
EDUCATION FOR SUSTAINABILITY



SUMMARY PROJECT

2022/2023



INDEX

PAGE

1. EDUCATION FOR SUSTAINABILITY: ALCOA FOUNDATION AND UNIVERSITY OF A CORUÑA	3
2. PRESENTATION AND CALENDAR	4
3. ACTIVITY SAMPLES	
3.1. 'A MARIÑA ENVIRONMENTAL PROJECT'	5
3.2. 'ENVIRONMENTAL MARCH UDC 2023'	8
3.3. ONLINE ECOLOGICAL FOOTPRINT CALCULATOR	10
3.4. OTHER ACTIVITIES	11
4. RESULTS	
4.1. PARTICIPATION	12
4.2. METRICS	12
4.3. EVALUATION	13

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), 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 2022-2023 and with the co-financing of Alcoa Foundation. The project was effective in two locations of the Galician region: the Campuses of University of A Coruña, and 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.

The chosen area A Mariña is composed of 15 municipalities, which comprise a population of 70,000 people, including approximately 5,000 students and more than 300 teachers. The area reaches about 50 educational centers, covering from early childhood education to high school, and also including specialized centers, such as music, language or sports schools.

The UDC area includes A Coruña and Ferrol cities with their metropolitan area, more than 600,000 inhabitants. The university community reached about 18,850 students in 2022 and more than 2,850 employees.

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 provinces of A Coruña and Lugo, therefore including the A Mariña Lugo region (Image 1).

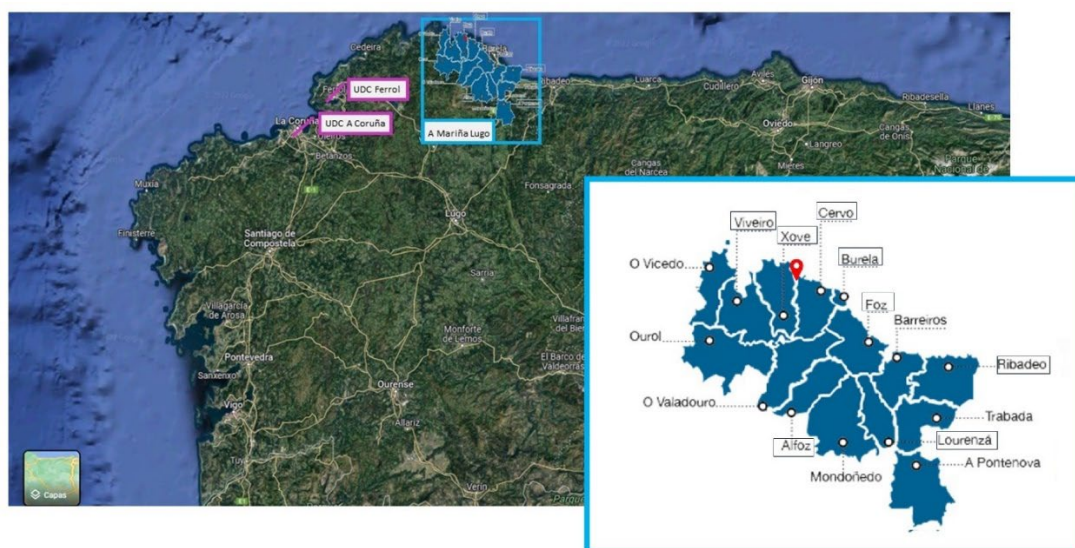


Image 1. Geographical location of the development sites of the 'Education for Sustainability project': University of A Coruña (Coruña and Ferrol campuses), and Comarca da Mariña Lucense (the municipalities of the primary and secondary education centers directly involved in the project are labelled with a blue box; in red: location of the Alcoa San Cibrao factory).

2. 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.

