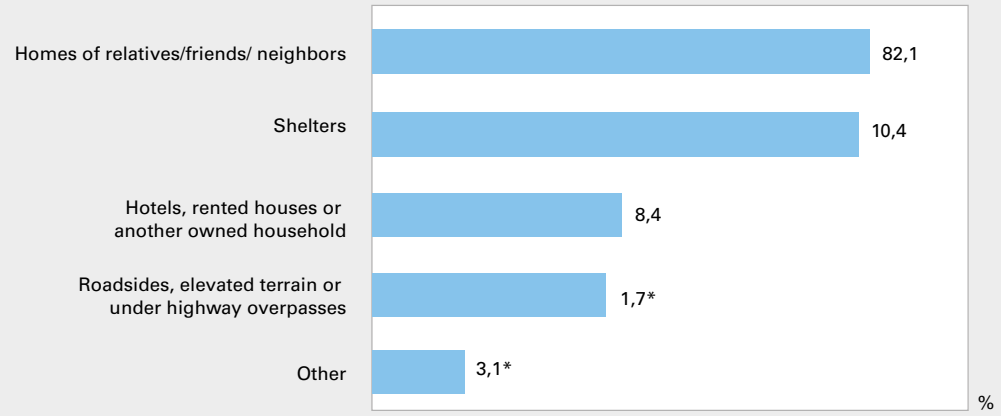
To carry out these rescues, the main means of transportation used were water (70.0%) and land transportation (34.6%). Regarding the agents who carried out the rescues, volunteers accounted for the vast majority of assisted households (74.9%), while official bodies (Fire Department, Armed Forces, Civil Defense, etc.) rescued 35.4% (Table 13)..

Floods and their severe impacts, leaving households flooded, destroyed, at risk of collapse, or even inaccessible, often led people to seek refuge outside their own residences. PEERS found that, in 726,358 households, at least one resident had to spend at least one night away from home due to the floods. This problem affected 31.2% of all households. Analyzing the income distribution of these households, those with incomes up to R$2,000.00 accounted for 30.2% (Table 10).

Analyzing the households assessed with some structural damage together with those in which at least one resident spent at least one night away due to the floods, the percentage reached a significant result, 83.9% (Table 10).

Graph 10 shows the proportions of different locations where a household member stayed for at least one night due to flooding, most frequently at the homes of relatives, friends, or neighbors (82.1%). This was followed by shelters (10.4%), then hotels, rented houses, or another owned household (8.4%).

Graph 10- Proportion of DPPs with any resident who need to spend at least one night away due to the floods, by different places of stay - Survey coverage area - Rio Grande do Sul - April and May 2024

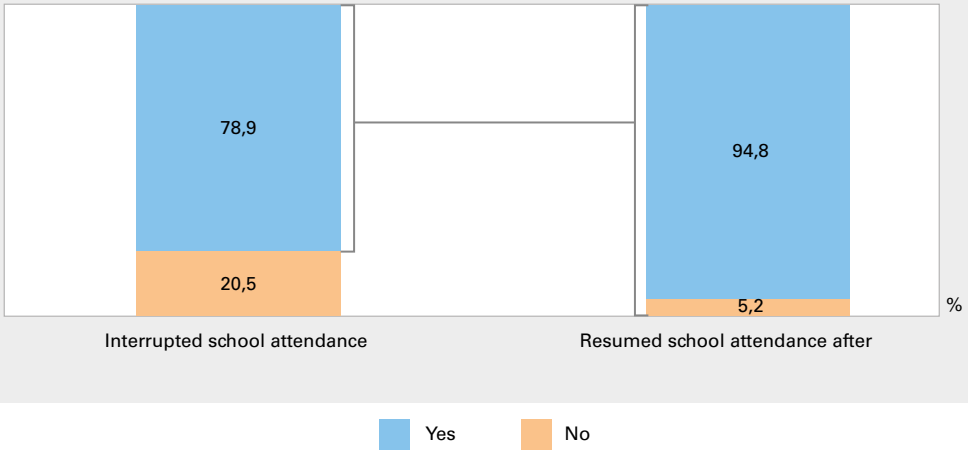


Source: IBGE, Directorate of Surveys Division of Population and Social Indicators, Special Survey on 2024 Floods in Rio Grande do Sul.
*Estimates with coefficient of variation in the C range, more than 15% up to 30%.

School attendance

The interruption of school activities due to the floods proved to be an important impact exerted by the rains.Table 16 shows that 1,696,612 persons went to school in April 2024. Of them, 20.5% did not stop going to school, whereas 78.9% stopped attending school either temporarily or permanently by the time of the floods. Among these residents who stopped going to school due to the heavy rains, almost all of them (94.8%) had resumed attendance during the data collection period (Graph 11).

Graph 11 - Percentage distribution of residents in DPPs who attended school before the floods, by selected characteristics - Rio Grande do Sul - April and May 2024



Source: IBGE, Directorate of Surveys Division of Population and Social Indicators, Special Survey on 2024 Floods in Rio Grande do Sul.
Note: Answer categories do not add up to 100.0% as they do not include those who answered "I don't know".

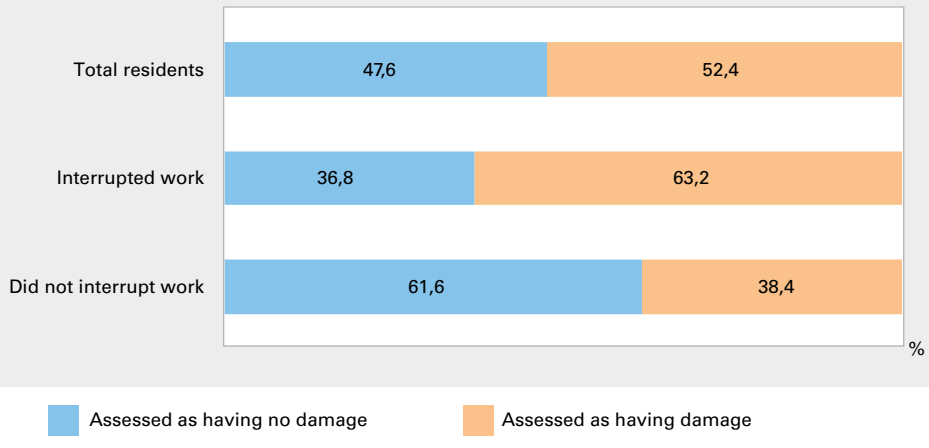
Participation in paid work

Another relevant effect investigated in the life of the residents as a consequence of the heavy rains was their situation in the labor market. After the floods, according to Table 3, 3,043,889 persons performed paid work, either formally or informally, corresponding to 58.3% of the 5,221,594 persons aged 14 and over. During the floods, labor activities were interrupted by 56.4%, or 1,718,066, of individuals who were working before the heavy rains. By the time data was collected, participation in paid work showed recovery, reaching a total similar to pre-flood levels: 3,035,991.

According to Table 17, the percentage of residents aged 14 and over who performed any kind of paid work and lived in households within the income range of up to R$3,000.00 corresponded to 33.9%. Among those residents who interrupted their activities due to the heavy rains, the percentage was higher, reaching 38.1%. Conversely, in the same income range, 28.8% reported not having stopped working due to the rains (Table 17).

Graph 12 presents the analysis of residents aged 14 and over and their participation in the job market together with assessed structural condition of households after the floods. Of this total number of residents, 52.4% lived in households that suffered some damage after the heavy rains. Considering those who performed paid work and interrupted it as a result of the floods and whose households were also assessed as damaged, the percentage reached 63.2%. And in relation to workers who did not interrupt their activities and had their households assessed with some type of damage, the proportion was 38.4%. These results indicate that people who lived in more vulnerable households were more exposed to the interruption of paid work.

Graph 12 - Percentage distribution of residents in DPPs who performed paid work, by assessed household structural condition, according to work interruption - Survey coverage area - Rio Grande do Sul - April and May 2024



Source: IBGE, Directorate of Surveys Division of Population and Social Indicators, Special Survey on 2024 Floods in Rio Grande do Sul.
Note: Refers to residents aged 14 and over, to formal and infomal jobs and to the period before the floods.

The comparison of income from work in the data collection period with income from work before the floods resulted in an almost balanced perception: 1,450,661 persons reported loss and 1,562,689 said there had been no loss in their income from work. Among those who reported income loss, 66.8% corresponded to the group who reported structural damage in the household, whereas this participation recorded 39.1% in the group that reported no decrease (Table 17).

Quality of life before and after the floods

Comparative assessments of pre-flood quality of life versus conditions at the time of data collection, as initially highlighted, revealed that, among the 6,333,727 persons affected by the floods, 17.3% lived in households where quality of life was assessed as having improved, 24.9% as having worsened, and 56.5% reported unchanged conditions (Table 21).

The analysis of residents who assessed their quality of life as unchanged reveals a concentration among those in income ranges above R$5,000.01 (33.6% compared to 29.9% in the overall distribution). Regarding the percentage of persons who reported that their quality of life remained the same as before the heavy rains and had their households structurally damaged, the figure was 46.8%, lower than the 55.5% observed for the resident population as a whole.

According to Table 18, the assessment of a decline in quality of life during the data collection period, compared to the month prior to the floods, is concentrated among individuals with incomes of up to R$ 3,000.00 (49.9%), a figure exceeding the percentage of residents in this income range when compared to the total population (42.6%). Among residents who reported that their lives had worsened and that their households were structurally damaged after the heavy rains, the percentage was also higher (72.9%) than the overall figure (55.5%).

Still referring to Table 18, it is observed that 44.8% of the residents who perceived life as better at the time of the Survey fell within the income range of up to R$3,000.00. Regarding this improvement in quality of life, but together with residents who reported structural damage to their households after the heavy rains, the recorded proportion was 58.4%.

When considering all services and comparing the month prior to the floods with the data collection period, the results follow the pattern observed in the general quality-of-life assessment: the largest share of respondents perceived no change in conditions. The percentages indicating a worsening of conditions exceeded those indicating improvement for the following items: access to healthcare services (22.3% vs. 14.7%), water supply (17.7% vs. 10.5%), rainwater drainage (29.3% vs. 14.1%), sewerage (17.2% vs. 8.9%), and public transportation (23.2% vs. 8.7%). Conversely, higher proportions of respondents reported improvements in electricity supply (11.7%), street lighting (19.1%), and street cleaning (17.8%). The percentages reporting a worsening of services for these three categories were 10.5%, 11.2%, and 14.4%, respectively (Table 21).

