
EDUCATION FOR SUSTAINABILITY



PROJECT SUMMARY REPORT

2023/2024

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1. EDUCATION FOR SUSTAINABILITY: ALCOA FOUNDATION AND UNIVERSITY OF A CORUÑA

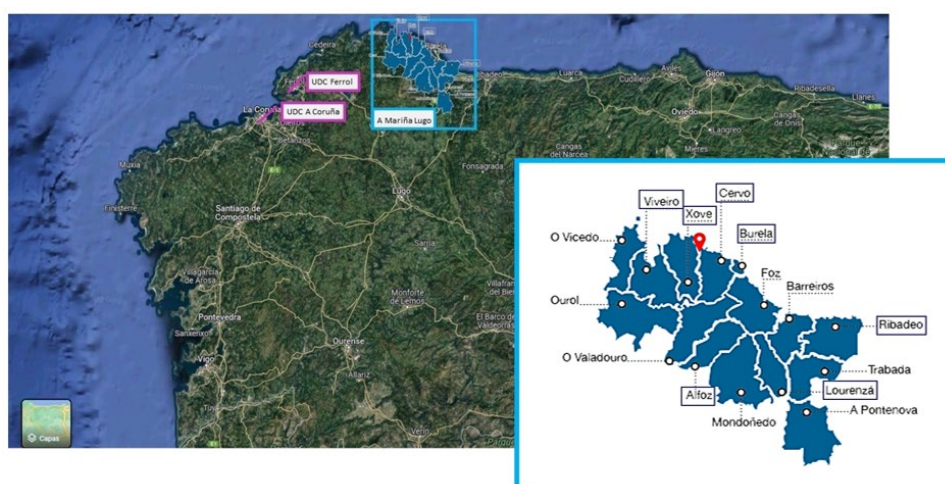
The Alcoa Foundation works with a values-based culture to minimize its environmental impact while returning positive results to society. In this line, the Foundation collaborates with non-profit associations and public and private entities in the areas in which it is located. The Alcoa Foundation area of work in sustainability focuses on biodiversity conservation and climate change mitigation and adaptation, supporting equitable access to education, skills development and research in this field.

In this way, it converges with the lines of action of the University of A Coruña (UDC), which has its own service for the improvement of Campus sustainability: the Office for Environment (OMA)¹, dependent on the Vice Chancellor of Infrastructure and Sustainability. Its priority objective is to raise awareness and participation of the university community and society in sustainability.

It is in this context that the fifth call of the project 'Education for Sustainability UDC + Alcoa Foundation' was promoted, carried out by the UDC during the academic year 2023-2024 and with the co-financing of Alcoa Foundation. The project was effective in two locations of the Galician region: the Campuses of the University of A Coruña, and the primary and secondary schools of A Mariña de Lugo, with the aim of promoting the training and participation of the educative community in matters of environmental and social sustainability.

One chosen area to carry out this project was A Mariña Lucense, where the Alcoa factory of San Cibrao is located. It is composed of 15 municipalities and comprises a population of 70,000 people, including approximately 5,000 students and more than 300 teachers. A Mariña reaches 51 educational centers, covering from early childhood education to high school, and also including specialized centers, such as music, language or sports schools.

The other influence area is the UDC and A Coruña-Ferrol metropolitan area, with more than 600,000 inhabitants. The university community reached 18,850 students in 2023/2024 course and it has more than 2,850 employees (teachers and staff). The sustainability programs at the UDC spread the transfer of environmental knowledge towards the communities of the UDC, which affects the whole northern area of Galiza, that is to say, the north of the Spanish provinces of A Coruña and Lugo, therefore including the A Mariña Lugo region (Image).



Geographical location of the development sites of the 'Education for Sustainability project': University of A Coruña (Coruña and Ferrol campuses), and Comarca da Mariña Lucense (the municipalities of the primary and secondary education centers directly involved in the project are labelled with a blue box; in red: location of the Alcoa San Cibrao factory).

¹ Re-called Sustainability Office from 30/04/2024.

2. PROJECT PRESENTATION AND CALENDAR

'Education for Sustainability' is a project that seeks to advance in the university community and citizenry's training in the basic concepts of environmental and social sustainability, and also to develop its capacity to act on priority issues of our time.