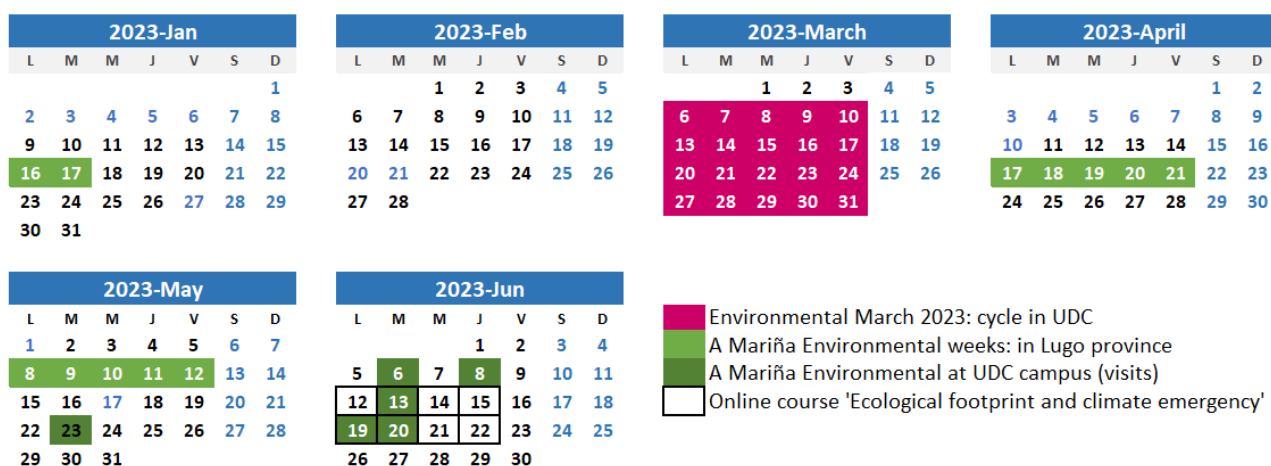
This is a multidisciplinary environmental education project that covers a wide range of ages: from children's, primary and secondary education to the university audience. The target audience are students, but also including the teachers and workers in educational centers, such as administrative assistants, 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 2022/2023 also took place.

It continued as well with the second 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 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 face-to-face or teaching activities took place, but please notify that the programming, organization, monitoring and evaluation also took place between the months of September and December 2022, and the implementation of environmental projects of A Mariña schools extended until July 2023.



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 2) 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



Image 2. Examples of explanatory sheets for two 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 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 one of the developed activities as well as a description of sustainability projects (full report in Galician contains the details of all activities).

M2.4. 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 twelve 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 17th: CEIP Pedro Caselles Rollán (Xove).
- ✓ April 18th: IES Alfoz Valadouro (Alfoz).
- ✓ April 19th: CPR Landro (Viveiro).
- ✓ April 19th and 21st, and May 9th: CEIP Fondo Nois (Foz).
- ✓ April 20th: IES Perdouro (Burela).
- ✓ May 8th: CEIP Gregorio Sanz (Ribadeo).
- ✓ May 10th: CEIP Juan Rey (Lorenzá).
- ✓ May 9th and 11th: CEIP Cervo (Cervo).

Scope:

Number of class groups	Number of students	Level/age
23	465	Elementary and Secondary school

To this number, a total of 25 teachers responsible of the groups should be added.

Results: After carrying out a waste collection of between 1 and 2 hours, in all cases waste of various types was found. There were groups that specialized in micro-plastics, while others came to find large bulky ones that could not be removed and had to be notified to the council.

The majority of the waste corresponded to litter boxes, heavy waste such as nets or lines, single-use plastics, personal hygiene utensils, clothes, etc.

Field activity



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 Coruña, sustainability projects were carried out in four centers (Table 1).

Table 1. Sustainability projects implemented in A Mariña centers in 2023.

Center	Requested project	Sustainability line
CEIP Pedro Caselles Rollán (Xove)	"Rainwater collection for drip irrigation in the vegetable garden"	Water
IES Monte Castelo (Burela)	"Laboratory energy autonomy"	Energy
CEIP Fondo Nois (Foz)	"Selective collection in the classroom"	Waste
IES Marqués de Sargadelos (San Cibrao)	"An ecological garden: sustainability and humanity"	Natural resources

In this way, a system for the selective collection of intra-centre waste was installed at the CEIP Fondo Nois (Foz), necessary for the educational community to correctly carry out the separation at source. The realization of the project involved an audit of waste in the centre, the location of separation islands in the classrooms, the preparation of the global project and the acquisition of waste bins. Due to its participatory nature, the students were involved in the design of the bin posters (Image 3).