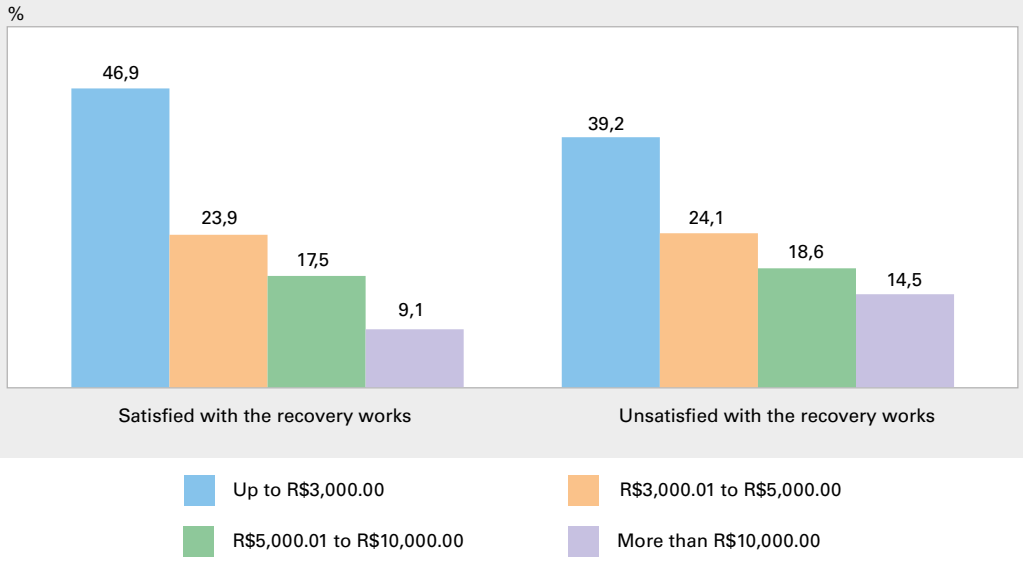
Regarding the assessment of total household income sufficiency to cover monthly expenses during the data collection period compared to the pre-flood situation, an improvement was reported by households accounting for 12.9% of all residents. As for assessments indicating the situation was worse or the same as before the floods, the figures were 38.5% and 47.4%, respectively. When considering residents of households where structural damage was reported, the assessment of the sufficiency of total household income to cover monthly expenses shows that the worse category (46.6%) exceeded the same category (39.3%), as shown in Table 21.

Information and opinion about recovery measures taken

Based on Table 19, it was estimated that residents living in households aware of preventive measures adopted to mitigate the impacts of future floods accounted for 38.5% of the total. The distribution of these residents by income differed from the Survey's overall allocation, showing a lower concentration in the lowest income ranges and a higher prevalence in the highest ones. In the household income ranges up to R$3,000.00, the percentage was 35.9% (compared to 42.6% in the overall result), while for incomes above R$10,000.00, it was 15.9% (compared to 11.7% in the overall result). Where there was no awareness of any preventive measures being adopted, the proportions of households in these two ranges were 46.5% and 9.2%, respectively (Table 19).

According to Table 20, the recovery efforts carried out in flood-affected areas were deemed satisfactory by residents living in households that accounted for 41.0% of the surveyed population (2,594,761 out of 6,333,727). Among residents with a positive opinion, 46.9% had a household income of up to R$3,000.00. Regarding the view that the work was unsatisfactory, this figure stood at 39.2%. In terms of unsatisfactory assessments, 14.5% of respondents fell into the income range above R$10,000.00, whereas the approval rate within this same bracket was 9.1%, representing 469,618 and 236,403 persons, respectively (Graph 13).

Graph 13 - Percentage distribution of residents in DPPs, by ranges of total monthly household income, according to opinion about the recovery works in affected areas - Survey coverage area - Rio Grande do Sul - April and May 20244



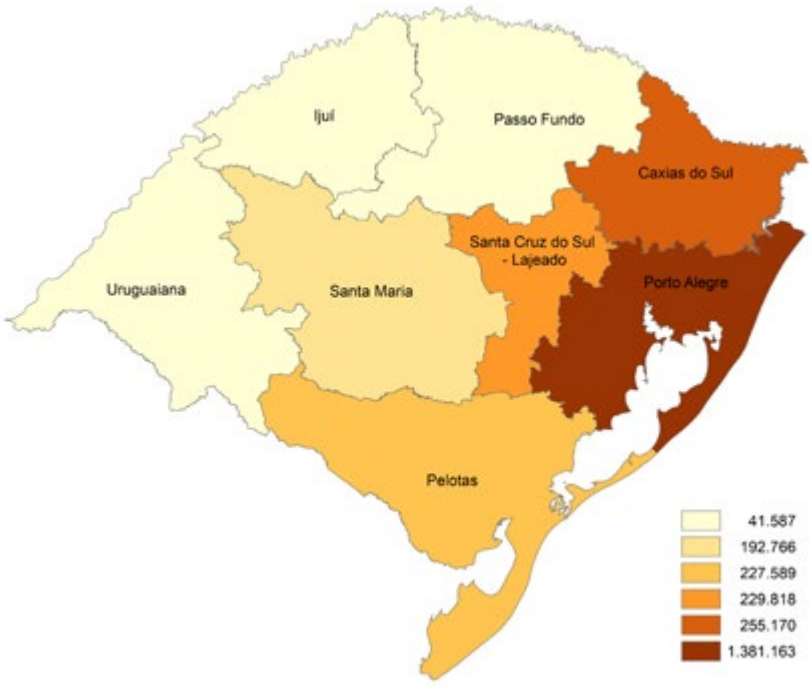
Source: IBGE, Directorate of Surveys Division of Population and Social Indicators, Special Survey on 2024 Floods in Rio Grande do Sul.
Note: Answer categories do not add up to 100.0% as they do not include those who answered "I don't know".

The Intermediate Regions: highlighted results

The following section addresses the main results obtained for the Intermediate Regions (RIs) of the state, spatial disaggregation made possible by the sampling design and precision controls carried out. Based on such controls, the need to aggregate information from the RIs of Uruguaiana, Ijuí and Passo Fundo was identified, which, for the purposes of the tabulations carried out and the analyses that follow, are observed together.

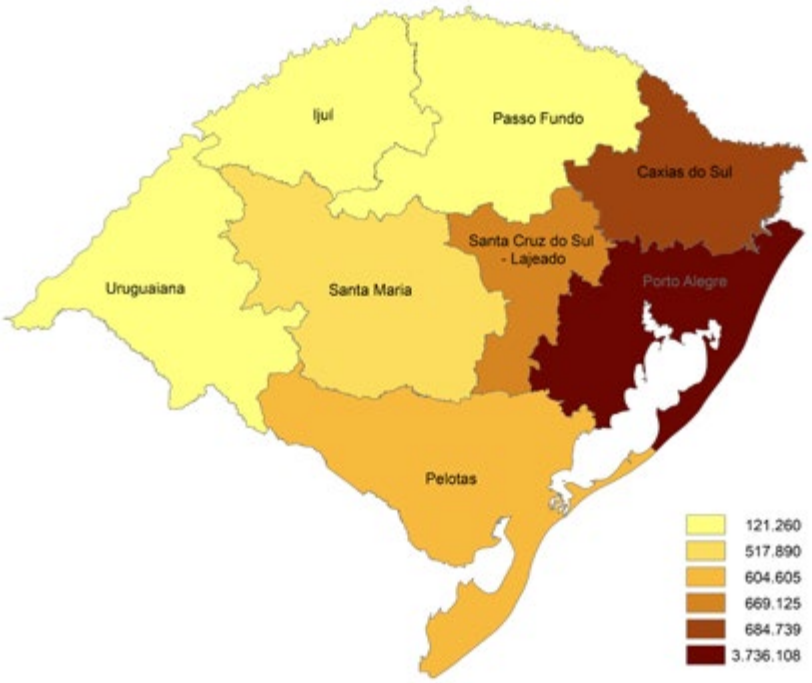
Cartograms 1 and 2 illustrate the territorial coverage of each of the RIs analyzed, namely: Porto Alegre; Caxias do Sul; Santa Cruz and Lajeado; Pelotas; Santa Maria; and Uruguaiana, Ijuí and Passo Fundo, showing the estimated total number of households and residents in their respective areas.

Cartogram 1 - Total number of households, according to Intermediate Regions analyzed - Rio Grande do Sul - April and May 2024



Source: IBGE, Directorate of Surveys Division of Population and Social Indicators, Special Survey on 2024 Floods in Rio Grande do Sul.

Cartogram 2 - Total number of residents, according to Intermediate Regions analyzed - Rio Grande do Sul - April and May 2024

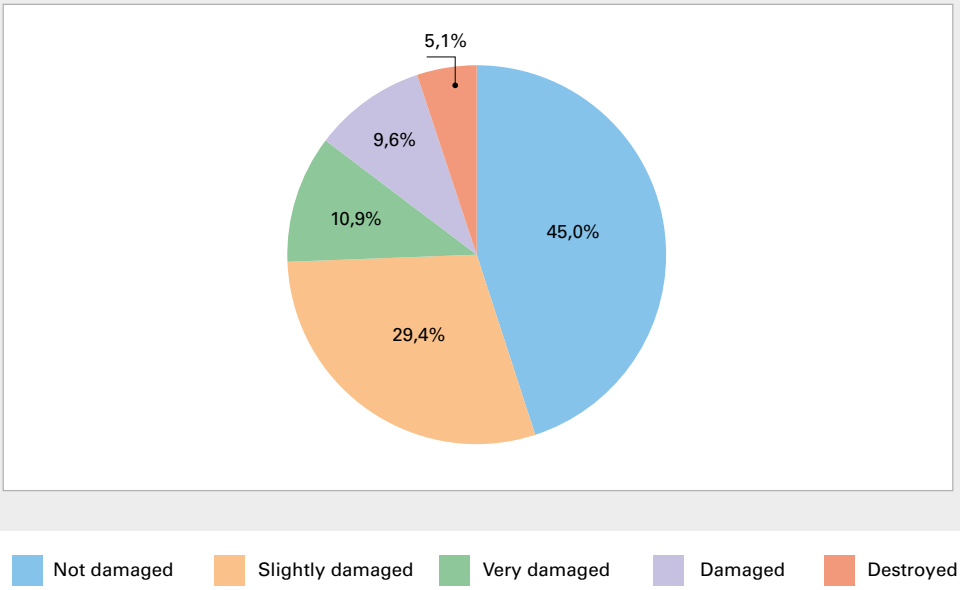


Source: IBGE, Directorate of Surveys Division of Population and Social Indicators, Special Survey on 2024 Floods in Rio Grande do Sul.

The RI of Porto Alegre is the most populous, corresponding to 59.3% of households and 59.0% of residents compared to the complete area covered by the survey, which, as seen, added up to 6,333,727 residents and 2,328,093 households. The RI of Uruguaiana, Ijuí and Passo Fundo showed an absolute number of households (41,587) and residents (121,260) much lower than those referring to the others, whose total number of households and residents exceeded, respectively, 190,000 and 500,000 (Cartogram 2).