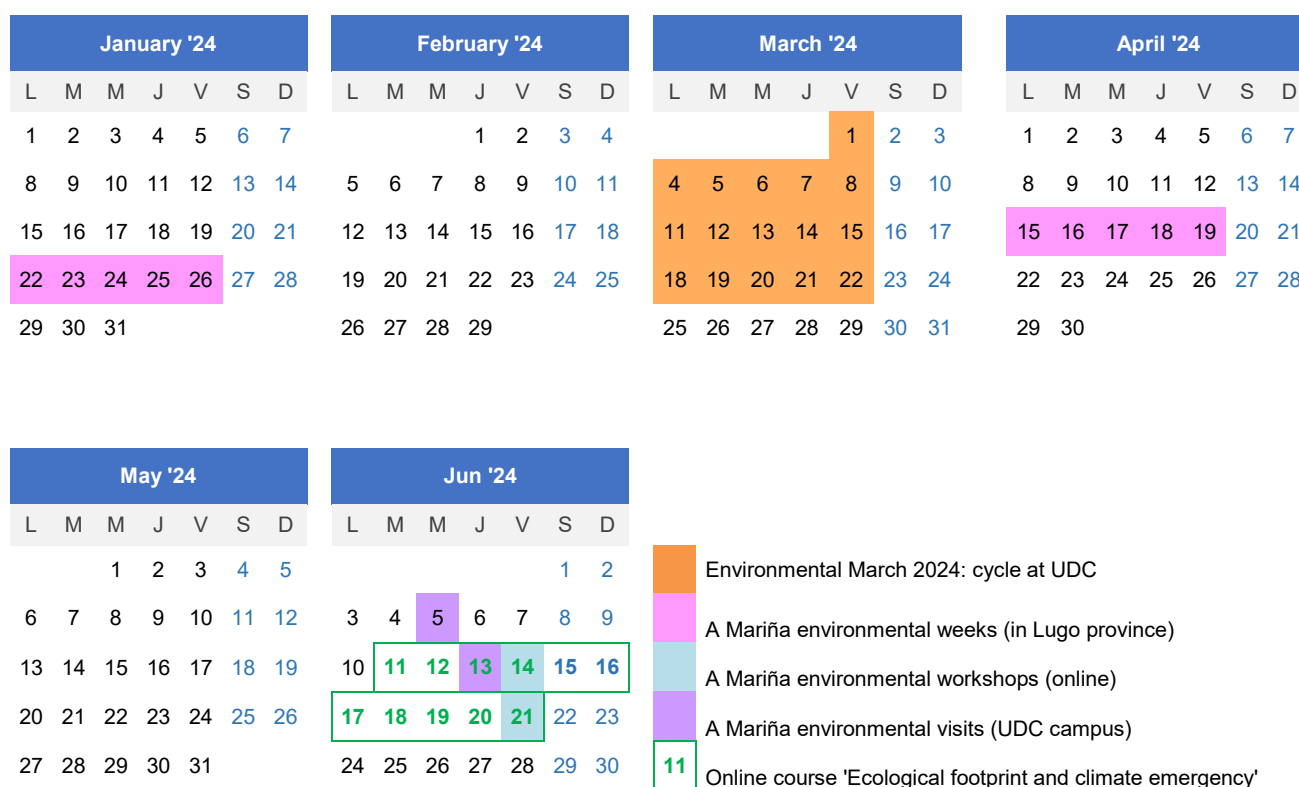
This is a multidisciplinary environmental education project that covers a wide range of ages: from children's, primary and secondary education to the university audience. The target audience are students, but also including the teachers and workers in educational centers, such as administrative assistants, research staff, garden workers or dining rooms attendants, among others.

The project continued with its format of activities at the University of A Coruña, by its general name '*Campus, Home, City; Labs for change*', and through the main call 'Environmental March 2023' and the online course 'Ecological footprint and climate emergency: contributions from the UDC'. Additionally, specific actions spread throughout the course 2023/2024 also took place.

