POSTGROWTH S.A.
-Alimentación-

Methodological report

Lessons learned from the project Postgrowth S.A.: Alimentación

Citizen science on food consumption
and its emissions in Pontevedra

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Authors

Brais Suárez Eiroa
Cristina Míguez González

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AT A GLANCE

Executive summary

Postgrowth S.A.: Alimentación was a citizen science action carried out during the 2025-2026 school year at IES Luís Seoane in Pontevedra. Its scientific aim was to understand the food consumption pattern of households in the municipality, the social and material factors that explain it and the associated greenhouse gas emissions, with the intention of detecting differences between urban, peri-urban and rural areas. The results were meant to feed into the work of the Citizens' Climate Committee, a group of local residents drawing up proposals to reduce the carbon footprint of food in Pontevedra.

The action was coordinated by the Post-Growth Innovation Lab at the Universidade de Vigo and was carried out within the Plataforma ODS project, with financial support from the Ministry of Social Rights, Consumer Affairs and 2030 Agenda. Some 200 students from 14 groups in compulsory secondary education (ESO), Bachillerato and vocational training (FP) took part, together with 19 teachers.

≈200 students	**14** ESO, Bachillerato and FP groups	**19** teachers trained	**587** surveys collected
454 households analysed	**6** study zones	**3 of 4** forum challenges based on the research	**12** Committee recommendations to the City Council

This action introduced a change of model compared with earlier editions of Postgrowth S.A. In Pontevedra and Vigo the university team went into the classrooms. Here the team trained the teachers through a course of five sessions and 12 hours, accredited by the Centro de Formación e Recursos de Pontevedra, and the teachers themselves led the five classroom sessions with their students. The purpose was to reach more groups with the same resources and to leave lasting capacity in the school.

The research combined a citizen survey with existing statistical data. Between 17 December 2025 and 2 February 2026 the students collected 587 surveys. After data cleaning, 503 were valid and 454 had usable spending data. The professional team estimated emissions using the ARCA methodology, which multiplies household spending on each type of food by the emissions generated by each euro spent on it.

The results describe the households surveyed and cannot be generalised to the municipality as a whole. Meat, fish and seafood, and milk, cheese and eggs account for more than half of the estimated emissions, with a distribution similar to that of the municipal estimate. The analysis found weak but consistent associations. Households that place more value on fresh food, read labels more often and include older people report more fruit and vegetables, more local products and fewer processed foods. None of the factors measured is clearly associated with meat consumption. These results shaped three of the four working challenges of the First Local Development Forum, held on 28 April 2026 with the Citizens' Climate Committee, which in July delivered 12 recommendations to the City Council.

The action did not achieve its main objectives. Three of the six zones have hardly any surveys and none reached the planned minimum, so the analysis by zone, the backbone of the design, could not be carried out. Reported spending came to around half of the INE estimate, so the survey is useful for understanding how consumption is distributed and leaves out its total volume. In addition, some groups did not complete the planned sessions, the analysis was in practice left to the professional team and only a small delegation of students attended the forum.

The main lesson

Delegating classroom work to teachers makes it possible to reach many more students. For that reach to produce reliable knowledge, three conditions are needed that this action did not meet. Close and regular support for teachers, monitoring of data collection while it is taking place and a design that gives students a real role in the research.

CHAPTER 1

What is the project?

Purpose and meaning of the project

Postgrowth S.A.: Alimentación is a citizen science action in the social sciences. Its scientific aim was to generate knowledge about household food consumption in Pontevedra and its contribution to climate change, in order to guide local mitigation measures. The abbreviation S.A. stands for Social Actions and signals the practical orientation of the whole series.

Food is one of the ways in which everyday life connects with climate change. Every food item that reaches a household carries the emissions from its production, processing, transport and distribution. The available estimates for Pontevedra offer a single figure for the whole municipality, and that average may hide significant differences between neighbourhoods and parishes with different ways of life. The action set out to open up that average to understand what lies behind it and where it makes sense to act in one way or another.

It is the third action in the Postgrowth S.A. series, following the Pontevedra (2023-2024 school year) and Vigo (2024-2025 school year) editions. It shares with them the idea that students and teachers can be part of the research team. It differs in its topic, in its method, which here is a quantitative survey, and in its working model, based on training teachers to lead the process in the classroom.

Territorial and social context

Pontevedra combines a compact urban centre with peri-urban and rural parishes where the family vegetable garden and ties to the village are still present. This diversity made it reasonable to assume that food consumption and its emissions are unevenly distributed across the municipality. To study it, the research grouped the parishes into six zones, one urban, three peri-urban and two urban-rural.

IES Luís Seoane, located in Monte Porreiro, brought a school with a well-established track record in education for sustainability. Since 2023 it has organised the Feira da Sostibilidade, whose fourth edition, from 28 to 30 April 2026, brought together 30 organisations and schools from Galicia, Spain and Europe.

At the same time, the Citizens' Climate Committee was operating within the Plataforma ODS project. It is a voluntary working group that seeks to develop policy proposals to meet the Sustainable Development Goals in the municipality. In its first edition the Committee worked on food consumption and climate change over five sessions devoted to the life cycle of food. The overlap in topics made it possible to connect the school research with a process of citizen deliberation that was already under way.

Project objectives

- To analyse the food consumption pattern of households in Pontevedra, its social and material determinants and the associated greenhouse gas emissions, distinguishing between zones of the municipality.
- To involve students and teachers in a complete scientific process, from adjusting the method to communicating the results.

- To train teachers so that they could lead a citizen science process in the classroom on their own.
- To pass the results on to the Citizens' Climate Committee so that they could feed into its proposals for local action.

Participation, reach and main outputs

Indicator	Confirmed figure
Participating school	IES Luís Seoane (Pontevedra)
Participating groups	14, from Year 1 of ESO to vocational training programmes
Participating students	Some 200
Teachers trained	19
Teacher training	5 sessions and 12 hours, accredited by the CFR de Pontevedra
Planned classroom sessions per group	5 one-hour sessions, led by the teachers
Surveys collected	587
Valid surveys after cleaning	503
Surveys with usable spending data	454
Study zones	6
Forum challenges built on the research	3 of 4
Public feedback event	First Local Development Forum, 28 April 2026

The participating groups covered every year of ESO, including Year 4 of the Curricular Diversification Programme, both years of Bachillerato and several vocational training programmes in business administration, sales and marketing, and computing. Some of the 14 groups brought together more than one class.