Specifically in the RI of Porto Alegre, the occurrence of households with structural damage reached 55.0% of homes. In this region, it was observed that the most severe damage conditions of households reached 16%: destroyed, with 5.1% and very damaged, with 10.9% (Graph 14).)

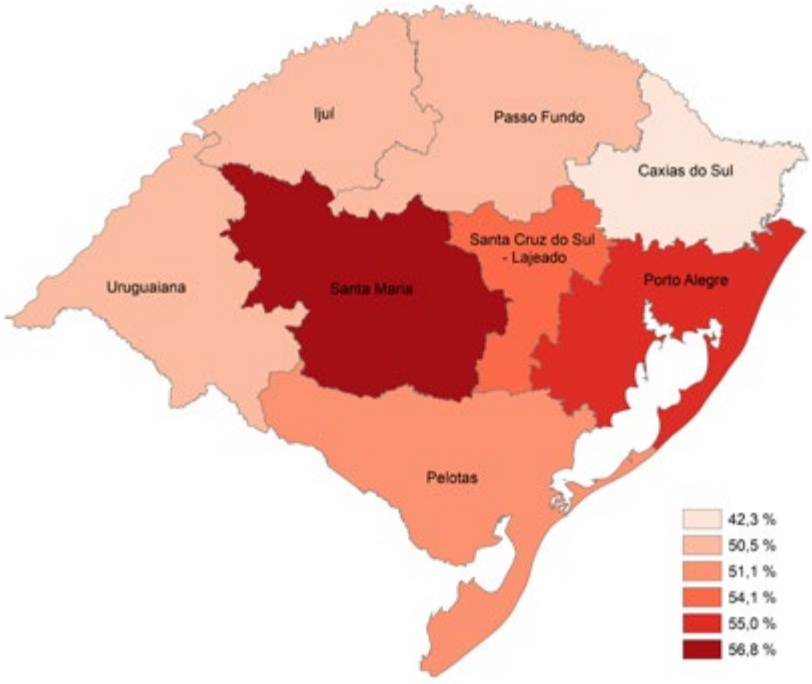
Graph 14 - Percentage distribution of DPPs, by degrees of assessment of the structural condition of the household after floods - Intermediate Region of Porto Alegre - Rio Grande do Sul - April and May 2024



Source: IBGE, Directorate of Surveys Division of Population and Social Indicators, Special Survey on 2024 Floods in Rio Grande do Sul.

For the other regions, structural damage to residences was observed in aggregate format, without assessing the gradation of the damage, taking into account the standards of precision of estimates established for PEERS. The percentages of households with damage assessment after the floods in the RI of Santa Maria (56.8%), Porto Alegre (55.0%) and Santa Cruz do Sul and Lajeado (54.1%) were the highest ones, exceeding that recorded in the total area where the survey was carried out, 53.2% (Table 1). Caxias do Sul showed the lowest indicator, 42.3% (Cartogram 3).

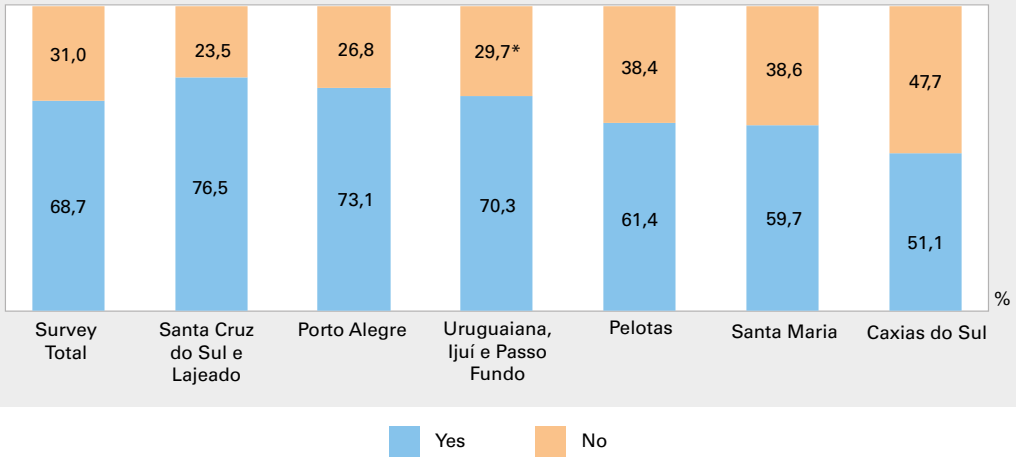
Cartogram 3 - Proportion of permanent private households with assessment of the structural condition of the household after floods, according to Intermediate Regions analyzed - Rio Grande do Sul - April and May 2024



Source: IBGE, Directorate of Surveys Division of Population and Social Indicators, Special Survey on 2024 Floods in Rio Grande do Sul.

Confirming the severity of the climate event experienced, according to Graph 15, the reports of rain impacts in neighborhoods and surroundings of homes reached percentages above 70% in three Intermediate Regions: Santa Cruz do Sul and Lajeado, Porto Alegre and Uruguaiana, Ijuí and Passo Fundo, which resulted in higher values in relation to the total area surveyed, 68.7%. The other RIs were below the general level, but above 50%.

Graph 15 - Percentage distribution of DPPs, by existence of impacts caused by floods in the neighborhood and nearby streets, according to Intermediate Regions analyzed - Rio Grande do Sul - April and May 2024

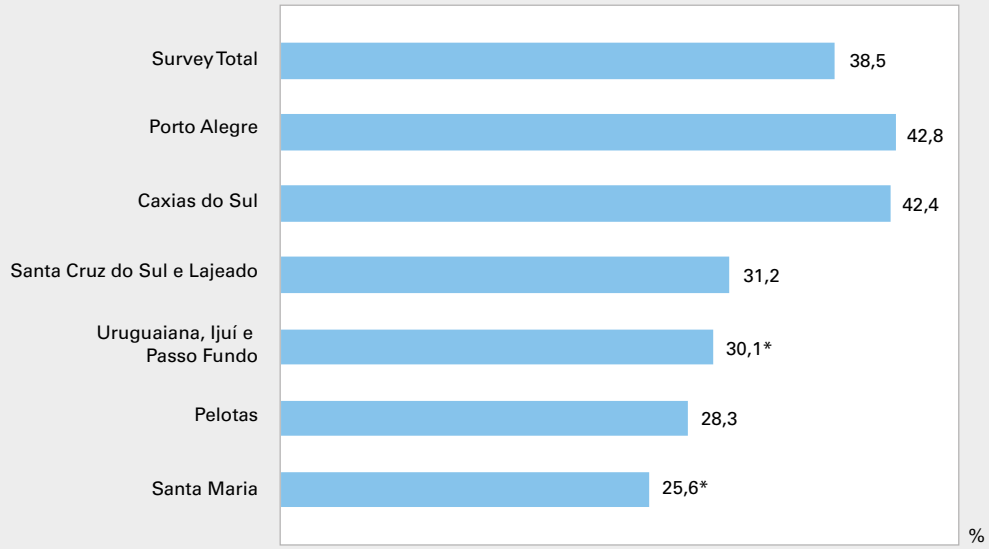


Source: IBGE, Directorate of Surveys Division of Population and Social Indicators, Special Survey on 2024 Floods in Rio Grande do Sul.
*Estimates with coefficient of variation in the C range, more than 15% up to 30%.
Note: The answer categories do not add up to 100.0% as they do not include those who answered "I don't Know".

Given the many implications of the floods, it was sought the residents' perception of two aspects: the knowledge they had regarding prevention measures aimed at future events and their opinion about the work carried out in the areas affected by the rains. The highest proportions of knowledge about the measures were observed in the RIs of Porto Alegre and Caxias do Sul. This percentage was 38.5% for the entire area surveyed (Graph 16).

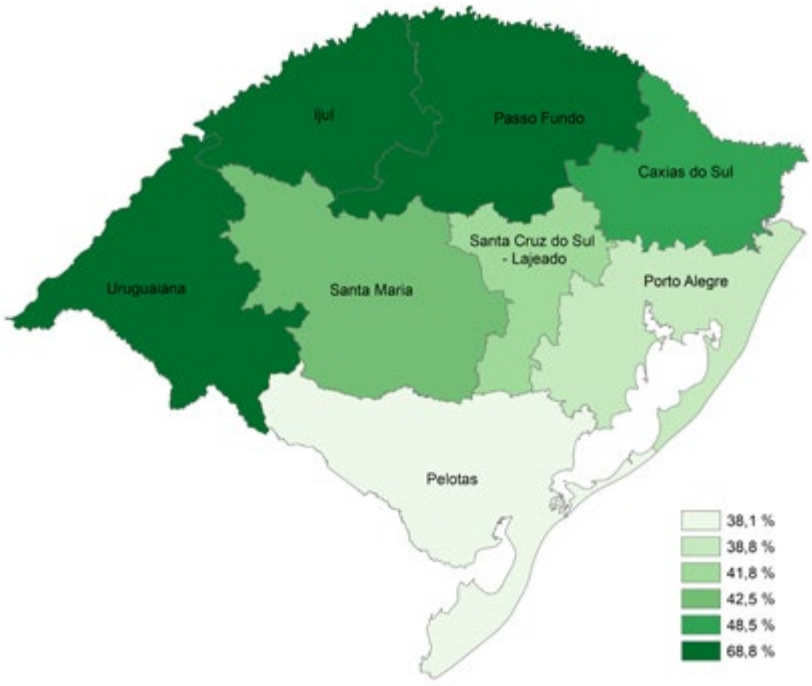
Cartogram 4 shows the proportions of residents of households in which the recovery work carried out in the areas affected by the floods were considered satisfactory, which stayed between 38.1% (Pelotas) and 68.8% (Uruguaiana, Ijuí and Passo Fundo), the latter being at a high level compared to the other five RIs. In relation to the total territorial coverage of the survey, where the indicator of adequacy of the measures was 41.0% (Table 2), the RIs of Porto Alegre, Pelotas and Santa Cruz do Sul and Lajeado showed closer results.

Graph 16 - Proportion of residents in DPPs who knew about preventive measures adopted to mitigate the impacts of future floods, according to Intermediate Regions analyzed - Rio Grande do Sul - April and May 2024



Source: IBGE, Directorate of Surveys Division of Population and Social Indicators, Special Survey on 2024 Floods in Rio Grande do Sul.
*Estimates with coefficient of variation in the C range, more than 15% up to 30%.