It continued as well with the third edition of the project titled 'A Mariña Environmental Project', meant to provide sustainability training to the younger generations in the north of Lugo's province, this geographical area of shared influence for both the UDC and the Alcoa factory.

A specific section on the website of the UDC Office for Environment of the project was created: https://www.udc.es/en/sociedade/medio_ambiente/curso/, where the links were provided for online registration in the activities. A complete final report (in Galician) is also available on the same website.

The calendar below shows the dates on which teaching activities took place, but please notify that the programming, organization, monitoring and evaluation also took place between the months of September-December 2023 and May-June 2024, and the implementation of environmental projects of A Mariña schools extended until July 2024.



3. ACTIVITY SAMPLES

3.1. 'A MARIÑA ENVIRONMENTAL PROJECT'

The educational offer consisted of a total of ten activities differentiated in three thematic training modules, which were presented in the form of explanatory sheets (Image) with the technical details and needs for the development of each one.

They can be consulted at the following link (in Galician):

https://www.udc.es/export/sites/udc/sociedade/medio_ambiente/galeria_down/curso/Fichas-actividades-Marina-Ambiental.pdf_2063069239.pdf



Example of an explanatory sheet for one of the activities.

The three training modules and the activities contained in each one were:

1. WATER: This module had the objective of highlighting this vital resource, raising awareness of the need of water-saving and efficiency measures in the current scenario of scarcity and inviting to re-consider the consumption of water in everyday activities. The module included the following activities:

- M1.1. Eco-audit of water at home and at school (lecture-workshop)
- M1.2. Collaborative mapping of water consuming equipment (Emapic UDC calculator)
- M1.3. Natural wastewater treatment, constructed wetlands (lecture-workshop)

2. WASTE: It was the module with the highest number of requests, demonstrating the need and interest of educating the new generations in responsible consumption, waste prevention and circular economy. The activities in this module offered advice and awareness practices through the realization of eco-audits, the calculation of the ecological footprint of waste generation and management, the practice of recycling organic matter and the experience of cleaning litter from natural spaces. The following activities were included:

- M2.1. Calculation of the ecological footprint of waste generation (Emapic UDC calculator).
- M2.2. Eco-audit of waste: quantities, composition, and separate collection (lecture-workshop).
- M2.3. Practical experience of composting in the educational center (lecture-workshop).
- M2.4. Cleaning of the natural environment: beaches, rivers, plogging (field activities).

3. ENERGY: This module included 3 activities related to the energy issue, all focusing on the ecological impact of everyday actions, such as mobility habits and energy consumption at home and in the school center. The following activities were offered:

- M3.1. Calculation of the ecological footprint of mobility (Emapic UDC calculator)
- M3.2. Calculation of the ecological footprint of energy consumption (Emapic UDC calculator)
- M3.3. Eco-audit of energy at home and in the center (lecture-workshop)

In addition, the project was completed with the implementation of sustainability initiatives and equipment in the schools, and with visits from the A Mariña students to the UDC Campuses.

As an example, the following pages show the summary of developed activities (the full report achieved in Galician language contains the details of each activity, soon available at

https://www.udc.es/gl/sociedade/medio_ambiente/curso/).

Cleaning of beaches and the natural environment

This is a practical activity with the aim to sensitize students to the problem of leaving waste out of collectors, as well as the excessive generation of waste and the multiple ways it can finally end up in nature.

The seven cleanings carried out were located on beaches and un urban parks. They began with a brief explanation of the problem, followed by the rules and considerations for carrying out an ecological and collective collection, and finally an analysis of the rubbish found: typology, origin, and how it affects natural ecosystems.

A space was also dedicated to reflection on how everyone can potentially be responsible for this situation and what changes can be made to become agents of change in the face of this worrying situation.

Dates and locations:

- ✓ April 15th: CIFP Porta da Auga (Ribadeo).
- ✓ April 15th: CEIP Juan Rey (Lourenzá).
- ✓ April 16th: IES Perdouro e IES Monte Castelo (Burela).
- ✓ April 17th: CEIP Lois Tobío (Viveiro).
- ✓ April 18th: CPR Landro (Viveiro).
- ✓ April 18th: EEI San Roque (Viveiro).
- ✓ April 19th: CEIP Cervo (Cervo).