In addition to the research process, the action produced an accredited teacher training course, a research conceptualisation document, a reusable questionnaire and sampling plan, a cleaned database of 454 households, the students' presentation of results at the forum and this methodological report.

CHAPTER 2

How was the project organised?

Governance structure and division of roles

Overall coordination was the responsibility of the Post-Growth Innovation Lab at the Universidade de Vigo. The professional team designed the research and the questionnaire, prepared the sampling plan, delivered the teacher training, cleaned the data, estimated the emissions, carried out the preliminary analysis and prepared the results materials.

In this action the teachers had a much broader role than in earlier editions. Besides integrating the project into the classroom, they led the five sessions with their students, organised the collection of surveys and guided the interpretation and dissemination of the results. They acted as a bridge between the university team and the students.

The students formed the non-professional research team. They adjusted the logistics of the fieldwork, administered the surveys to the public, worked on the results in class and a delegation presented them at the forum. Citizens took part in two ways. Households in Pontevedra answered the survey, and the Citizens' Climate Committee received the results and worked with them in its session on consumption patterns.

Collaboration network

IES Luís Seoane was the participating school and the venue for the forum. The Centro de Formación e Recursos de Pontevedra accredited the teacher training course, which gave formal recognition to the teachers' commitment. The course is part of the offer of the Post-Growth Citizen Science Network of Galicia, formalised in September 2025. Pontevedra City Council took part in the forum and connected the process with the local institutional context. The Citizens' Climate Committee, which works within the Plataforma ODS project, was the recipient of the results. The Feira da Sostibilidade, organised by the school itself and also promoted by the Post-Growth Innovation Lab, provided the public space where the forum was held.

Overall timetable

Phase	Period	Activities	Purpose
1. Design and preparation	July – November 2025	A1	Design the research, the questionnaire and the sampling plan, and organise the training.
2. Training and launch in the classroom	November – December 2025	A2 – A5	Train the teachers and launch the process with the students.
3. Data collection	17 Dec. 2025 – 2 Feb. 2026	A6	Administer the surveys in the six zones of the municipality.
4. Cleaning, calculation and results	February 2026	A7 – A10	Clean the data, estimate the emissions and work on the results in class.
5. Dissemination and classroom closure	March – April 2026	A11 – A12	Prepare the dissemination and close the classroom projects.
6. Public feedback	28 April 2026	A13	Present the results to the Committee at the First Local Development Forum.
7. Review and methodological closure	May – October 2026	A14	Review the analysis and document the action.

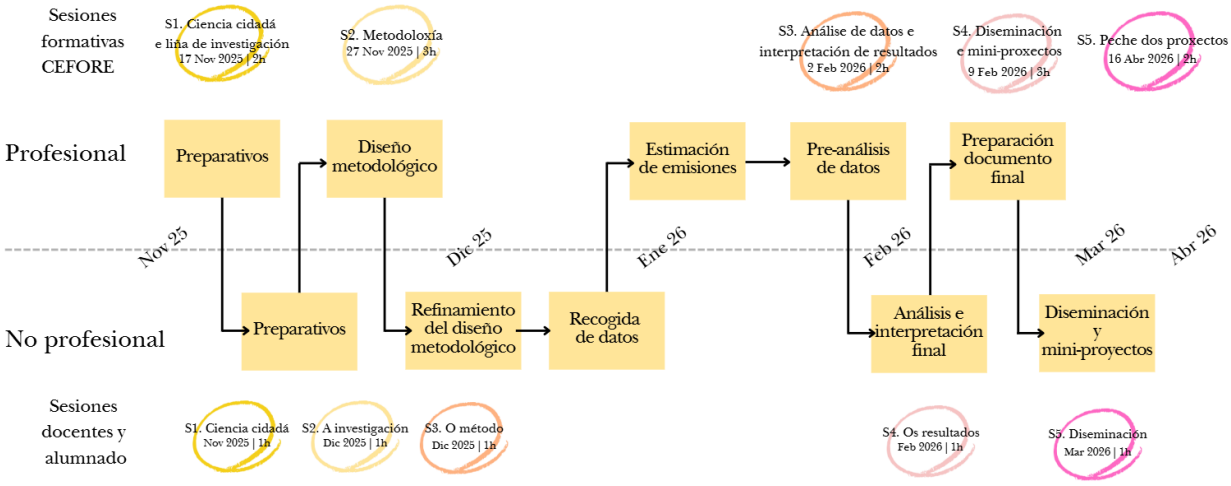


Figure 1. Teacher sessions (top) and student sessions (bottom), and the tasks of each team over the school year.

Resources and support

The action was funded through the Plataforma ODS project, with support from the Ministry of Social Rights, Consumer Affairs and 2030 Agenda. It also received significant in-kind support, such as the teachers' time, the school's facilities, the CFR accreditation and the framework of the Feira da Sostibilidade. The materials were simple. An online form, mobile phones, paper questionnaires as an alternative, shared folders and presentations were enough.

CHAPTER 3

How was it done? Methodology step by step

Methodological principles

The action was designed as a citizen science process aimed at producing knowledge useful for local action. Its recipient was clear from the outset. The results had to reach the Citizens' Climate Committee just as it was about to work on consumption patterns.

The design was deductive and quantitative. The professional team defined the research question, the questionnaire, the sampling plan and the hypotheses in advance, in line with the topic the Committee was working on. The students' role consisted of adjusting the logistics of the fieldwork, collecting the data, interpreting the results and communicating them. This approach differs from that of Postgrowth S.A.: Pontevedra, where the students identified the challenges and chose the case studies.

The research used a hybrid method that combines two sources of information. On the one hand, the citizen survey captures the detail of how households consume and why. On the other, official statistics and economic and environmental models make it possible to convert that consumption into emissions. Neither source is sufficient on its own. The survey alone cannot calculate emissions, and general statistics do not explain the internal diversity of the municipality.