Image 3. Posters designed by CEIP Fondo Nois students for the project, drip irrigation system at CEIP Pedro Caselles Rollán and low-energy laboratory equipment at IES Monte Castelo.

In the water line, with the aim of responsible consumption and saving of this precious natural resource, the rainwater collection system for drip irrigation of the school vegetable garden of CEIP Pedro Caselles Rollán (Xove) was installed. As far as the power line is concerned, the center project of the IES Monte Castelo (Burela) involved the renewal of high-consumption scientific equipment with another of low energy consumption. This center has a professional training line and uses the material daily, achieving a saving of 1750 kWh/year, equivalent to 90% of the energy consumption in the previously existing situation.

Fourthly, this edition included a transversal sustainability project in the line of conservation of natural resources, "An ecological vegetable garden: sustainability and humanity", requested by IES Marqués de Sargadelos (San Cibrao). The project included the installation of a greenhouse in the center for the practice of cultivation during the school year, including horticultural varieties that without the infrastructure would not have the opportunity to grow given the location of the center. The vegetable garden will also allow the use of organic waste in situ, after composting, contributing to a more circular economy.

3.2. 'ENVIRONMENTAL MARCH UDC 2023'

This was the fifth 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, and a street-theatre performance, among others.

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

Sustainable and healthy food | Wind energy | Climate crisis and ecological emergency | Energy efficiency
Environmental volunteering | Responsible mobility | Composting and waste prevention | Plastic pollution
Ecological and water footprint | Ethical technology | Eco-audits | ...and more.