Cartogram 4 - Proportion of residents of households in which the works of recovery in the areas hit by floods were considered satisfactory, according to Intermediate Regions analyzed - Rio Grande do Sul - April and May 2024



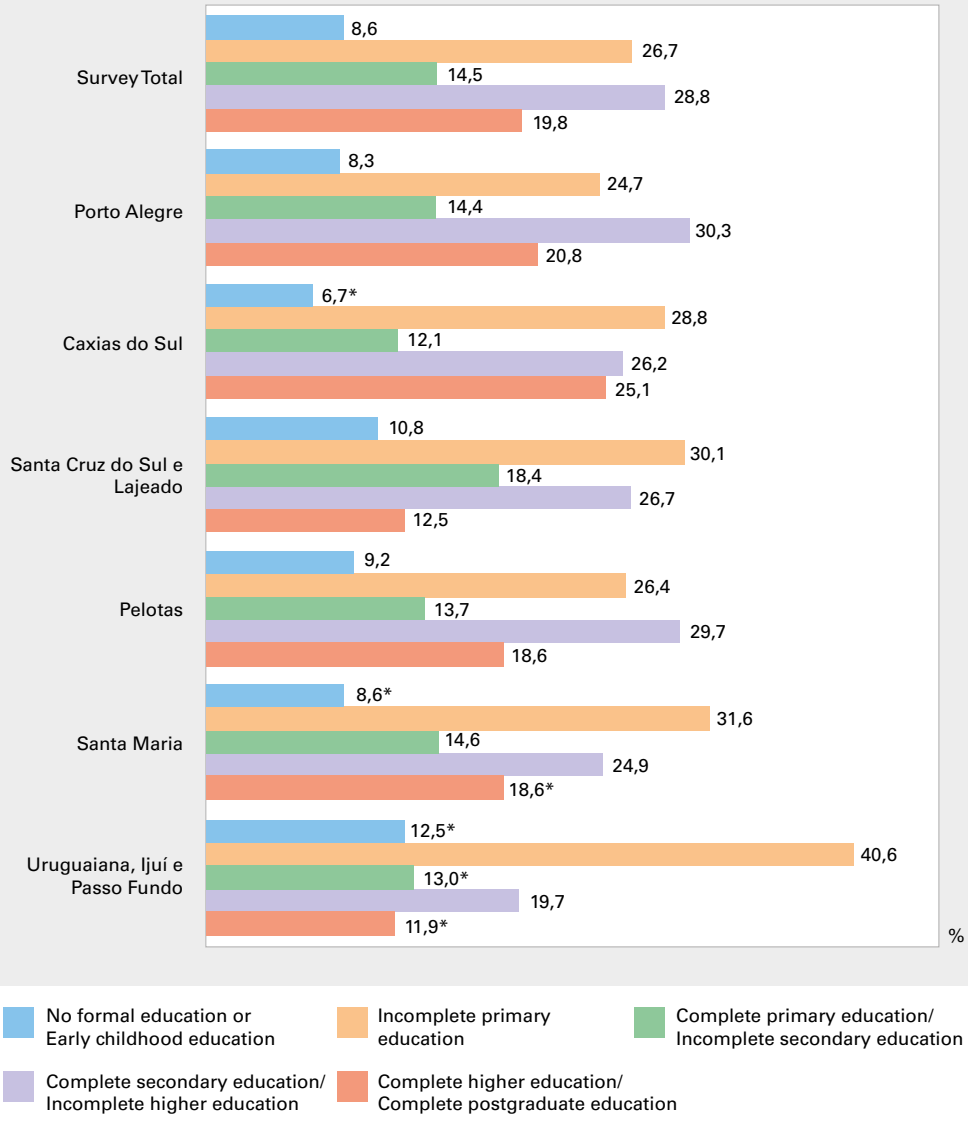
Source: IBGE, Directorate of Surveys Division of Population and Social Indicators, Special Survey on 2024 Floods in Rio Grande do Sul.

Characterization of the surveyed population

The predominant self-declared color or race was white, with shares exceeding 75.0% in all RIs, as occurred for the total area collected (78.5%). The RIs of Santa Cruz do Sul and Lajeado (81.1%) and Caxias do Sul (85.0%) surpassed 80%. This last RI also proved to be long-lived, with the percentage of persons over 60 years of age corresponding to 23.9%. The RIs of Porto Alegre (19.1%) and Pelotas (18.3%) showed the lowest results in this age group. In the other three RIs, these figures stayed above 20%, a percentage corresponding to the total of areas surveyed (Table 2 and Tables 22.2 to 27.2)

Regarding the level of schooling, the percentages of persons with complete secondary education, incomplete or complete higher education and complete postgraduate studies were around 50.0% in the RI of Porto Alegre (51.1%), Caxias do Sul (51.3%) and Pelotas (48.3%), a result that came closest to the total area covered by the survey, 48.6% (Graph 17)

Graph 17 - Percentage distribution of residents in permanent private households, by level of schooling, according to Intermediate Regions analyzed - Rio Grande do Sul - April and May 2024



Source: IBGE, Directorate of Surveys Division of Population and Social Indicators, Special Survey on 2024 Floods in Rio Grande do Sul.
*Estimates with coefficient of variation in the C range, more than 15% up to 30%.
Note: 1. Refers to April 2024.
2. The answer categories do not add up to 100.0% as they do not include those who answered "I don't Know".

Next, the results corresponding to different specific objectives established for the survey are observed for all the RIs analyzed.

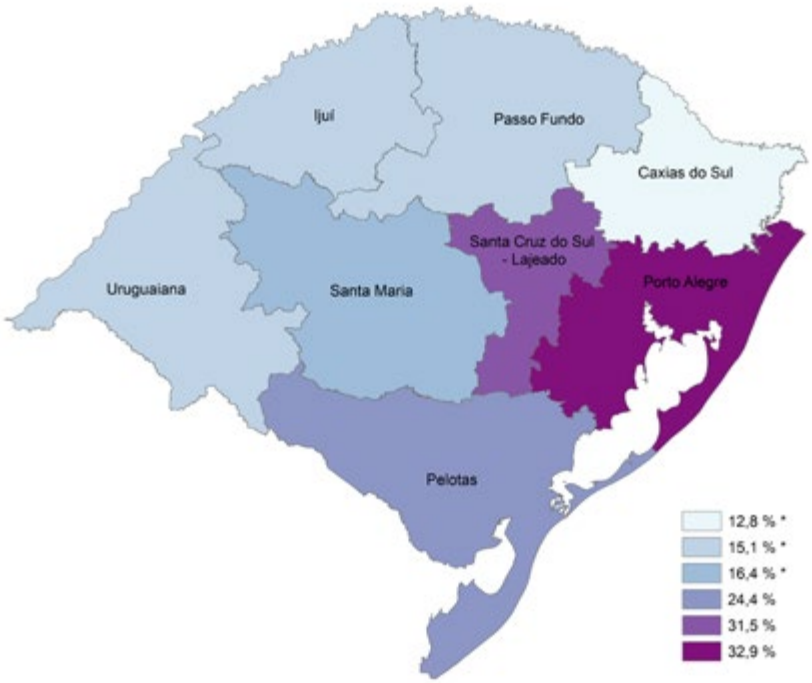
Damage and place of residence

In addition to the existence of damage to the physical structure of homes, other impacts of rainfall on households in each RI were analyzed, observing different types of difficulties imposed by the floods on homes (Table 22.5 to 27.5). The interruptions in electricity and water supplies stood out in the observation of all RIs as the most common incidents. Whenever it did not reach the highest proportion in the RI, the limitation in water availability corresponded to the second highest. In the region of Caxias do Sul, it reached 47.2% of homes and, in Porto Alegre, 72.6%.

In the total area of the survey, the drop in quality or the cut in the supply of this service was also reported by the largest proportion of households (66.3%) compared to the other impacts suffered (Tables 6).

Another type of impact observed reinforces the severity of the climate event - the existence of households that were unable to be accessed. This type of situation showed varying proportions of occurrence among RIs. The highest rates were observed in Porto Alegre (32.9%) and Santa Cruz do Sul and Lajeado (31.5%), according to Cartogram 5.

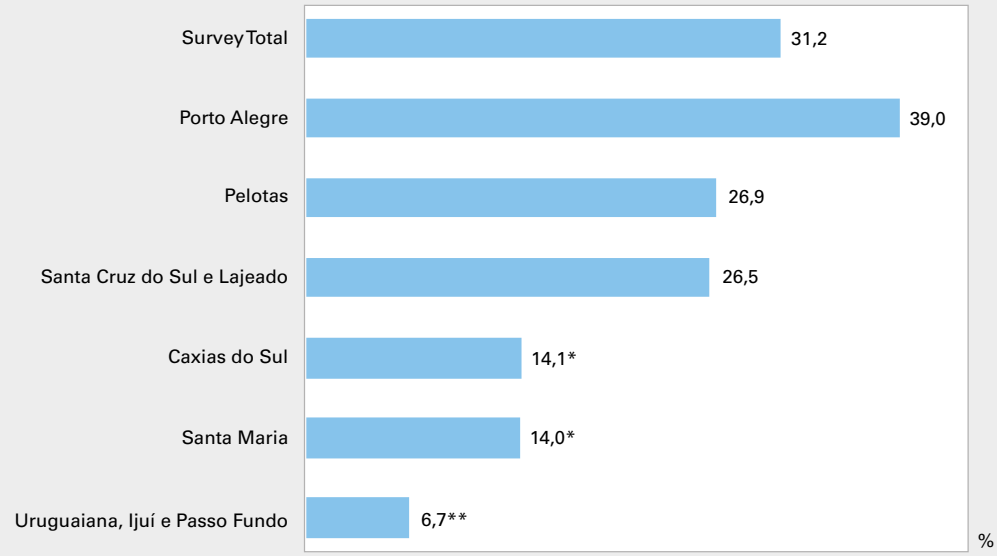
Cartogram 5 - Proportion of households unable to be accessed, according to Intermediate Regions analyzed - Rio Grande do Sul - April and May 20244



Source: IBGE, Directorate of Surveys Division of Population and Social Indicators, Special Survey on 2024 Floods in Rio Grande do Sul.

In 31.2% of households, considered the complete area covered by the survey, some residents had to spend at least one night away from home due to flooding. Among the RIs, the highest percentages were observed in Porto Alegre (39.0%), above PEERS coverage, Pelotas (26.9%) and Santa Cruz do Sul and Lajeado (26.5%), according to the following graph.

Graph 18 - Proportion of DPPs with any resident who needed to spend at least one night away due to floods, according to Intermediate Regions analyzed - Rio Grande do Sul - April and May 2024



Source: IBGE, Directorate of Surveys Division of Population and Social Indicators, Special Survey on 2024 Floods in Rio Grande do Sul.
*Estimates with coefficient of variation in the C range, more than 15% up to 30%.
**Estimates with coefficient of variation in the D range, more than 30% up to 50%.