Scope:

Number of class groups	Number of students	Level/age
17	294	Elementary and Secondary school

To this number, a total of 24 teachers responsible of the groups should be added.

Results: After collecting waste for between 30 minutes and 1 hour, in all cases waste of various types was found. There were groups that specialized in micro-plastics, while others had larger trash. The majority of the waste corresponded to single-use plastics, caps, fishing waste, personal hygiene utensils and clothes.

As a novelty, this year an open beach cleaning was carried out during non-school hours, aimed at the students of IES Perdouro and IES Monte Castelo (Burela), in which 40 people were encouraged to participate.



Sustainability projects at A Mariña centers

Sustainability training at the A Mariña centers was complemented by the effective provision of sustainability resources and equipment, with the aim of promoting a comprehensive environmental improvement.

Counting on the financial support of the Alcoa Foundation and the scientific-technical advice of the staff of the University of A Coruña, sustainability projects were carried out in four centers (Table 1).

Table 1. Sustainability projects implemented in A Mariña centers in 2024.

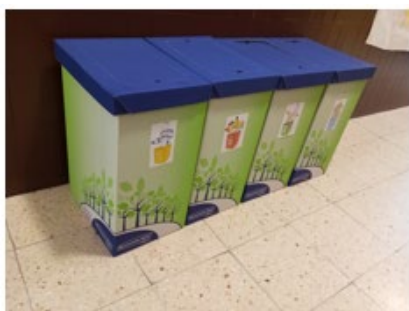
Center	Requested project	Sustainability line
IES Monte Castelo (Burela)	"Energy efficiency: LEDs in the IES"	Energy
IES Marqués de Sargadelos (San Cibrao)	"An ecological garden: sustainability and humanity: cultivation table"	Natural Resources
IES Perdouro (Burela)	"Actions for saving water"	Water
CEP Lois Tobío (Viveiro)	"Separate collection of waste in the center"	Waste
CIFP Porta da Auga (Ribadeo)	"Beach cleaning"	Waste

In the energy line, the IES Monte Castelo was the beneficiary of the main project of this call, which consisted of the replacement of fluorescent light fixtures with LEDs. With this initiative, the annual consumption is expected to be reduced to half the current consumption for each fluorescent tube replaced, which were 92 units, which will mean an annual saving of 6044.4 kWh. In addition, LEDS tubes present a series of advantages such as greater durability, lower environmental impact because they do not contain mercury and do not emit IR/UV radiation.

At IES Marqués de Sargadelos, the project started the previous year was continued, completing it with equipment that allows students to learn about the natural resources of agricultural ecosystems and their biodiversity in variable climatic conditions during the academic year. For this, the greenhouse was equipped with cultivation tables and ecological substrate to develop the tasks that will be included in the biology and geology practices.

Thirdly, in the water line, IES Perdouro was provided with equipment for savings, which were 15 double-discharge cisterns and eco-efficient perilizers for taps where they were compatible. This project was the result of the eco-audit of the water carried out by the students of the center after the monitoring of the workshop for this purpose carried out by the staff of the UDC in the framework of "UDC-Alcoa Foundation Environmental Marine". With the installation of this equipment, a minimum annual saving of 174,479 liters of water is estimated.

In the line of waste, two centers were awarded: at CEP Lois Tobío they chose to use the boxes to implement the separate collection of waste in the common areas of the center, an initiative in which the students participated by designing the informational posters. At CIFP Porta da Auga they took on an educational project of continuity for the cleaning of the surrounding beaches. The necessary material and training and support were provided in the first cleaning, continuing with the advice in the following ones. The result was the interesting involvement in environmental volunteering of basic professional training students, with a low motivation profile.



Evidences of the sustainability equipment installed in the centers: waste line, energy line, water line.

3.2. 'ENVIRONMENTAL MARCH UDC 2024'

This was the sixth edition of UDC actions for sustainability receiving the support of Alcoa Foundation. In total, more than thirty activities took place throughout the month of March at the UDC. In addition, great importance was given to the diffusion of the program, organizing information tables with participatory games, social media contests, among others.