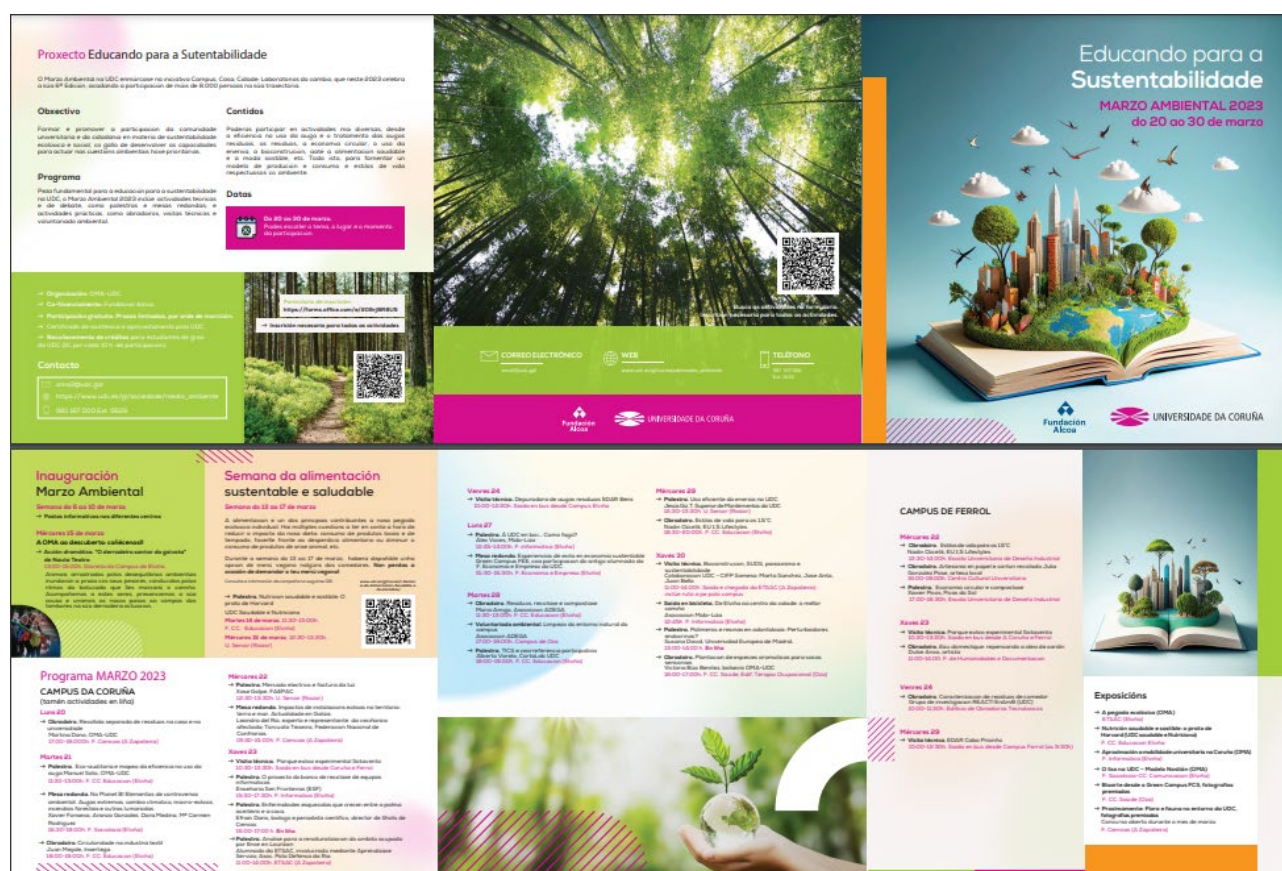


Image 4: General view of the 'Environmental March 2023' leaflet, distributed at educational and administrative centers of the UDC.

As an example, the following page shows the summary of two of the developed activities (the full report in Galician contains the details of each of the activities, available at https://www.udc.es/gl/sociedade/medio_ambiente/curso/):

Conference: Lifestyles for 1.5º

DATE: March 22th and 29th, 2023

PLACE: Elviña and Ferrol Campus

ATTENDANCE: 58 people



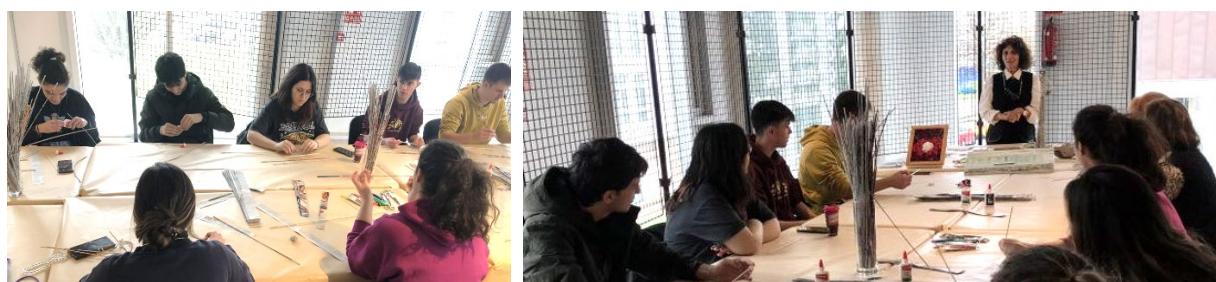
One of the items of *EU 1.5 Lifestyles project* was a puzzle game that represents the carbon footprint. Each piece turned out to be habits to reduce the personal ecological footprint, and the purpose of the game was to reduce it to the goal of the Paris Agreement. The presentation was completed with a questionnaire for promoting expression in the issues of personal habits when it comes to reducing the carbon footprint.

Workshop: Crafts in recycled paper and cardboard

DATE: March 22nd, 2023

PLACE: University Cultural Center (Ferrol)

ATTENDANCE: 15 people



The workshop was divided into two parts: First, Julia González Pose, a local artisan, gave a short talk in which she showed the attendees her works and how she made each of them. In addition, she also taught in a simple and simplified way different techniques for working with used paper. In the eminently practical workshop, the attendees made their own objects out of paper and cardboard (jewelry, containers...).

Environmental volunteering: Cleaning of the campus natural environment

DATE: March 28th, 2023

PLACE: Oza Campus

ATTENDANCE: 41 people



The Oza Campus is integrated in the same-called neighborhood. It has many green areas and is next to Oza's beach. The a task of manual collection, achieved result of 8 bags of garbage of all kinds, about 160L in volume, and highlighting the abundance of cigarette butts collected.