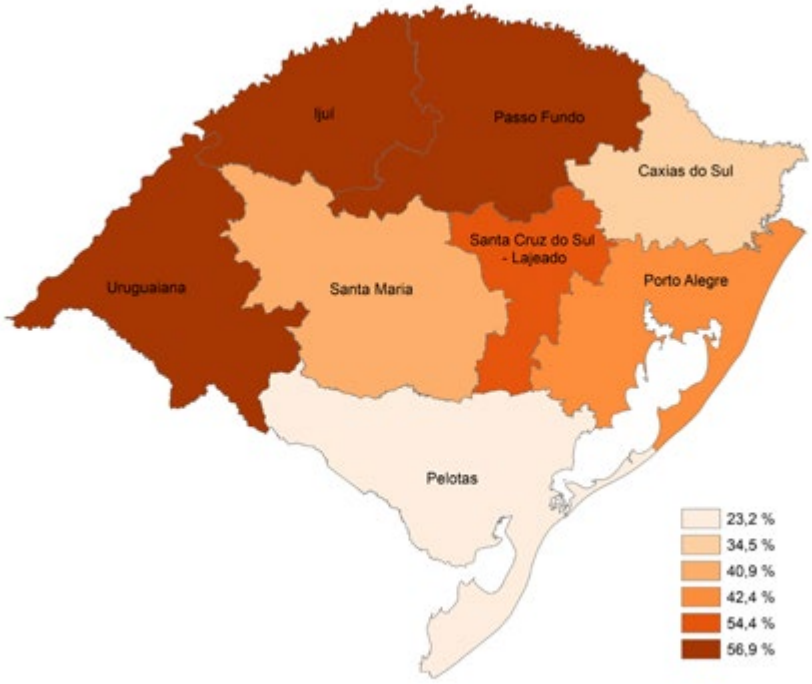
Damage to household surroundings

The percentages of households that reported damages in their surroundings varied between 51.1% (RI of Caxias do Sul) and 76.5% (RI of Santa Cruz do Sul and Lajeado) (Tables 22.1 to 27.1). For the complete coverage of the survey, the percentage was 68.7% (Table 1).

In relation to the type of damage, damaged, flooded or blocked streets or roads were the most common in five RIs, affecting 57.1% of households in the Pelotas region and 70.6% in the RIs of Santa Cruz do Sul and Lajeado. In the region of Caxias do Sul (44.1%) this occurrence came in second place, being surpassed by fallen trees and poles and landslides (47.9%) (Tables 22.4 to 27.4).

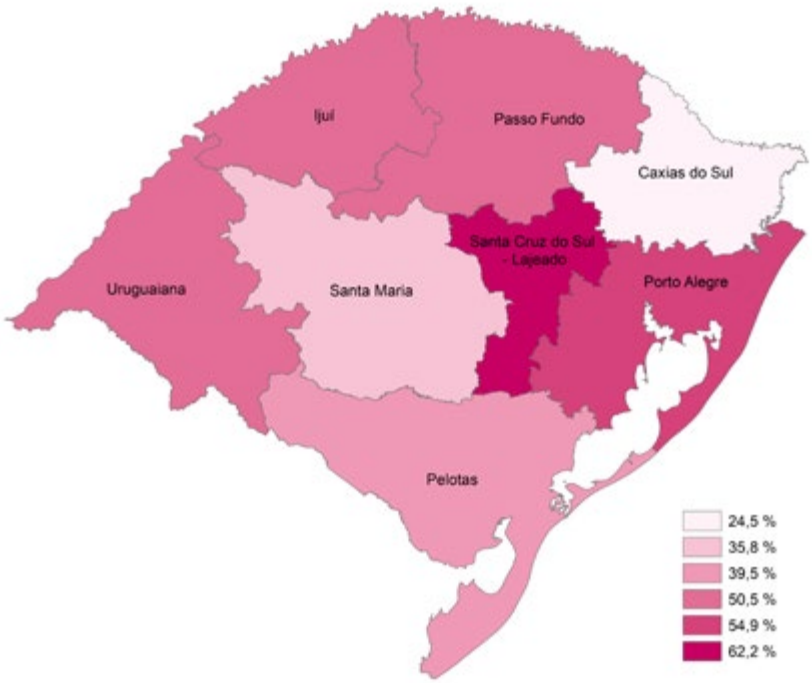
Broken, destroyed or blocked bridges were a type of impact in the neighborhood or streets nearby that showed the greatest variation across the RIs (Cartogram 6), with the lowest value in the RI of Pelotas (23.2%) and the highest one in Uruguaiana, Ijuí and Passo Fundo (56.9%). The suspension of public transportation affected regions differently as well. (Cartogram 7). In this case, the RI of Caxias do Sul (24.5%) recorded the lowest result and that of Santa Cruz do Sul and Lajeado (62.2%), the highest one.

Cartogram 6 - Proportion of households that reported broken, destroyed or blocked bridges in the neighborhood or nearby streets, according to Intermediate Regions analyzed - Rio Grande do Sul - April and May 2024



Source: IBGE, Directorate of Surveys Division of Population and Social Indicators, Special Survey on 2024 Floods in Rio Grande do Sul.

Cartogram 7 - Proportion of households that reported suspension of public transportation in the neighborhood or nearby streets, according to Intermediate Regions analyzed - Rio Grande do Sul - April and May 2024

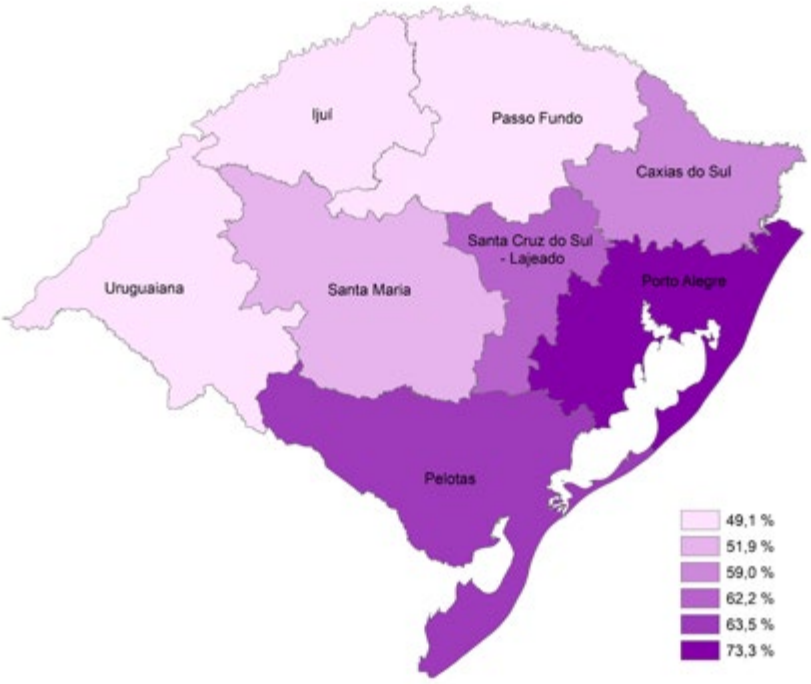


Source: IBGE, Directorate of Surveys Division of Population and Social Indicators, Special Survey on 2024 Floods in Rio Grande do Sul.

Impacts suffered by people

Considering the way in which the climate event affected the personal lives of residents of different RIs, the most mentioned impact was the condition of impaired mental health. The percentages are represented in Cartogram 8. In relation to the total area of the survey, this situation was recorded in 67.5% of households (Graph 8), a value surpassed by the RI of Porto Alegre (73.3%) and closely followed by Pelotas (63.5%) and Santa Cruz do Sul and Lajeado (62.2%).

Cartogram 8 - Proportion of households that reported condition of impaired mental health by at least one resident, according to Intermediate Regions analyzed - Rio Grande do Sul- April and May 2024



Source: IBGE, Directorate of Surveys Division of Population and Social Indicators, Special Survey on 2024 Floods in Rio Grande do Sul.

Participation in paid work and quality of life before and after the floods

Comparing the percentage of residents with paid work during the flood period with the time of data collection, there is slight variation in the RIs of Porto Alegre (from 58.3% to 58.2%) and Uruguaiana, Ijuí and Passo Fundo (from 62.8% to 63.0%). The regions of Caxias do Sul (61.5% to 64.2%) and Santa Cruz do Sul and Lajeado (from 60.3% to 61.8%) showed growth and decreased in Pelotas (from 54.1% to 52.0%) and Santa Maria (from 55.4% to 50.7%) (Tables 22.3 to 27.3). The first four regions recorded patterns consistent with the recovery observed for the total result of the survey, in which practically equal contingents of labor participation were identified for the two periods, 3,043,889 and 3,035,991, corresponding to 58.3% and 58.1% of residents (Table 3).

Regarding the comparison of the quality of life before the floods with the conditions at the time of data collection, for the different aspects surveyed, given the three response options (improvement, worsening or same conditions), equality of quality prevailed in all the RIs. And, following the behavior of the total PEERS coverage area, among the other two options, the opinion of worsening prevailed (Tables 21 and 22.6 to 27.6).

The same occurred with the assessment of the sufficiency of income to cover monthly expenses. The most frequent evaluations showed the same pattern of satisfaction in both periods, with worsening income in second place. The exception was the region of Caxias do Sul where the perception of worsening and equal conditions are similar, with a minimal advantage in the estimated percentage of worsening (Chart 2). When observing the complete area covered by the survey, the improvement of income sufficiency was indicated by 12.9% of households, falling short of the indication of worsening, 38.5%, and equality of income capacity at both moments, 47.4% (Table 21).

Chart 2 - Percentage of residents in DPPs of the Intermediate Regions analyzed who assessed the sufficiency of the total household income to cover monthly expenses - Rio Grande do Sul - April and May 2024

Intermediate Regions	Better than before floods	Worse than before floods	Same as before floods
Porto Alegre	13,0	39,2	46,7
Caxias do Sul	10,4*	44,8	44,2
Santa Cruz do Sul e Lajeado	13,3*	40,3	45,3
Pelotas	8,8*	35,7	54,3
Santa Maria	19,0*	30,1*	49,6
Uruguaiana, Ijuí e Passo Fundo	16,6*	24,9*	57,2

Source: IBGE, Directorate of Surveys Division of Population and Social Indicators, Special Survey on 2024 Floods in Rio Grande do Sul.
Note: Compared against one month before the floods.
*Estimates with coefficient of variation in the C range, more than 15% up to 30%.

References

BRASIL. Centro Nacional de Monitoramento e Alertas de Desastres Naturais (CEMADEN). Nota técnica nº 469/2024/SEI-CEMADEN – Mapeamento das manchas de inundações e enxurradas do desastre ocorrido no Rio Grande do Sul em abril-maio/2024. 2024. Available from: https://www.gov.br/cemaden/pt-br/assuntos/monitoramento/notas-tecnicas/nota-tecnica-no-469-2024-sei-cemaden-mapeamento-das-manchas-de-inundacoes-e-enxurradas-do-desastre-ocorrido-no-rio-grande-do-sul-em-abril-maio-2024. Accessed in: December 2025.