The priority issues that were discussed in the present call were:

Microplastics and pollution | Wind energy | Sustainable fashion
Green Artificial Intelligence | Environmental volunteering | Responsible mobility
Composting and waste | Ecological and water footprint | SDG2030 | Eco-audits | ...and more.

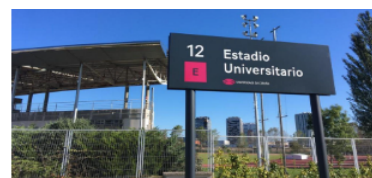


General view of the 'Environmental March 2024' leaflet, distributed at educational and administrative centers of the UDC.

Press news

EL ESPAÑOL. La UDC organiza una treintena de actividades abiertas a A Coruña sobre sostenibilidad

https://www.elspanol.com/quincemil/cultura/ciencia/20240222/udc-organiza-treintena-actividades-abiertas-coruna-sostenibilidad/834667106_0.html



La UDC organiza una treintena de actividades abiertas a A Coruña sobre sostenibilidad. UDC

CIENCIA

La UDC organiza una treintena de actividades abiertas a A Coruña sobre sostenibilidad

El evento se centrará en acercar a la ciudadanía una perspectiva amplia sobre la realidad climática, ecológica y de sostenibilidad

22 febrero 2024 - 17:21

Redacción Quincemil

Comienza la cuenta atrás para la celebración del ciclo *Marzo Ambiental*, organizado por la UDC en colaboración con la *Fundación Alcoa*. Será su séptima edición y contará con una treintena de actividades de distinta naturaleza. Entre el 1 y el 22 de marzo en el campus habrá mesas redondas, proyecciones, talleres, vistas técnicas, voluntariado medioambiental y demás propuestas.

As an example, following is the summary of some of the developed activities (the full report achieved in Galician language contains the details of each activity, will be available at https://www.udc.es/gl/sociedade/medio_ambiente/curso/).

Impacts of microplastics from Chemistry and Biology.

DATE: 13/03/2024

PLACE: Faculty of Sciences

ATTENDANCE: 40 people



Soledad Muniategui, Professor of Chemistry and Director of the University Institute of Environment at the UDC, took part in the discussion, who showed the details of the composition of microplastics, their influence on the environment and on health. Alfredo López, biologist from CEMMA (Coordinator for the Study of Marine Mammals), Galician NGO of reference, also spoke, accompanying his explanation with images of the damage caused to marine mammals by plastics.

It turned out to be a table with active participation in the debate, dealing with a topical issue after the crisis on the Galician coast due to the dumping of pellets from the ship Toconao in December 2023.

Sustainable fashion.

DATE: 20/03/2024

PLACE: U. Sénior Coruña

ATTENDANCE: 26 people



The speaker was the sociologist and teacher at UDC Faculty of Economics and Business, Noelia Salido, who gave an interesting lecture explaining concepts like linear and circular economy, and textile circularity. Salido presented the responsibility of companies in the textile sector regarding the destination of textile waste and the new measures of imminent application from 2025. In addition to the initiatives of large corporations in order to comply with the regulations, the speaker recommended local and face-to-face trade, promoting the second hand which, in addition to taking care of the planet, is often linked to social projects.

3.3. ONLINE ECOLOGICAL FOOTPRINT CALCULATOR

The Office for the Environment has developed an application adapted to the geographical area of Galiza for the calculation of various components of the ecological footprint, through the carbon footprint: energy, waste and mobility, as well as another citizen science application for the collaborative mapping of water-consuming equipment (taps, cisterns). In addition, in the current academic year 2023-2024, the calculator related to the ecological footprint for personal food was developed, which is in a trial period, at this moment with only 7 external contributions to the people of the organization, as can be seen in the image (4.e).