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). 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 2022/2023 are shown in Table 2 and Image 5. To estimate the amount of CO₂ avoided, an average reduction of 5% in declared per capita emissions after participation in the project's activities was considered.

Table 2. Participation on EMAPIC-OMA carbon footprint tool (2022/2023).

	MOBILITY	WASTE	ENERGY	WATER	Total GHG avoided
Course 2022/2023 (n ^{er} contributions)	62	246	59	158	7,928 kg CO ₂
Emissions (kg CO ₂ /person-year)	1,356.37	115.16	708.50	27.4	

^a Based on the consumption of 150 L of water per person and day (average value for Galicia) / GHG: Green House Gases.

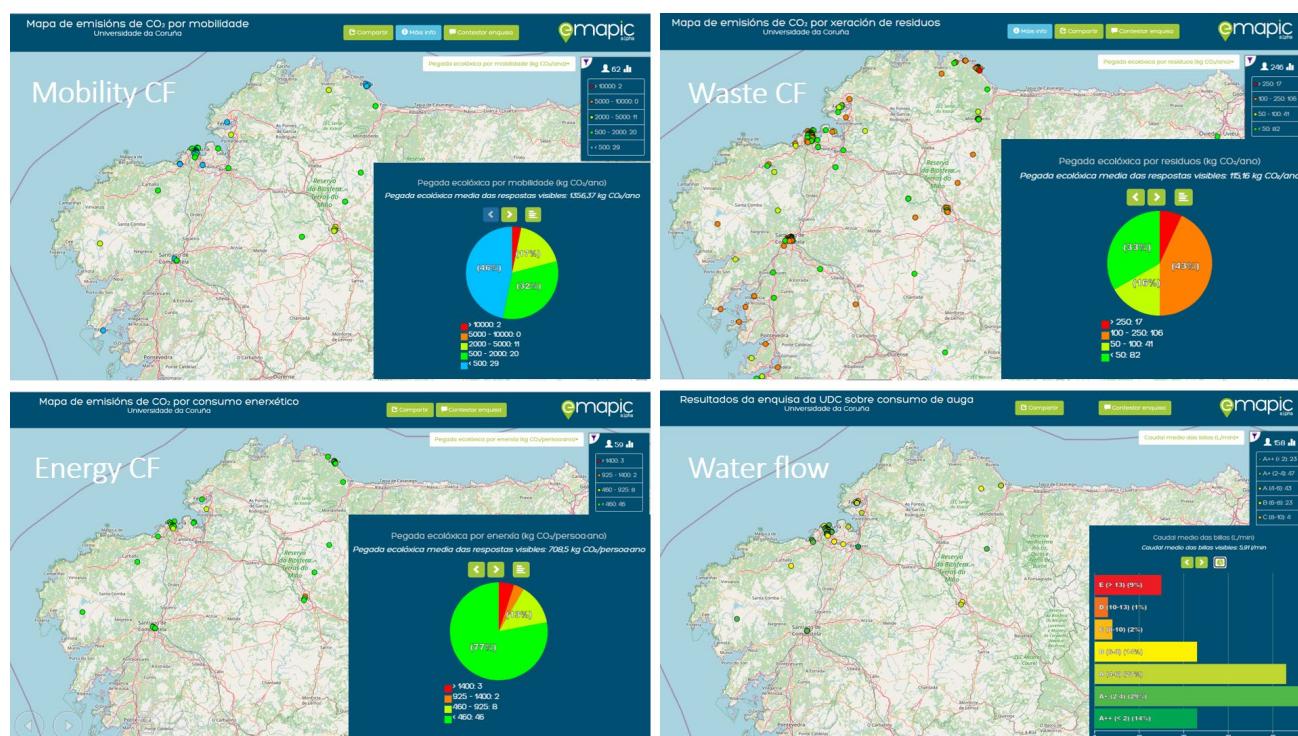


Image 5. Geolocation and graphics obtained for the contributions at carbon footprint (CF) and water use equipment (water flow) during the course 2022/2023.