CONTRERAS, Ivette; OSENI, Gbemisola; PALACIO-LOPEZ, Amparo; BANERJOE, Raka. Household surveys during multiple crises: modifying questionnaires to assess the impact of shocks. Banco Mundial, 2023. Available from; https://openknowledge.worldbank.org/entities/publication/e1ca50c3-416e-4cab-a381-05c42964eed7. Accessed in: July 2024.

DEVILLE, Jean-Claude; SÄRNDAL, Carl-Erik; SAUTORY, Olivier. Generalized raking procedures in survey sampling. Journal of the American Statistical Association, v. 88, n. 423, p. 1013-1020, 1993.

DOLFMAN, Michael L.; WASSER, Solidelle Fortier; BERGMAN, Bruce. The effects of Hurricane Katrina on the New Orleans economy. Monthly Labor Review, Washington, DC, jun. 2007. p. 3 -18. Available from: https://www.bls.gov/opub/mlr/2007/06/art1full.pdf. Accessed in: May 2024.

GROEN, Jeffrey A.; POLIVKA, Anne E. Hurricane Katrina evacuees: who they are, where they are, and how they are faring. Monthly Labor Review, Washington, DC, mar. 2008. p. 32–51. Available from: https://www.bls.gov/opub/mlr/2008/03/art3full.pdf. Accessed in: May 2024.

IBGE. Classificação Nacional de Atividades Econômicas – CIE, Versão 1.0. Rio de Janeiro: Instituto Brasileiro de Geografia e Estatística - IBGE, 2024. Available from: https://www.ibge.gov.br/estatisticas/metodos-e-classificacoes/classificacoes-e-listas-estatisticas/39584-classificacao-de-informacoes-estatisticas.html?edicao=39586. Accessed in: May 2026.

IBGE. Código de boas práticas das estatísticas do IBGE. 2. ed. Rio de Janeiro, 2021. 67 p. Available from: https://biblioteca.ibge.gov.br/visualizacao/livros/liv101744.pdf. Accessed in: May 2026.

IBGE. Divisão Regional do Brasil em Regiões Geográficas Imediatas e Regiões Geográficas Intermediárias 2017. Coordenação de Meio Ambiente. Rio de Janeiro: Instituto Brasileiro de Geografia e Estatística - IBGE, 2017. Available from: https://chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://biblioteca.ibge.gov.br/visualizacao/livros/liv100600.pdf. Accessed in: May 2026.

IBGE. Estatísticas do Meio Ambiente e de Mudanças Climáticas: recomendações e iniciativas. Coordenação de Meio Ambiente. Rio de Janeiro: IBGE, 2024. 97 p. il. color. (Textos para discussão. Diretoria de Geociências, n. 6). ISBN 978-85-240-4632-2. Available from: https://biblioteca.ibge.gov.br/visualizacao/livros/liv102129.pdf. Accessed in: November 2024.

IBGE. Guia para lidar com estimativas imprecisas. Rio de Janeiro: Instituto Brasileiro de Geografia e Estatística - IBGE, 2024. Available from: https://biblioteca.ibge.gov.br/index.php/biblioteca-catalogo?view=detalhes&id=2102146. Accessed in: May 2026.

IBGE. Pesquisa de Orçamentos Familiares 2024 - Questionário POF 6. Rio de Janeiro: Instituto Brasileiro de Geografia e Estatística - IBGE, 2024.

IBGE. Pesquisa de Informações Básicas Municipais 2024: perfil dos municípios brasileiros: 2024. Rio de Janeiro: Instituto Brasileiro de Geografia e Estatística - IBGE, 2026. Available from: https://biblioteca.ibge.gov.br/index.php/biblioteca-catalogo?view=detalhes&id=2102224. Accessed in: May 2026.

INPE; CEMADEN; UFRGS; Exército Brasileiro; Estado do Rio Grande do Sul; ANA; SGB; FAB. Metodologia da produção do mapa de inundações e movimentos de massa do desastre do RS em maio de 2024. São José dos Campos: Instituto Nacional de Pesquisas Espaciais, 2024. Available from: http://urlib.net/8JMKD3MGP6W34R/4BHENC8 (urlib.net in Bing). Accessed in: June 2026.

KAISER FAMILY FOUNDATION. Giving voice to the people of New Orleans: the Kaiser Post-Katrina Baseline Survey – Executive Summary. Menlo Park, CA: Kaiser Family Foundation, 2007. Available from: https://www.kff.org/medicaid/giving-voice-to-the-people-of-new/. Accessed in: May 2024.

LEE, Sunghee; VALLIANT, Richard. Weighting telephone samples using propensity scores. p. 170-183, mar. 2007.

PAIVA, Juliana. Quadro síntese sobre as experiências com o Katrina e outras. Mímeo. 2024.

RIO GRANDE DO SUL. Decreto nº 57.614, de 13 de maio de 2024. Diário Oficial do Estado do Rio Grande do Sul, Porto Alegre, 2. ed., published on May 13, 2024.

RIO GRANDE DO SUL. Decreto nº 57.626, de 21 de maio de 2024. Diário Oficial do Estado do Rio Grande do Sul, Porto Alegre, 2. ed., published on May 13, 2024.

RIO GRANDE DO SUL (State). Secretaria de Planejamento, Governança e Gestão. Impactos socioeconômicos dos eventos climáticos extremos de 2024 no Rio Grande do Sul: uma análise após um ano do desastre. Relatório Técnico. Porto Alegre: Governo do Estado do Rio Grande do Sul, 2025.

SASTRY, Narayan. Tracing the effects of Hurricane Katrina on the population of New Orleans: the displaced New Orleans residents pilot study. Social Methods & Research, Thousand Oaks, v. 38, n. 1, p. 171–196, ago. 2009. Available from: https://www.researchgate.net/publication/41452858_Tracing_the_Effects_of_Hurricane_Katrina_on_the_Population_of_New_Orleans_The_Displaced_New_Orleans_Residents_Pilot_Study. Accessed in: May 2024.

SSO-OES. Operações de pesquisas estatísticas: manual de habilidades básicas: CATI. [S. l.: s. n.], 2007. 157 f. Translation of: SSO-OES: statistical survey operations: basic skills manual: CATI.

STATISTICS CANADA. CANCEIS user's guide: Canadian census edit and imputation system. Version 5.4. Ottawa: Statistics Canada, Statistical Integration Methods Division (SIMD), 2020.

THE WASHINGTON POST; KAISER FAMILY FOUNDATION; HARVARD UNIVERSITY. Survey of Hurricane Katrina evacuees. [S.l.: s.n.], set. 2005. Available from: https://www.kff.org/wp-content/uploads/2013/01/7401.pdf. Accessed in: May 2024.

UNITED NATIONS. Department of Economic and Social Affairs. Statistics Division. Framework for the Development of Environment Statistics (FDES 2013). NewYork: United Nations, 2017. A: https://unstats.un.org/unsd/envstats/fdes.cshtml. Accessed in: July 2024.

UNITED NATIONS. Economic and Social Council. Statistical Commission. Climate change statistics: report of the Secretary-General. E/CN.3/2018/14. New York: United Nations, 2017. Available from: https://unstats.un.org/unsd/statcom/49th-session/documents/2018-14-ClimateChange-E.pdf. Accessed in: [coloque a data de acesso].

UNITED NATIONS. Statistical Commission. Disaster-related statistics: report of the Secretary-General. Fiftieth session, 5–8 March 2019. E/CN.3/2019/16. New York: United Nations, 2018. Available from: https://unstats.un.org/unsd/statcom/50th-session/

documents/2019-16-DisasterStats-E.pdf. Accessed in: June 2024.

UNITED NATIONS. Statistical Commission. Report on the special session (11-15 April 1994). New York, 1994. 34 p. (E/1994/29 and E/CN.3/1994/18). Economic and Social Council, official records, 1994. Suppl. 9. Available from: http://unstats.un.org/unsd/statcom/94report.pdf. Accessed in: May 2026.

UNITED NATIONS. Statistical Commission. Report on the special session (11-15 April 1994). New York, 1994. 34 p. (E/1994/29 and E/CN.3/1994/18). Economic and Social Council, official records, 1994. Suppl. 9. Available from: http://unstats.un.org/unsd/statcom/94report.pdf. Accessed in: May 2026.

UNITED NATIONS OFFICE FOR DISASTER RISK REDUCTION (UNISDR). Sendai Framework for Disaster Risk Reduction 2015-2030. Geneva: UNISDR, 2015. Available from: https://www.undrr.org/publication/sendai-framework-disaster-risk-reduction-2015-2030 Accessed in: August 2024

Annexes

List of municipalities in the scope of PEERS, according to Immediate Regions and Intermediate Regions

Annexes - List of municipalities in the scope of PEERS, according to Immediate Regions and Intermediate Regions

(to be continued)

Intermediate Regions	Immediate Regions	Municipalities
Porto Alegre	Porto Alegre	Alvorada
		Arroio dos Ratos
		Barra do Ribeiro
		Cachoeirinha
		Canoas
		Eldorado do Sul
		Esteio
		Gravataí
		Guaíba
		Nova Santa Rita
		Porto Alegre
		Sapucaia do Sul
	Novo Hamburgo - São Leopoldo	Bom Princípio
		Campo Bom
		Capela de Santana
		Harmonia
		Lindolfo Collor
		Novo Hamburgo
		São José do Hortêncio
		São Leopoldo
		São Sebastião do Caí
		São Vendelino
	Taquara - Parobé - Igrejinha	Igrejinha
		Parobé
		Rolante
		Taquara
		Três Coroas
	Camaquã	Arambaré
		Cerro Grande do Sul
	Charqueadas -Triunfo - São Jerônimo	Charqueadas
		General Câmara
		São Jerônimo
		Triunfo
	Montenegro	Maratá
		Montenegro
		Pareci Novo
		São José do Sul

Source: IBGE, Directorate of Surveys Division of Population and Social Indicators, Special Survey on 2024 Floods in Rio Grande do Sul.

Annexes - List of municipalities in the scope of PEERS, according to Immediate Regions and Intermediate Regions

(to be continued)

Intermediate Regions	Immediate Regions	Municipalities
Pelotas	Pelotas	Pelotas Rio Grande São José do Norte São Lourenço do Sul
Santa Maria	Santa Maria	Agudo Dona Francisca Faxinal do Soturno Nova Palma Restinga Sêca Santa Maria São João do Polêsine São Martinho da Serra São Sepé Silveira Martins Toropi
	São Gabriel - Caçapava do Sul	São Gabriel
	Cachoeira do Sul	Cachoeira do Sul Cerro Branco Novo Cabrais Paraíso do Sul
Uruguaiana	Uruguaiana	Manoel Viana
Ijuí	Ijuí	Nova Ramada
	Três Passos	Barra do Guarita Derrubadas Miraguaí
	Passo Fundo	Espumoso
	Erechim	Barra do Rio Azul Ponte Preta Severiano de Almeida
	Cruz Alta	Jacuizinho
	Carazinho	Engenho Velho Nova Boa Vista Rondinha Sarandi
Passo Fundo	Frederico Westphalen	Novo Tiradentes Pinhal Vicente Dutra
	Marau	Nova Alvorada São Domingos do Sul
	Soledade	Fontoura Xavier São José do Herval
	Tapejara - Sananduva	Ibiaçá
	Palmeira das Missões	Lajeado do Bugre São José das Missões São Pedro das Missões
	Nonoai	Alpestre

Source: IBGE, Directorate of Surveys Division of Population and Social Indicators, Special Survey on 2024 Floods in Rio Grande do Sul.