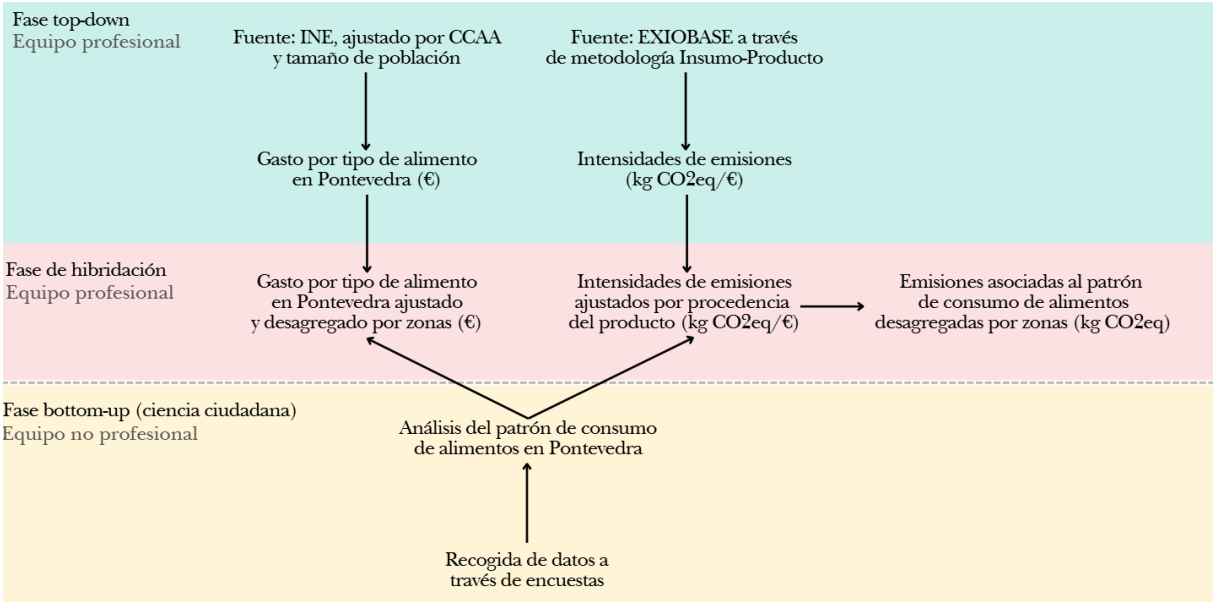


Figure 2. Planned design of the hybrid method. The hybridisation phase by zone could not be completed because of the lack of sample in three zones.

The last principle was training the trainers. The university team worked with the teachers and the teachers worked with the students. This model sought to extend the reach of the action and to leave the school with the capacity to repeat similar processes without depending on the university.

Research design

What was to be measured

The research focused on the consumption of food and non-alcoholic beverages within the household, category 1 of the European ECOICOP consumption classification. Consumption in bars and restaurants was left out, as it belongs to another category and accounts for a smaller

share of emissions. Using this standard makes the results comparable with other research. The information was organised into three blocks.

Determinants	Consumption practices	Consumption estimates
Sociodemographic data (age, income, household size, employment status) Material data (access to vegetable gardens and local markets, available time) Cultural aspects (habits, how food is valued)	Where food is bought Type of shops How shopping is organised Type of products (fresh, processed, ultra-processed, local)	Spending on eleven food groups, from bread and cereals to water, soft drinks and juices Total monthly household spending on food

Where and whom to ask

The municipality was divided into six zones by grouping its 18 parishes by postcode. For each zone, the number of surveys needed for the results to represent its households with a margin of error of seven points and a confidence level of 93% was calculated. The result was a minimum of 200 surveys per zone, except in the urban-rural south, where 180 were enough, giving a total of 1,180.

Zone	Parishes and neighbourhoods	Estimated households	Surveys needed
1. Urban	Centro, A Virxe do Camiño, Lérez Sur, Campañó Sur, Campolongo and O Burgo	25,482	200
2. Peri-urban south	Salcedo, Tomeza and Marcón	1,974	200
3. Peri-urban north	Mourente and Lérez Norte	1,681	200
4. Peri-urban industrial	Lourizán	1,182	200
5. Urban-rural north	Bora, Xeve, Santa María de Xeve, Verducido, Cerponzóns, Santa María de Alba and Campañó Norte	2,315	200
6. Urban-rural south	Canicouva and Ponte Sampaio	492	180
Total		33,126	1,180

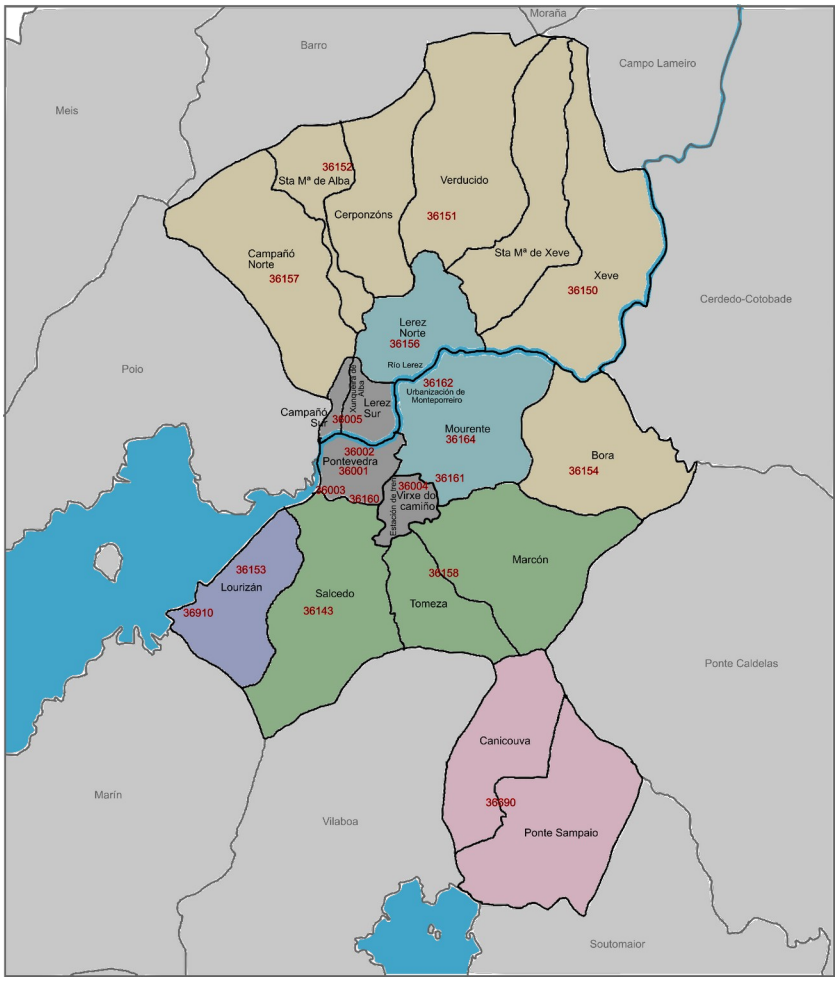


Figure 3. Parishes and postcodes of Pontevedra grouped into the six study zones.