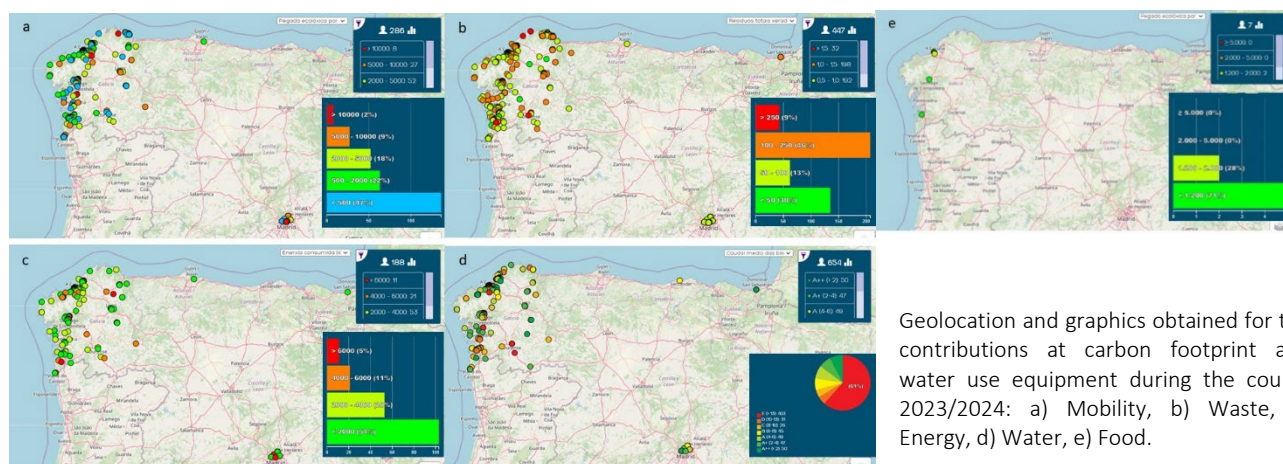
These tools are presented to the university community within 'Education for Sustainability' workshops, and also to the teaching centers of A Mariña Lucense for the free participation of interested students.

The application used is EMAPIC, a free software service developed by cartoLAB (the cartography laboratory of the UDC School of Civil Engineering), with the peculiarity that all participation contributions are georeferenced. This allows to make the calculation of the ecological footprint, while also registering their geographical distribution and possible habits depending on the location.

The access for contributions is open at this link: <https://emapic.es/custom/oma>. The results of participation in the present academic year 2023/2024 are shown in Table 1 and in the following image. To estimate the amount of CO₂ avoided, an average reduction of 2% in declared per capita emissions after participation in the project's activities was considered, resulting in a total of 33,134 kg of CO₂ avoided due to this initiative.

Table 1. Participation on EMAPIC-OMA carbon footprint tool (2023/2024).

	MOBILITY	WASTE	ENERGY	WATER	FOOD	Total
Course 2023/2024 (N ^{er} contributions)	286	447	59	158	7	1,582
Kg CO ₂ /person-year	4,232.1	125.1	2,036.6	-	1,072.9	1,656,695.0 kg CO ₂



3.4. OTHER ACTIVITIES

ONLINE COURSE 'ECOLOGICAL FOOTPRINT AND CLIMATE EMERGENCY'

Online course taught by Manuel Soto Castiñeira, Professor of Chemical Engineering, UDC EnAmb-React! researching group. This course aims to being conscious about our personal carbon footprint and also the contributions of the University of A Coruña for decreasing the associated emissions.

The course started with 84 people enrolled and with 41 completed successfully. It was developed on the Teams platform from June 11 to 21, 2024. The training modules, estimated at 10 hours of dedication, combined the

study of concepts, using web tools, audiovisual material and supporting texts; with another practical part of analysis and calculation of the personal ecological footprint through the OMA-Emapic calculator.

These statistic results of the student contributions are shown in Table 2. The total of greenhouse gases avoided through this initiative are included as part of the total 82,834.75 kg CO₂ avoided for the 2023-2024 academic year.

Table 2. Some statistic results of Emapic tools from online course.

Parameter	Media	SD
Water consumption (L/person-day):	132.6	113.6
Waste generation (per person, kg/d):	1.0	0.3
Ecological footprint of the waste generated (kg CO ₂ /year):	142.7	89.2
Carbon footprint by consumption of Energy at home (kg CO ₂ /person-year):	904.8	1,715.5
Ecological footprint due to mobility (kg CO ₂ /person-year):	2,250.2	3,226.3

a)



b)



c)



Images: a) Informative poster of the course, b, c) Screenshots of the welcome day, by prof. Manuel Soto.