Annexes - List of municipalities in the scope of PEERS, according to Immediate Regions and Intermediate Regions

(continuation)

Intermediate Regions	Immediate Regions	Municipalities
Caxias do Sul	Caxias do Sul	Caxias do Sul Feliz Gramado Picada Café
	Bento Gonçalves	Bento Gonçalves Boa Vista do Sul Coronel Pilar Cotiporã Santa Tereza São Valentim do Sul
	Nova Prata - Guaporé	São Jorge
Santa Cruz do Sul e Lajeado	Santa Cruz do Sul	Candelária Passo do Sobrado Rio Pardo Santa Cruz do Sul Sinimbu Vale Verde Vale do Sol Venâncio Aires Vera Cruz
	Lajeado	Arroio do Meio Bom Retiro do Sul Canudos do Vale Colinas Coqueiro Baixo Cruzeiro do Sul Estrela Forquetinha Imigrante Lajeado Marques de Souza Paverama Poço das Antas Pouso Novo Sério Taquari Teutônia Travesseiro
	Sobradinho	Ibarama Passa Sete Segredo Tunas
	Encantado	Doutor Ricardo Encantado Muçum Nova Bréscia Putinga Relvado Roca Sales Vespasiano Corrêa

Source: IBGE, Directorate of Surveys Division of Population and Social Indicators, Special Survey on 2024 Floods in Rio Grande do Sul.

Glossary

air transportation Characterization given by the resident, when the transportation used for aid or rescue was carried out by air, using aircrafts.

assessment of access to healthcare services Condition for assessing the healthcare services in the data collection period compared to one month before the floods. The analysis considers the set of circumstances that enables or prevents care in health services in fact, such as the lack of doctors, clinics and hospitals in the informant's neighborhood or city. It also includes the impossibility of physically accessing the places where services are offered.

assessment of the quality of life during the data collection period on different aspects Condition for evaluating the quality of life in general of the residents and of some services (healthcare, water supply and electricity, street lighting, rainwater drainage, sewerage and mass transportation) offered during the period of data collection, compared to one month before the floods. This analysis considers the quality of the services. Condition declared by the resident, based on the following options: 1. Better than before the floods 2. Worse than before the floods. 3. Same as before the floods.

assessment of the structural condition of the household after the floods Condition declared by the resident based on the assessment of the magnitude of the physical damage that they considered their household suffered after being hit by heavy rains. It was answered according to the following categories: 1. Destroyed. 2. Damaged. 3. Slightly damaged. 4. Not damaged. In some situations, due to the low precision of the estimates, these categories were aggregated into: 1. With damage. 2. No damage.

color or race Condition declared by the resident, based on the following categories: 1. White 2. Black. 3. Yellow/Asian. 4. Brown. 5. Indigenous. The yellow category refers to persons of oriental origin.

complementary informant Resident aged 14 and over who lived in the household of the original household informant in the period between April and May 2024, but who, at the time of the survey, lived in another household. This resident answered the complementary questionnaire.

complementary questionnaire Data collection instrument for recording responses from the complementary informant.

completed questionnaire Condition that is attributed to the questionnaire when the resident answers the call, agrees to participate in the survey, is part of the target audience and completes all questionnaire modules.

floods Extreme climate event that began on April 27, 2024, in which, in a few days (approximately six), rainfall reached historical levels, and which triggered a climate catastrophe marked by floods, inundations, landslides and fallen barriers on roads in several municipalities in the state of Rio Grande do Sul.

formal work Jobs with a formal contract, public contracts or acting as a registered legal entity.

gross income from work It is the payment of the employed person, without subtracting the corresponding discounts for social security (either public or private), income tax, absences, consignment loans, etc. It is compensation in gross terms.

hotels, rented houses or another owned households Characterization of places where people spent at least one night because they were unable to access the household where they lived at the time of the floods. Corresponds to any accommodation for which flood victims have paid some amount to stay at least one night. This category does not include definitive moves to rented houses.

household Place built or used for the purpose of serving as a residence or dwelling. In this survey, only private households will be covered, that is, households in which the relationship between their occupants is dictated by ties of kinship, domestic dependence or by rules of coexistence, and which do not occur under rules of administrative subordination. Therefore, collective households are outside the scope of the survey. Therefore, persons who at the time lived in orphanages, hotels, barracks, penitentiaries, etc. are outside the scope of the survey.

household external area Exterior spaces owned by the residences, including the parts of access to the household and those of common use. Like, for example, walls, fences, gates, corridors, entrances, gardens, swimming pools, backyards or playgrounds, whether they face the street or buildings, villas and condominiums.

household outside the survey profile Condition which applies when the contact is made by telephone registered for the survey, but the resident answering - or another resident - is not eligible to participate. This happens if the person available to answer neither lived in municipalities affected by the time of the 2024 floods nor was at home during the rainy season.

impaired physical health Condition declared by the residents when they show injuries or illnesses caused by the floods or worsening of pre-existing illnesses.

informal work Activities without a regulated employment relationship, such as providing independent services ("odd jobs"), street trading and on-demand work via delivery or transportation apps.

interruption of Internet provision Condition declared by the resident when the service was interrupted due to rainfall. The situation in which the user was unable to pay for the service and it was suspended was not considered.

interruption of water supply Condition declared by the resident when the exclusive supply of piped water was interrupted. Condition declared in the households that had this service before the start of the floods.

land transportation Characterization given by the resident when the transportation used for rescues was carried out by land.

loss of income from work Condition that applies to the resident who suffered financial loss in obtaining earnings from some work due to forced interruption/suspension of the activity, either total or partial, as a result of the floods. It also applied to persons who did not interrupt their work activity, but who began to receive less income than usual.

lost or damaged documents Condition declared by the resident when any document lost or damaged brought physical or sentimental damage. Examples: personal documents (ID, driver's license, birth certificates, marriage certificates); of real estate; of vehicles; professional and educational (diplomas, certificates and professional cards).

official bodies Characterization given by the resident to designate those in charge of the rescue when some member of the household was rescued during the floods. This rescue was carried out by professionals who act as representatives of official bodies, such as the Fire Department, Civil Defense, Armed Forces, etc.

original informant Resident aged 14 and over residing in a municipality within the coverage area between April and May 2024, whose telephone contact was selected to integrate the survey sample. This resident answers the original questionnaire. If another resident of the household is designated to answer the survey, and it is actually completed by this person, this resident becomes the original informant of the household.

original questionnaire Data collection instrument for recording responses from the original informant.

partially completed questionnaire Condition that is attributed to the questionnaire when the call is answered and the resident agrees to participate in the survey, but interrupts the interview before concluding or, after the interruption, it was not possible to resume contact even with subsequent attempts. Therefore, the questionnaire is considered finished even with incomplete parts.

performance of some paid work Condition declared by the resident when performed some activity, occupation or provision of service at least one hour per day, one month before the floods, in exchange for financial compensation (such as salary, commission, fees or per diem) or indirect benefits. It can occur under a formal regime, with legal and contractual protection, or informally.

preventive measure adopted to mitigate the impacts of future floods Condition applied to verify the resident's knowledge about any type of measure adopted, not just those carried out by public authorities, with the aim of reducing damages in the event of new floods occurring.

public financial assistance Financial support paid by the Federal Government in one or more transfers to displaced or unsheltered families due to the floods that hit some municipalities in RS between April and May 2024. These places were declared in a state of public calamity or in an emergency situation by public authorities. Do not consider the exceptional FGTS withdrawal, also known as "Calamity Withdrawal", and discount on the IPTU for flooded streets, as public aid related to the floods.

recovery of the affected area is being carried out satisfactorily Condition submitted to the opinion of the resident, declared based on the following options: 1. Yes. 2. No.

reduction of security Characterization of the impact of floods on the surroundings of the household. Applies to attempted looting, theft or break-ins, but also to the perception of insecurity caused, for example, by the presence of unknown people wandering around the household. Therefore, it refers also to fear or feeling of insecurity.

refusal Condition of non-participation attributed to the informant, who answered the call, but refused to answer the questionnaire, without any possibility of reversal.

rescue Condition in which individuals, through a movement, were removed from their household or its surroundings, since they were prevented from leaving with their own efforts, due to the floods. This rescue may have been of emergency nature or not.

resident Persons: a. who had their household as their usual place of residence and they were there on the reference date; or b. who, although absent on the reference date, had their household as their

usual place of residence, as long as the absence does not exceed 12 months for the reasons we will see below: b.1) traveling for pleasure, work, business, studies, etc.; b.2) departure from their traditional community due to hunting, fishing, wild-crop harvesting, farm work, participation in festivals or rituals; b.3) admission in an educational establishment or accommodation in another household, boarding house, student dormitory, aiming to facilitate school attendance during the academic year; b.4) detention without a definitive sentence declared; b.5) temporary hospitalization in a hospital or similar establishment; and b.6) embarkation for service (military, oil tankers).

return to school attendance Condition that occurs when residents resumed school attendance (college, school or daycare) after having interrupted it due to the floods, even if they have subsequently completed their studies or were no longer attending school during the data collection period.

roadside, elevated terrains or under highway overpasses Characterization of places where people spent at least one night because they were unable to access the households where they lived at the time of the floods. In this characterization, the use of improvised tents set up in the open air is considered.

school attendance Condition declared by the residents when, at the time of the floods or during the data collection period, they attended college, school or daycare, that is, when they were enrolled and attended a course, such as: preschool (nursing or kindergarten); youth and adult literacy programs; regular, primary or secondary school; youth and adult education - EJA, primary or secondary school; higher education; master´s programs; doctoral programs; distance learning - DL at any level (elementary, secondary or higher education). It took into account those who attended school, who were enrolled, but during the data collection period were temporarily prevented from attending classes for some reason.

sex of birth Condition declared by the resident based on the following options: 1. Male. 2. Female.

shelters Establishment or any public or private place, whether permanent, temporary or improvised, that protects against external danger. Examples: Settlement houses for destitute people, shelters for minors, gymnasiums and courts of clubs and schools, lodgings provided free of charge, whether by official bodies or volunteers.

stopped performing any paid work Condition declared by the residents when they stopped performing any paid work for reasons related to the impacts of the floods. The condition in which they stopped working, but continued to be paid, was considered. The situation in which they stopped working voluntarily or due to other reasons unrelated to the floods was not considered.

total monthly household income It is the sum of all known sources of income of all residents, including gross earnings from paid work, retirements, pensions, rental income, cash benefits, social programs, unemployment insurance, income from financial investments, donations (including allowances from people outside the household) and other sources of income such as withdrawals, pro-labore, copyright and patents.

volunteers Characterization given by residents when the rescue of a member of the household, during the floods, was carried out by agents outside the family, persons who dedicate part of their time to activities aimed at the well-being of society, without receiving any type of compensation.

water transportation Characterization given by the resident when the transportation used for rescues was carried out by water, using vessels, boats, canoes, jet skis, speedboats, boards or any improvised means of flotation.