The calculation assumed that every household had the same probability of being surveyed. In practice the students would survey the people they could reach, which introduces bias. To reduce it, the design set three rules. Each survey had to be carried out in its assigned zone, a variety of streets and parishes had to be sought within each zone and days and times were to be varied. A shared spreadsheet allowed each class to record how many surveys it planned to carry out in each zone and to see whether the total reached the minimum.

How to ask

The questionnaire was designed in Microsoft Forms and intended to take 15 to 20 minutes to complete. It was addressed to the person who organises the shopping in the household, because that person knows what is bought, how much and where. Three ways of responding were offered. The students could read out the questions and record the answers, the respondent could answer on their mobile phone via a QR code with the students present to clear up any doubts, or they could answer on paper for the students to enter into the form later.

The questionnaire asked about household composition, income, education, diets and allergies, time available for cooking, nearby shops, how fresh and local food is valued, label reading, the influence of advertising and ties to rural areas. It also asked about the proportion of fresh, processed and ultra-processed food, the weight of local products, how shopping is organised, spending on each food group and where each one is bought.

Operational summary of the fourteen activities

Act.	Timing	Main content	Immediate result
A1	Jul. – Nov. 2025	Research design, preparation and initial meeting with the teachers	Conceptualisation, questionnaire, sampling plan and course accredited by the CFR
A2	17 Nov. 2025	Teacher training S1 (2 h). Citizen science and line of research	Teachers introduced to the project
A3	27 Nov. 2025	Teacher training S2 (3 h). Methodology	Teachers prepared for the fieldwork
A4	Nov. 2025	Classroom S1 (1 h). Citizen science	Students introduced to citizen science
A5	Dec. 2025	Classroom S2 and S3 (1 h each). The research and the method	Allocation of zones and planning of the surveys
A6	17 Dec. 2025 – 2 Feb. 2026	Data collection	587 surveys
A7	2 Feb. 2026	Teacher training S3 (2 h). Data analysis and interpretation	Teachers prepared to work on the results
A8	Feb. 2026	Data cleaning, emissions calculation and preliminary analysis	503 valid surveys, 454 usable and first results
A9	9 Feb. 2026	Teacher training S4 (3 h). Dissemination and mini-projects	Dissemination plan for the fair
A10	Feb. 2026	Classroom S4 (1 h). The results	Interpretation of results in class
A11	Mar. 2026	Classroom S5 (1 h). Dissemination	Preparation of the public presentation
A12	16 Apr. 2026	Teacher training S5 (2 h). Closing the projects	Close of the work with the teachers
A13	28 Apr. 2026	First Local Development Forum with the Citizens' Climate Committee	Results presented and four working challenges. In July the Committee delivered 12 recommendations to the City Council
A14	May – Oct. 2026	Review of the analysis and methodological closure	Revised analysis and methodological report

Research design and preparation (A1)

Between July and November 2025 the professional team drew up a conceptualisation document that presented the research as a whole, served to fine-tune the design and provided content for the teacher training. In this phase the questionnaire and the zone-based sampling plan were designed, the shared monitoring spreadsheet was prepared and the teacher training course, entitled Ciencia cidadá dende o centro educativo, was organised with the CFR de Pontevedra. Before the course, the team held an initial meeting with the teachers to present the action and agree on how to work.

Teacher training (A2, A3, A7, A9 and A12)

Teacher training was the centrepiece of the new model. It consisted of five sessions totalling 12 hours, delivered by the Post-Growth Innovation Lab team to 19 teachers. Each session prepared the teachers for the next classroom session. The first introduced citizen science and the line of research. The second covered the methodology, the sampling plan and the logistics of the survey. The third prepared the analysis and interpretation of results. The fourth was devoted to dissemination and to the mini-projects for the Feira da Sostibilidade. The fifth closed the projects.

Classroom sessions (A4, A5, A10 and A11)

Each group was scheduled to have five one-hour sessions led by its teachers. The first, in November, introduced citizen science. In December, the second presented the research and the third the method, with the allocation of zones and the planning of the surveys. In February, the fourth worked on the results and, in March, the fifth prepared the dissemination. According to the observations of the coordinating team, involvement varied greatly between groups and teachers. Some groups did not complete all the sessions and some teachers left the process midway through the school year. There is no systematic record of what was done in each class.

Data collection (A6)

The students administered the surveys between 17 December 2025 and 2 February 2026. Most were collected in January, with 79% of the total. Data collection had no interim quality checks. The median response time was 11 minutes, below the 15 to 20 planned.

Cleaning, calculation and preliminary analysis (A8)

In February the professional team cleaned the database, estimated the emissions and prepared a preliminary analysis to be worked on in class. The cleaning process is detailed in the section on quality control and the emissions calculation in the section on results.

Interpretation and dissemination in the classroom (A10 and A11)

The teachers worked on the results with their students and prepared the public presentation. This is the most visible methodological change compared with earlier editions, where the collective analysis sessions were led by the professional team. In practice, the conclusions were drawn up by the professional team and the classes received them to discuss and communicate them.

First Local Development Forum (A13)

On 28 April 2026, from 16:00 to 20:00, IES Luís Seoane hosted the First Local Development Forum, as part of the fourth Feira da Sostibilidade. The forum is part of the Plataforma ODS project and was created as an annual meeting to present research that supports the Sustainable Development Goals in Pontevedra. In this first edition it coincided with the third session of the Citizens' Climate Committee, devoted to food consumption patterns.

The invitation anticipated the attendance of some 16 members of the Committee, some 10 students and teachers from the project, some 15 Erasmus students and teachers, one or two representatives of the City Council and some 10 members of the coordination team. The organisers provided a bus from the city centre for the Committee.

The session began with a presentation of the forum, the City Council and the fair. The students then presented the research in about 20 minutes. Two activities followed. In the first, From data to action, the groups rotated through four stations, each with a challenge on consumption patterns and three sources of information, which were the research results, the recommendations from the Committee's second session and the life cycle of food. In the second, From idea to reality, the

groups developed proposals with their rationale, the actors involved, the stage of the life cycle at which they act, what is needed to carry them out and the barriers.

Review of the analysis and methodological closure (A14)

To prepare this report, the preliminary analysis was reviewed using a single, documented procedure. The review kept the descriptive results, corrected some presentation errors and withdrew three relationships that are not supported by the data. The results section already reflects the revised analysis.