SUSTAINABILITY AT FERROL CAMPUS: WASTE, COMPOSTING AND URBAN GARDENS

The project improved the selective collection of waste in the canteen of the UDC Ferrol campus and consolidated the composting area for the on-site treatment of the collected organic waste, as well as increasing the recycling of the remaining fractions. The action included the five teaching centers of the UDC's Ferrol campus, as well as the other administrative, research and auxiliary centers, with a total of 15 campus buildings. According to the data obtained, the campus composters received an average of 20 kg of food waste per day, from both the dining room and the kitchen, which was mixed with pruning scraps (partly from the campus garden) to make compost. The compost produced is being used in the newly created vegetable garden on campus.



Various moments of construction and maintenance of the composting area (above) and urban vegetable garden (below) on the UDC Ferrol campus.

4. RESULTS

4.1 PARTICIPATION

The results obtained in the project regarding the hours of involvement of the participants were **a total of 3,944 hours and 4,142 people** (Table 3, left), what implicates 1.1 hours per person of training in sustainability. The time dedicated from students to face-to-face activities on the UDC campuses and in the A Mariña region was balanced (42 and 36%, respectively), with 22% of the remaining time dedicated to the online activities: EF calculators and online course (Table 3, right).

Module	Persons (number)	Hours (number)
Environmental March UDC	1,521	1,654
Environmental Mariña Lugo	998	1,405
Online course	41	410
Carbon footprint calculator	1,582	475
TOTAL	4,142	3,944

Table 3. Participation in 'Education for Sustainability' 2023/2024 project: People and hours per module of formation.

4.2. METRICS

Some concepts that can be quantified to show the improvement in sustainability due to the present project, included in lines of environment and education, are those shown in Table 4.

Table 4. Expected and obtained metrics in Education for Sustainability Project 2023/2024.

CONCEPT	Expected	Obtained
Number of communities to be impacted by this initiative	4	4 ^a
Environment		
Number training hours A Mariña	900	1,405
Number training hours UDC	2,000	2,064
Number of individuals (students) to be trained to support environmental initiatives A Mariña	300	941
Number of individuals (students) to be trained to support environmental initiatives UDC	200	206 ^b
Number of teachers to be trained to support environmental initiatives	20	99
Number of environmental initiatives to be created	2	4 ^c
Bodies of water to be restored	2	8 ^d
Expected reduction of CO ₂ in tons	35	83 ^e
Expected reduction in energy use in kWh	35000	68652
Reduction in/avoidance of waste generation in tons	15	13
Tons of aluminum to be recycled	1.5	2
Tons of non-aluminum to be recycled	30	41
Education		
Number of teachers expected to be trained to deliver academic improvement programs	30	99
Number of schools expected to be impacted by academic improvement programs	20	26 ^f

^a Impacted communities: The community of school centers in A Mariña, with the general public of the municipalities involved, and the University community, including students, teachers and administrative staff, with the general public metropolitan area.

^b Number of students at UDC are considerate normalized by 10 hours of formation.

^c Environmental initiatives created: 1) UDC Environmental March, 2) A Mariña Environmental Project, 3) Emapic calculators for Ecological Footprint, 4) Other disperse activities, i.e. online course, composting.

^d Restored bodies of water were where the cleaning of the natural environment took place: (1) fresh water from the Lagar river (A Coruña), (2) Bens beach (A Coruña) and almost 6 different beaches of the Mariña Lucense.

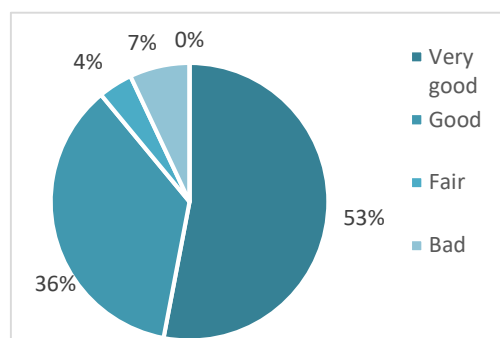
^e American tons of CO₂ avoided due to: a) electricity saving at UDC centers and A Mariña projects, b) waste prevention and recycling at UDC campuses, c) environmental education of EF calculators and online course.