.

Technical team

Directorate of Surveys

PEERS Technical Working Group
Juliana Paiva Vasconcellos

Division of Population and Social Indicators
Cristiane dos Santos Moutinho

Department of Social Studies and Surveys
Vânia Maria Pacheco

Department of Statistics and Technology
Paulo Cesar Dick

Division of the Center for Computer-Assisted Telephone Interviews - CETAC
Andrea da Cruz Leonel Salvador

Division of Methods and Quality
Marcus Vinicius Morais Fernandes

State Superintendency of Rio Grande do Sul
Luis Eduardo Azevedo Puchalski

Design and Planning
Andrea da Cruz Leonel Salvador
Elizabeth Belo Hypolito
José Renato Braga de Almeida
Juliana Paiva Vasconcellos
Luis Eduardo Azevedo Puchalski
Marcia Maria Melo Quintslr
Marcus Vinicius Morais Fernandes
Tiago Henrique de Pinho Marques França

Tabulation, editing and consistency analysis

Andrea da Cruz Leonel Salvador
Elizabeth Belo Hypolito
Jailson Mangueira Assis
João Pedro Matos Freire
Juliana Paiva Vasconcellos
Marcia Maria Melo Quintslr
Marcus Vinicius Morais Fernandes
Paulo Diogo Rodrigues Leao

Selection, control, sample expansion and data imputation

João Pedro Matos Freire
Marcus Vinicius Morais Fernandes

Development and execution of the tabulation plan

Jailson Mangueira Assis
Juliana Paiva Vasconcellos
Marcus Vinicius Morais Fernandes
Paulo Cesar Dick
Paulo Diogo Rodrigues Leao

Analysis of results and preparation of analytical texts

Juliana Paiva Vasconcellos
Marcia Maria Melo Quintslr

Data Collection Agents

Alessa Costa De Jesus
Alexandre Guerra Doederlein
Aline Helena Antonio
Ana Odete Costa Pinto
Ananda Moura Costa
Andrea Rodrigues De Assis Santos
Andrey Alan Ferraz de Albuquerque
Anna Lyvia De Souza Costa
Bernardo Monteiro Rocha
Camila Higino da Conceição
Camila Nascimento De Oliveira
Carlos Alberto De Souza Pacifico
Carlos Eduardo Raed Gandra
Carlos Henrique Correia Medeiros
Caroline Da Cruz Azevedo
Celina Marletta Soares Carvao
Claudia Ferreira Rodrigues Alves
Claudia Forge
Cristiane Bernardina Nascimento De Souza Chagas
Damiana Alves De Souza
Dandara Oliveira De Andrade
Daniele Maria Pereira Dos Santos Pessanha da Silva
Debora Ribeiro Claudio Da Silva
Denise De Moraes Santanna
Douglas Sancler Da Silva Pereira Ferreira
Elisa Recci Costa Mendes
Elizabete Santos Da Conceição
Fabio Da Costa Marinho
Fabio Do Amaral Castelhano
Felipe De Jesus Paiva Do Nascimento
Fernanda Bispo Dos Santos Duarte
Fernando Antonio Da Silva
Fernando Monteiro do Monte

Flavia Da Silva Santos
Francisco Paulo Homem Neto
Gilvan da Silva Antunes
Glauco Rangel Das Chagas
Humberto Dos Reis Da Silva
Iara Henrique Da Silva
Ingrids Priscila Conceicao Costa
Isabela Da Silva Oliveira
Isabele De Fatima Bezerra Lopes
Jaime Barcellos De Souza
Jakyson Oliveira Souza
Jean Carlos Geffer da Silva
Jefferson Silva Dos Santos
Joao Carlos Dos Santos Torres
Jose Luiz Roque Gomes
Juliana Machado Malveira
Julio Cesar Candido de Oliveira Barbosa
Karen Cristina Oliveira Da Silva
Laffayette Boechat Marques Santos
Lidia Alves de Souza
Lilian Da Silva Marinho Lopes
Liliane Cristina Paes dos Santos
Lincoln Fernandes de Souza
Luana Braule Pinto De Oliveira
Luana Dos Santos Fidelis Tiburcio
Lúcia Barbosa Vilas
Ludimila Rangel de Melo Penna
Marcella Laurentino Dos Prazeres
Marcella Pereira De Oliveira
Marcelo Calmon Ferreira Da Silva
Marcio Fidalgo Ferreira
Maria Conceicao Da Silva
Maria Eduarda Alves Barreto
Mariana Carvalho dos Santos
Mariana Marques Da Conceicao
Mariana Pereira Martinelli dos Santos
Marta Diniz Silva
Matheus Felipe Dos Santos
Mayra Da Silva Alves
Maysa Cristina Santos De Lira
Michele Cipriano Campos Goncalves
Michelle Silva De Lima
Mike Henrique Silva Pereira
Milene Soares De Souza
Monica Roberta Lima De Souza
Neusa Santos Gaspar
Nilson Da Silva Almeida
Queila da Costa Marinho de Natividade
Queren De Araujo Mattos
Raquel Lima Dos Santos
Raquel Lopes
Regina Lucia Jorge
Renan Rocha Trezze
Rodolpho Peixoto Bomfim
Rosa Malena Da Cunha
Rosane Guedes Pereira

Rosilene Santos Da Conceicao
Savio Daniel Da Costa Lima
Shana Dos Santos Ferreira
Thaiani Paula Fabricio
Thayanne Paz Santos Da Silva
Victor Goncalves Da Silva
Wallinson Ferreira Honorato Costa
William Antonio Almeida De Queiroz
Yuri Magalhaes Hersen de Andrade

Cetac supervisors

Daiana Branquinho Auad
Daniel Ferreira Henriques
Elica Santana Leitão
Felipe Afonso Pine
Fernando Cesar Mesquita da Silva
Filipe Silva de Sousa
Flavia Bioni Salabert
Igor de Oliveira Caldas
Isla Antonello Terrana de Melo Bezerra Brito
José Luiz Maia de Lima
Luciano Evangelista Candido
Luiz Carlos Marques Ferreira
Luiz Francisco Ferreira Lacerda
Luiz Philippe Gonçalves de Oliveira Figueiredo
Marianna Da Rocha Viana Santos
Mateus Gonçalves Bretas
Mauro Eduardo Pereira De Mattos
Nonato Fontenele Cavalcanti
Rayssa de Paula Moraes Romeiro
Rodrigo Costa Ney
Sarah Ferreira Lucena
Tiago Henrique de Pinho Marques França
Valeria Borges Bittencourt Ferreira
Victor Hugo Maul Gonçalves de Carvalho
Victor Paganini Pires
Yasmin Pellegrine Lima

Directorate of Information Technology

Division of Services and Systems Development

Márcio Tadeu Medeiros Vieira

Development and maintenance of the computer system

Beatriz Alves De Maria Leite
Edno Vicente da Silva

Collaborators

Directorate of Surveys

Deputy Director
Vladimir Gonçalves Miranda

Office Advisor
Claudio Dutra Crespo

Division of Household Sample Surveys
Adriana Araujo Beringuy

Management of the Consumer Expenditure Survey
Leonardo Santos de Oliveira
Luciana Alves dos Santos

Technical Coordination of the Population Census
Luiz Felipe Walter Barros

Directorate of Geosciences

Deputy Director
Gustavo de Carvalho Cayres da Silva

Division of Environment
Maria Luísa da Fonseca Pimenta

Technical assistant
Manuela Mendonca de Alvarenga

Department of Environmental Accounts and Statistics Management
Ivone Lopes Batista

Creation of cartograms
André Polly Assumpção
Everton Selau da Rosa

Division of Census Operations Coordination

Department of Census Addresses Registry Management
Eduardo Luis Teixeira Baptista

Editorial Project

Center for Documentation and Information Dissemination

Division of Graphic and Editorial Production
Mauro Emílio Araújo

Department of Publication and Content Management
José Márcio Batista Rangel

Text revision and normalization
Carlos Henrique Francisco de Amorim
Lioara Mandoju
Solange de Oliveira Santos
Victoria Braz Souza

Spanish translation
Augusto Valentini Schmitt

Department of Publishing
Rodrigo de Oliveira Paiva

Text layout
Eduardo Sidney Araújo
Antonio Albuquerque Guimaraes Neto
Ivo Mello Moraes

Division of Online Services and Experience
Roberto Stoeterau

Department of Publication and Content Management
Hugo Leal Setta

English translation
Aline Milani Romeiro Pereira
Gisele Flores Caldas Manhães
La Fayette Cortes Neto

Se o assunto é **Brasil**,
procure o **IBGE**.

/ibgeoficial /ibgeoficial /@ibgeoficial IBGE Oficial
/ibgeoficial /ibgecomunica /ibgeoficial.bsky.social

www.ibge.gov.br 0800 721 8181

Special Survey on 2024 Floods in Rio Grande do Sul

For the first time, a statistical survey conducted by the Brazilian Institute of Geography and Statistics - IBGE has measured the impacts and actions related to natural disasters from the perspective of the affected population.

By conducting the Special Survey on 2024 Floods in Rio Grande do Sul - PEERS, the Institute provides data that has the potential to support the formulation of public policies focused on climate change, aiming at the prevention and response to such events, the mitigation of its effects, and the recovery of damage.

In addition to investigating the socioeconomic characteristics of affected residents, the survey advances the understanding of the experienced damage and the degree of severity faced by the population. It also makes it possible to identify the types of support demanded and received, as well as opinions regarding preventive and recovery measures.

Analytical comments are presented in two parts: the first one counts with analyses referring to the total area covered by the survey, while the second one explores results for the Intermediate Regions. For both geographical scopes, key characteristics of residents, damages to households and surrounding areas, and the different difficulties faced by the population during the rainfall period are highlighted. Regarding the data collection period, the survey investigated quality of life assessments under various aspects compared to one month prior to the floods, as well as the level of satisfaction with recovery efforts carried out in the affected areas and awareness of adopted prevention measures.

This publication also includes technical notes with methodological considerations about the survey, a brief analysis of the results, and a glossary containing definitions considered essential for understanding the indicators.

The data are also available for consultation in the form of result tables on the PEERS page on IBGE website.

ISBN 978-85-240-4719-0
9 788524 047190