Ethics, data protection and quality control

The project met the requirements that the Universidade de Vigo sets for research with people and with personal data. These requirements are set out in the protocol of its Ethics Committee for Research with Human Beings and the Environment (CEISHMA), in the General Data Protection Regulation (GDPR) and in Spanish Organic Law 3/2018 on personal data protection.

- IES Luís Seoane authorised its participation in writing before the project began.
- Participation was voluntary. Anyone could withdraw at any time, without giving reasons and without consequences.
- Students, families and teachers received an information sheet written in language suited to each group.
- Each student signed the informed consent together with their family or guardian. The form set out separately the consent to take part, the consent to data processing and the image and voice authorisation.
- The survey was anonymous. It did not collect names, telephone numbers, email addresses or exact age, and sociodemographic data were requested in ranges.
- The form explained the research and asked for explicit consent before starting. Responses without consent were excluded from the analysis.
- Students and teachers who worked with the surveys signed a confidentiality agreement.
- Responses were stored anonymously in the university's Microsoft environment.
- Data and signed documents were stored in the Universidade de Vigo institutional cloud, with access restricted to the team and protected by password.
- Participants knew their rights to access, rectify and erase their data and how to exercise them before the Universidade de Vigo.
- Results are disseminated in aggregated or anonymised form, and images of students are published only with their authorisation.

Data cleaning followed four documented steps.

Step	Surveys excluded	Surveys remaining
Responses collected		587
No consent to participate	7	580
False data (nonsensical answers or impossible values)	30	550
Outside the study area by postcode	47	503
Spending written in a way that could not be converted into a figure	49	454

Many of the responses with a postcode outside the area were in fact also false data. Where the neighbourhood or street made it possible to identify the zone, mistyped postcodes were corrected, for example 30162 instead of 36162 in a response that gave Monte Porreiro. The questionnaire allowed spending to be written as free text, so responses such as 200€ or 350-400 euros had to be converted into figures. The spending reported for each food group was transformed into its percentage of the sum and applied to the total monthly spending reported by the household.

In total, 23% of the responses collected were discarded. The final cleaning protected the quality of the analysis, but made it clear that quality control was concentrated at the end of the process and was missing during data collection.

CHAPTER 4

What did the project research and what did it produce?

How to read these results

The sample was obtained by convenience, leaves three zones with almost no surveys and over-represents women and middle-aged people. For this reason the results describe the 454 households surveyed and cannot be generalised to the population of Pontevedra. The relationships between variables are associations observed in the sample and do not indicate causes.

Sample coverage

The sample fell far short of the planned design. No zone reached the minimum number of surveys, and three of them, the peri-urban south, the peri-urban industrial and the urban-rural south, ended up with 14, 3 and 2 surveys. The best-covered zone was the peri-urban north, which includes Monte Porreiro, where the school is located. Four surveys had a postcode that could not be assigned to any zone. With this distribution it is not possible to compare zones, and the analysis was carried out for the sample as a whole.

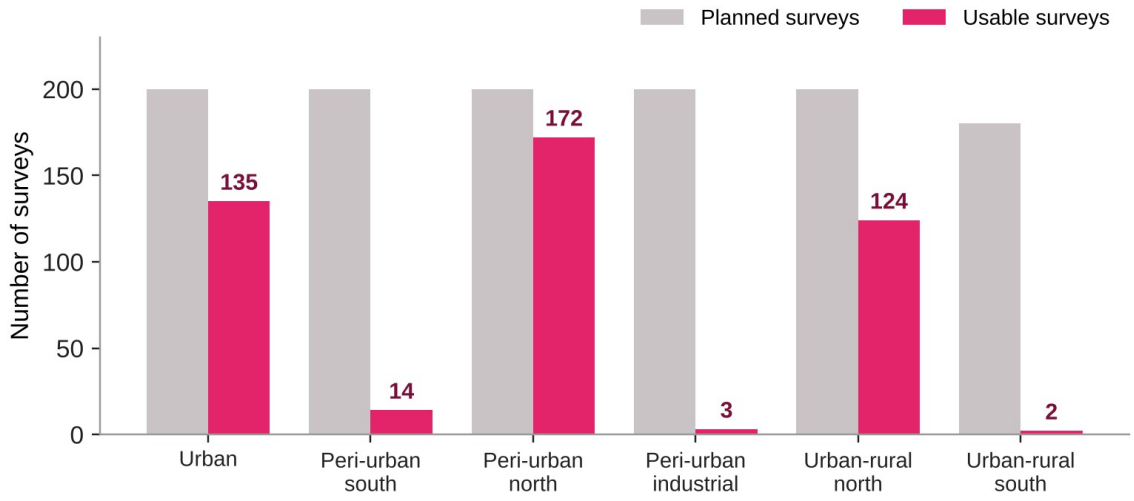


Figure 4. Planned surveys and usable surveys by zone.

Who responded

72% of the responses came from women, which is consistent with the instruction to survey the person who organises the shopping. Only 7% of respondents are aged 65 or over. 41% say they are mainly responsible for the shopping, 35% say it is shared equally and 23% say another member of the household organises it. The most common household size is four people. 64% of households include children under 18, 39% include people aged 65 or over and 47% live with pets. 67% report a regular tie to rural areas, through vegetable gardens or relatives from whom they receive food.

Monthly household income	Percentage
Less than €1,000	4%
€1,000 to €1,999	27%
€2,000 to €2,999	26%
€3,000 to €4,000	17%
More than €4,000	8%
Prefers not to say	18%

The consumption pattern

The households surveyed report a shopping basket dominated by fresh food. 46% say that between half and three quarters of what they buy is fresh and 32% put fresh food above three quarters. Processed food has a moderate place, with 44% placing it between 25% and 49% of the basket and 38% below 25%. 77% report that ultra-processed food and ready meals make up less than 25%. As these are self-reported data, these figures may be influenced by the tendency to give socially desirable answers.

Asked how much of their food is local, on a scale of 1 to 10, households answer 6.6 on average and half answer 7 or more. Shopping is mainly organised by combining large and small shops (62%) or through many small shops (33%). Large, infrequent shops are a minority (5%). 15% always check the labelling, 31% almost always, 45% sometimes and 8% never.