^f Study centers directly affected by the academic improvement programs are: 15 at UDC (Ferrol Engineering PS, Roads, Canals and Ports STES, Technical Architecture US, Industrial Design US, Sport Sciences Faculty, Education Sciences Faculty, Health Sciences Faculty, Sciences Faculty, Law Faculty, Economy and Business Faculty, Physiotherapy Faculty, Computing Faculty, Sociology Faculty, Senior University (Ferrol), Senior University (Riazor)), and 11 at A Mariña (CEIP Cervo (Cervo), CEIP Juan Rey (Lourenzá), CEIP Lois Tobío (Viveiro), CEIP Pedro Caselles Rollán (Xove), CIFP Porta da Auga (Ribadeo), CPR Landro (Viveiro), EEI San Roque (Viveiro), IES Alfoz-Valadouro (Alfoz), IES Marqués de Sargadelos (San Cibrao), IES Monte Castelo (Burela), IES Perdouro (Burela)).

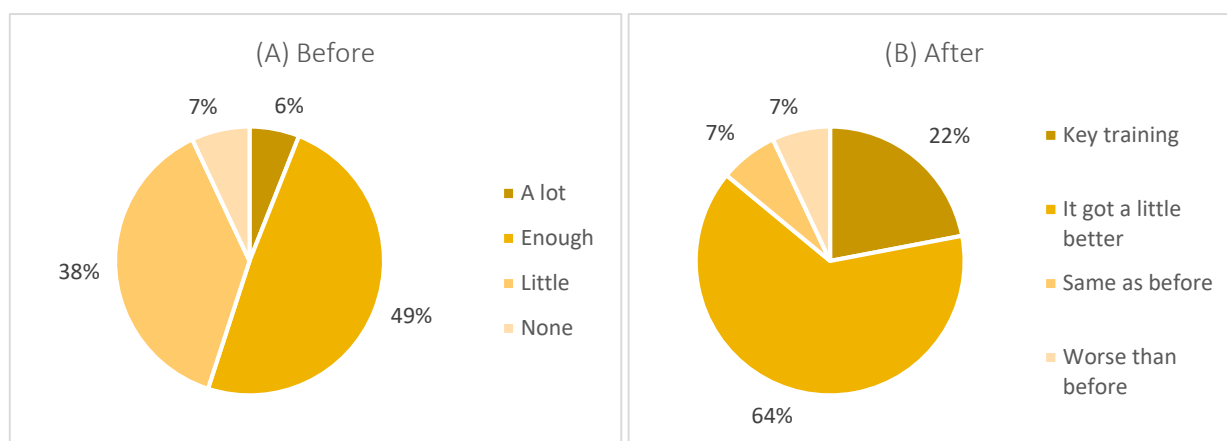
4.3. EVALUATION

The assessment of the Environmental March 2024 was done through a web form sent to the list of all participating people. 45 anonymous responses were obtained, of which 89% indicated an overall rating of Good or Very Good, and almost all of the people (98%) would in some way recommend others to participate in future editions of Environmental March at the UDC.

Graphic: Overall rating of Environmental March 2024.



In addition, the evaluation form contained questions for the analysis of the impact of the course on people, before and after having participated in the training modules. The results, which are shown in Image 7, reflect that starting from 55% of people with previous knowledge in sustainability, the perception of improving their knowledge rose to 86%, of which 22% considered it key to their training.



Perception of the people who responded to the assessment survey regarding their learning in sustainability after attending the training modules. (A) "Your knowledge/interest in sustainability issues BEFORE attending this course was..."; (B) "Your knowledge/interest in sustainability issues AFTER attending this course is...".

The number of participating people (students, teachers and staff) for both principal initiatives (Environmental March and A Mariña Environmental), show a very good reception of the program throughout the editions from the beginning to the present day (year 2023/2024), consolidating the proposal as a successful experience.

Acknowledgements

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