The supermarket is the most frequently mentioned place of purchase for all food groups except bread, which 80% of households buy in specialist shops. The municipal market and the central food market play a significant role for fish (37% of households) and seafood (38%). Self-production, in one's own or a family vegetable garden, plays a prominent role. It is mentioned by 52% of households for eggs, 37% for vegetables and 26% for fruit. As each household could indicate several places, the percentages add up to more than one hundred.

The associated emissions

Emissions were estimated using the ARCA methodology, developed by research groups at the universities of Vigo and A Coruña. ARCA calculates the consumption footprint of each municipality by multiplying household spending by the emissions generated by each euro spent on each type of product. Spending comes from the Household Budget Survey of the Spanish National Statistics Institute (INE), adjusted by autonomous community and municipality size, and emissions per euro come from the EXIOBASE database through environmentally extended input-output analysis.

The survey made it possible to replace the average distribution of spending with the distribution observed in the households surveyed. Total reported spending, however, turned out to be much lower than the INE estimate. The survey median is 104 euros per person per month, compared with 210 euros in the INE estimate. Using reported spending, emissions from household food consumption in Pontevedra would be around 77,000 tonnes of CO2 equivalent per year, compared with around 137,000 according to the municipal estimate. This difference suggests that respondents underestimate their spending, so the survey is useful for understanding how consumption is distributed and the municipal figure remains the reference for the total.

The distribution of emissions by type of food is similar in both sources. Meat, fish and seafood, and milk, cheese and eggs account for more than half of the emissions. The largest differences appear in bread and cereals, with less weight in the survey, and in oils and coffee, with slightly more.

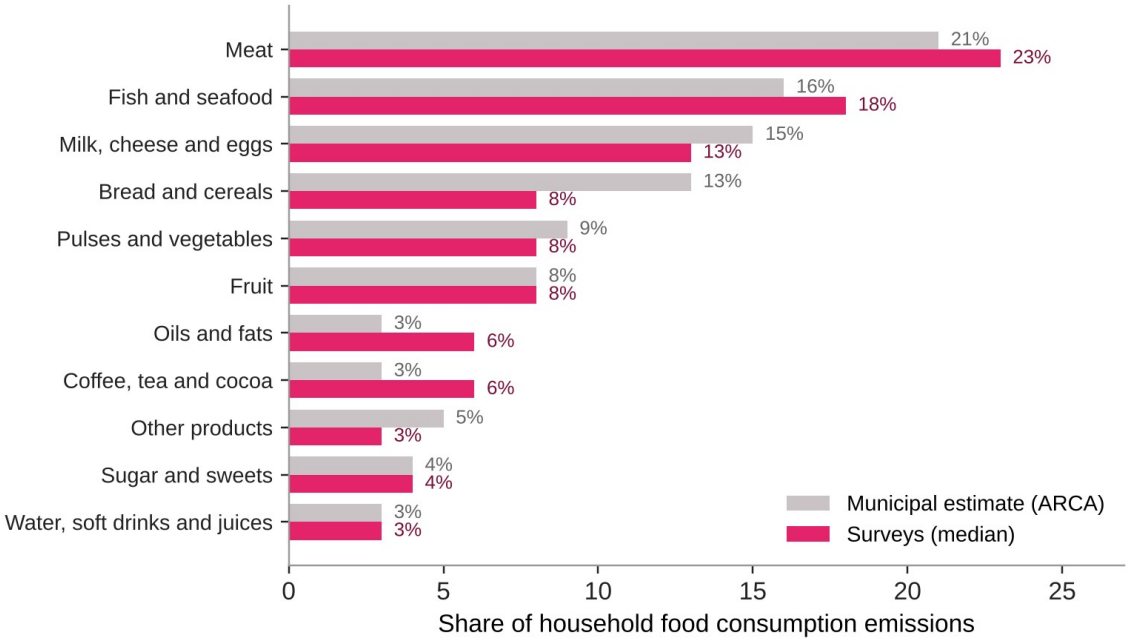


Figure 5. Distribution of emissions from household food consumption according to the municipal estimate and according to the survey.

Factors associated with consumption

The analysis started from four hypotheses with broad support in the scientific literature on the footprint of food. Diets with less meat, more plant-based food, more local and seasonal products and fewer processed foods have a smaller footprint. The survey does not measure the footprint of each household, so what was analysed is which factors are associated with each of these four forms of consumption.

Spearman's correlation was calculated between each factor and each form of consumption, and a correction was applied for having carried out 147 tests at once, to avoid accepting relationships that may be due to chance. Consumption of meat and of fruit and vegetables was measured as a percentage of food spending, because the survey measures the distribution of consumption well and spending per person depends heavily on household size. A relationship is considered weak below 0.3, moderate between 0.3 and 0.5 and strong above 0.5. The annex gives the values.

Form of consumption	Factors associated in the sample	Strength
Less meat	Households with a vegetarian or vegan member (only 11 households)	Weak
More fruit and vegetables	Reading labels more often Placing more value on fresh food Older age of the respondent	Weak
More local products	Placing more value on local food Placing more value on fresh food Self-production, people over 65 in the household, reading labels, rural ties, time for cooking, more women in the household and older age of the respondent	Strong Moderate Weak
Fewer processed and ultra-processed foods	Placing more value on fresh and local food, older age of the respondent, reading labels and shopping more often	Weak
More processed and ultra-processed foods	Greater perceived influence of advertising	Weak

The strongest relationship, between valuing local food and reporting more local products, links two self-assessments by the same person. It mainly indicates consistency between answers and explains little in itself. Beyond it, all the relationships are weak. The overall picture outlines a profile of a household that values fresh and local food, reads labels and is older, and that reports more fruit and vegetables, more local products and fewer processed foods. None of the factors measured is clearly associated with meat consumption, which probably depends on preferences, prices, traditions or other aspects that the survey does not capture.

The analysis also explored what lies behind these values. Households with higher incomes, more time for cooking, more women and older people place more value on fresh food. Households where the respondent is older or where there are people over 65 place more value on local food. Those who value fresh and local food and those with more education read labels more. Self-production is associated above all with rural ties.

The review withdrew three relationships from the preliminary analysis. The first stated that less meat is associated with more fruit and vegetables. When each food is measured as a percentage of spending, if one rises the others fall by pure arithmetic, and in euros the relationship is the reverse, because households that spend more on meat also spend more on fruit and vegetables. The second associated more women in the household with more fruit and vegetables and disappears when consumption is measured as a share of spending. The third stated that households with children do fewer and larger shops, and does not hold after the correction.

How the results informed the Committee

The results reached the Citizens' Climate Committee at the First Local Development Forum. Three of the four challenges that structured the work of the forum came from the associations found in the research. The fourth, on education, came from the Committee itself.

1. How can we increase the consumption of fruit and vegetables in everyday diets?
2. How can we make local food more accessible?
3. How can we reduce the consumption of processed and ultra-processed food?
4. What can we do through education to achieve a low-carbon diet?

The conclusions of the research fed the conversation and served as one of the sources of information at each work station. From there, the forum's working tables moved forward on the proposals the Committee had already been developing in its sessions. The action did not generate its own proposals derived from the research. The fact that meat was not included as a challenge fits with no measured factor being associated with its consumption.

The process continued after the forum. In July 2026 the Citizens' Climate Committee, made up of 16 local residents, delivered 12 recommendations on food and climate change to the City Council. The Committee's report states that the City Council will analyse their feasibility and that it is responsible for promoting, coordinating and monitoring their implementation, and identifies the design of a monitoring system as a pending step. The chain thus reached from the classroom to local government. What was not documented is which specific conclusion of the research translated into which recommendation.

Outputs and transfer results

- Cleaned database of 454 households on food consumption in Pontevedra.
- Estimate of the distribution of emissions from household food consumption based on citizen data, connected with the municipal footprint calculated by ARCA.
- Presentation of the research by the students at the First Local Development Forum and three working challenges for the forum built on its results.
- Contribution to the 12 recommendations that the Citizens' Climate Committee delivered to Pontevedra City Council in July 2026.
- Teacher training course Ciencia cidadá dende o centro educativo, accredited by the CFR de Pontevedra, with 19 teachers trained.
- Conceptualisation document, questionnaire and sampling plan reusable in future actions.
- Public page for the action on the TIAS lab website and presence in the Post-Growth Citizen Science Network of Galicia.
- This methodological report, which includes the revised analysis.

CHAPTER 5

Final evaluation of the project

How the project was evaluated

The action did not include a systematic final evaluation with students and teachers. This section draws on the participation indicators, the quality of the data obtained and the observations of the coordinating team throughout the process. This absence is in itself one of the weaknesses of the action, because it leaves out the voice of those who took part.

Main quantitative results

Indicator	Planned	Achieved
Surveys	1,180 minimum	587 collected and 454 usable
Zones with a sufficient sample	6	0
Zones with fewer than 20 surveys	0	3
Surveys discarded	Not anticipated	23%
Reported spending compared with INE	Similar	Around half
Responses from women	Not anticipated	72%
Responses from people over 65	Not anticipated	7%
Survey duration	15 – 20 minutes	Median of 11 minutes
Classroom sessions per group	5	Not all groups completed them
Teachers trained	Not anticipated	19 teachers
Students at the forum	Not anticipated	A small delegation

Strengths and limitations identified

Clearest strengths	Most evident limitations
Broad reach, with some 200 students from ESO, Bachillerato and FP	Insufficient territorial coverage, with three zones almost empty
Training accredited by the CFR and 19 teachers trained	Very uneven involvement between groups and teachers, with dropouts
Fit with the Feira da Sostibilidade, an already established space	Groups that did not complete all the sessions and no record of what was done in class
Meeting between the students and the Citizens' Climate Committee and the City Council	False surveys, wrong postcodes and ambiguous questions
Base of 454 valid surveys on food consumption	Reported spending far below actual spending and a biased sample profile
Data cleaning that protected the quality of the analysis	No quality control during data collection
Ethics and anonymity well handled	Students with no role in the question or the questionnaire
Students facing real members of the public in the fieldwork	Analysis in the hands of the professional team and few students at the forum
Continuity of the collaboration with the school	No final evaluation or documentation of how the Committee used the results

CHAPTER 6

Lessons learned and recommendations for future editions

Strengths worth keeping

The first strength was reach. The action reached some 200 students from fourteen groups with very little presence from the university team, and included vocational training groups, which are uncommon in citizen science processes. That reach was possible thanks to the teacher training model.

The second strength was the accredited training. Recognition by the CFR gave formal value to the teachers' commitment and leaves the school with 19 teachers who know the method. It is a foundation on which future actions can build.

The third strength was anchoring the action in existing spaces. The Feira da Sostibilidade offered an established framework for public feedback, and the Citizens' Climate Committee offered a real recipient for the results. The forum brought students, organised citizens and the City Council together in the same room.

The fourth strength was the handling of the data. The ethical safeguards worked, data cleaning detected and removed unreliable responses and the subsequent review of the analysis made it possible to correct errors before closing the action. The students also had the experience of going out to ask members of the public and obtaining real data.

Weaknesses worth correcting

The most important weakness was territorial coverage. The research was designed to compare six zones and the sample only partially covered three. The students mainly surveyed people close to them, with the school's zone the most represented. There was no monitoring of zone quotas during data collection and no fallback plan in case surveys were lacking.

The second weakness was data quality. One in four responses had to be discarded because of lack of consent, false data, postcodes outside the area or spending that could not be interpreted. Reported spending came to around half of actual spending, and the sample over-represents women and middle-aged people. Some questions were understood in different ways.

The third weakness was uneven involvement in the classroom. Some of the groups did not complete the sessions, some teachers dropped out and no record was kept of what was done in each class. Some teachers joined the project for the course more than for the research, and the lack of a regular monitoring channel meant that the coordinating team learned of difficulties late.

The fourth weakness was the limited role of the students. The students did not take part in defining the question or the questionnaire, they found the topic abstract, the statistical analysis was beyond their reach and motivation was low in some of the groups. The professional team took on the analysis to be ready in time for the forum, and only a small delegation of students attended the forum.

The fifth weakness was the connection with the Committee. The research entered the forum as a source of context within a process that already had its own agenda, and it was not documented what use the Committee made of each conclusion.

Methodological lessons in depth

1. **Delegating the classroom to teachers extends reach, but requires close support.**

Without the professional team present in the classroom, the quality of the process depends on each teacher passing on the instructions well and sustaining the group's motivation. The instructions were passed down a chain, from the team to the teachers and from the teachers to the students, and each step added a risk of information being lost along the way. Five classroom hours per group also left very little room to correct errors. Recommendation. Combine teacher training with a few visits by the team to each class at key moments and with a fortnightly monitoring channel with the teachers.

2. **Accredited training attracts teachers, but does not ensure their involvement in the research.**

Recognition by the CFR made participation easier, and it also attracted teachers interested mainly in the course. With teachers overloaded, the research competed with other tasks. Recommendation. Agree at the outset on a concrete commitment from each teacher to their group and link certification of the course to completing the classroom sessions.

3. **A territorial design needs quota monitoring while data are being collected and a fallback plan.**

With convenience sampling, students tend to survey the people close to them. The shared planning spreadsheet was not enough to correct the imbalance. Recommendation. Review the surveys received by zone every week, assign specific zones to specific groups and define in advance what analysis will be done if a zone is left without a sample.

4. **Data quality must be monitored during collection and not only at the end.**

The final cleaning was effective, but it came when there was no longer any room to repeat surveys. Recommendation. Review samples of responses from the first week, report back to each class on its issues and validate postcodes in the form itself.

5. **Asking about spending in euros does not work well.**

Respondents underestimated their spending and many wrote it in ways that were hard to interpret. Recommendation. Use closed numerical answers, ask about frequencies or quantities instead of euros, draw on a recent shopping receipt and test the questionnaire with a pilot group before launching it.

6. **A closed, quantitative design leaves little room for students.**

With the question, the questionnaire and the analysis defined by the team, the students were left in a data collection role, with an abstract topic and a statistical analysis that was hard to follow. Recommendation. Open at least part of the design to the students, for example some questions in the questionnaire or a hypothesis of their own, and work on the analysis with simple visual tools they can handle.

7. **Connecting citizen science with a deliberative process requires designing the link from the outset.**

The Committee had its own timetable and agenda, and the research came in as just one more input. Recommendation. Agree with the receiving process, before starting, on which questions the research should answer, when the results will be delivered and how their use will be documented, and ensure that a broad delegation of students attends.

8. **Evaluation is part of the method.**

Without a final evaluation or a classroom record, what students and teachers learned remains undocumented. Recommendation. Include brief micro-evaluations at the end of each session and a final questionnaire during class time.

Operational recommendations for replicating or scaling up the project

- Keep the accredited teacher training and complement it with visits by the team to the classroom at key moments.
- Set up a regular monitoring channel with the teachers and a simple record of each classroom session.
- Adjust the sample size to the real capacity of the groups and assign each zone to specific groups.
- Review the surveys by zone and their quality every week, and validate key data in the form itself.
- Pilot the questionnaire, shorten it and replace the questions on spending in euros with more reliable formats.
- Reserve at least one real decision on the research design for the students.
- Agree with the process receiving the results on the timetable, the questions and how their use will be documented.
- Include a final evaluation during school hours.

CHAPTER 7

Future work

The action opens up several lines of continuity. The first is institutional. The fifth Feira da Sostibilidade, scheduled for 28 to 30 April 2027, will host the Second Local Development Forum, which could become the permanent space for public feedback on the school's research.

The second is educational. IES Luís Seoane is part of the Post-Growth Citizen Science Network of Galicia and is taking part in the action on rural areas in ecological transition policies in the 2026-2027 school year. The 19 trained teachers provide a foundation for making that participation stronger.

The third is methodological. The lessons from this action, together with those from Pontevedra and Vigo, make it possible to compare three models of working with students and feed into a broader reflection on the conditions that allow school-based citizen science to produce reliable and useful knowledge. The database of 454 households, for its part, can serve as a starting point for future comparisons of food consumption in the municipality.

CHAPTER 8

Conclusion

Postgrowth S.A.: Alimentación set out to open up the average figure for food emissions in Pontevedra to understand how it changes from one neighbourhood to another and why. To do this on a large scale, it changed the working model of the series and entrusted the running of the classroom to the teachers.

The result was uneven. The action reached some 200 students, trained 19 teachers, generated a database on the food consumption of 454 households and brought its conclusions into a real process of citizen deliberation. At the same time, it did not achieve the territorial coverage that was at the heart of the design, reported spending did not make it possible to estimate the volume of emissions and the students had a more limited role than in earlier editions.

The final lesson is clear. Extending the reach of school-based citizen science is possible, and for that reach to translate into reliable knowledge it must be sustained by close support, quality control throughout the process and a real role for students in the research. This is the foundation on which the Postgrowth S.A. series will design its next actions.

ANNEX

Annex. Significant associations

The table shows the associations that remain after correcting for the number of tests ($q < 0.05$). ρ is Spearman's correlation, n the number of households with data and q the value corrected using the Benjamini and Hochberg procedure. A positive value of ρ indicates that both variables increase together.

Form of consumption	Factor	n	ρ	q
Meat (% of spending)	Vegetarian or vegan member in the household	451	−0.13	0.024
Fruit and vegetables (% of spending)	Label reading	450	+0.17	0.002
	Value placed on fresh food	451	+0.15	0.008
	Age of the respondent	451	+0.13	0.025
Local products (1 to 10)	Value placed on local food	454	+0.51	< 0.001
	Value placed on fresh food	454	+0.43	< 0.001
	Self-production	454	+0.19	< 0.001
	People over 65 in the household	454	+0.17	0.002
	Label reading	453	+0.16	0.003
	Rural ties	432	+0.15	0.007
	Time for cooking	454	+0.15	0.005
	Women in the household	454	+0.14	0.012
	Age of the respondent	454	+0.13	0.021
Processed and ultra-processed foods	Value placed on fresh food	425	−0.30	< 0.001
	Age of the respondent	425	−0.28	< 0.001
	Value placed on local food	425	−0.24	< 0.001
	Influence of advertising	425	+0.22	< 0.001
	Label reading	425	−0.19	< 0.001
	More frequent shopping	425	−0.17	0.002
Value placed on fresh food	Income	370	+0.20	< 0.001
	Women in the household	454	+0.17	0.002
	Time for cooking	454	+0.16	0.004
	People over 65 in the household	454	+0.14	0.013
	Age of the respondent	454	+0.13	0.023

Form of consumption	Factor	n	ρ	q
Value placed on local food	Age of the respondent	454	+0.19	< 0.001
	People over 65 in the household	454	+0.13	0.023
Label reading	Value placed on fresh food	453	+0.28	< 0.001
	Value placed on local food	453	+0.24	< 0.001
	Level of education	432	+0.15	0.008
Influence of advertising	Level of education	433	+0.12	0.046
Self-production	Rural ties	432	+0.37	< 0.001
	Income	370	+0.13	0.032

Processed and ultra-processed foods were measured as an approximation based on the ranges reported for both types of food. Age of the respondent, income, education, time for cooking, label reading and shopping frequency were treated as ordinal variables.

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