3.4. OTHER ACTIVITIES

ONLINE COURSE 'ECOLOGICAL FOOTPRINT AND CLIMATE EMERGENCY'

Online course for being conscious about our personal carbon footprint and also the contributions of the University of A Coruña for decreasing the associated emissions.

The course with 12 people enrolled and with 8 completed successfully, was developed on the Teams platform from June 12 to 22, 2023. 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 3.

Table 3. Some statistic results of Emapic tools from online course.

Parameter	Media	SD	Max.	Min.
Water consumption (L/person-day):	119	39	150	61
Waste generation (per person, kg/d):	0.89	0.29	1.24	0.45
Ecological footprint of the waste generated (kg CO ₂ /year):	65	29	118	50
Carbon footprint by consumption of Energy at home (kg CO ₂ /person-year):	400	539	1479	0
Ecological footprint due to mobility (kg CO ₂ /person-year):	2,946	4,240	12,033	0



By applying the same criterion, average reduction of 5% in declared per capita emissions, the total GHG avoided achieved 1,373 kg CO₂.

WASTE AND COMPOSTING AT FERROL CAMPUS

In the 2022/2023 academic year, progress was made in the line of waste management on the Ferrol campus, started in the past 2021/2022 academic year as part of the present project. The composting area implemented then, was maintained until present with the contributions of the university canteen and the quality parameters were monitored. During the 2022/2023 school year, more than 1,9 ton of food scraps were recovered, with which 444 kg of compost was produced, for use as top quality fertilizer in the urban vegetable garden in this campus.



In addition, characterization of waste in all educational centers was carried out (results in Table 4), being obtained the percentage of waste properly separated at source for recycling, which was currently 38% (65.5% gross separate collection). This means that 2546 kg of paper and light packaging were recovered for recycling, including 111 kg of aluminum. The activity concluded with the report of a new model proposal for the separate collection of intra-center waste, emphasizing the recovery of organic matter.

Table 4. Waste composition (%) of teaching centers of Ferrol Campus.

	Organic matter	Light packaging	Paper/ Cardboard	Rest
Faculty of Humanities and Documentation	9.5	9.9	76.8	3.8
University College of Industrial Design	5.8	10.2	46.6	37.4
Faculty of Labour	10.0	22.8	41.1	26.1
Polytechnic University College of Engineering	9.6	23.0	45.1	22.3
Faculty of Nursing and Podiatry	1.6	25.1	27.4	45.9

4. RESULTS

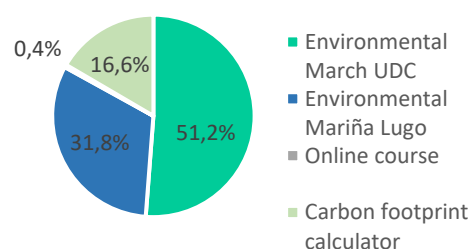
4.1 PARTICIPATION

The results obtained in the project regarding the hours of involvement of the participants were **a total of 3,609 hours and 3,162 people**, what implicates 1.14 hours per person of training in sustainability.

Approximately 50% of the participation took place during the 'Environmental March at UDC 2023', that achieved more than 1,600 implicated people in one month of diverse activities.

Table 5. Participation in 'Education for Sustainability' 2022/2023 Project: numbers per module of formation (left); percentage of participation (right).

	Persons (number)	Hours (number)
Environmental March UDC	1,622	1,670
Environmental Mariña Lugo	1,007	1,701
Online course	8	80
Carbon footprint calculator	525	158
TOTAL	3,162	3,609



4.2. METRICS

Table 6. Expected and obtained metrics in Education for Sustainability Project 2022/2023.

CONCEPT	Expected	Obtained
Number of communities to be impacted by this initiative	2	4 ^a
Environment		
Number training hours A Mariña	900	1,701
Number training hours UDC	2000	1,828
Number of individuals (students) to be trained to support environmental initiatives A Mariña	300	1,007
Number of individuals (students) to be trained to support environmental initiatives UDC	200	170 ^b
Number of teachers to be trained to support environmental initiatives	20	60
Number of environmental initiatives to be created	2	4 ^c
Bodies of water to be restored	2	2 ^d
Expected reduction of CO ₂ in tons	20	46.2
Expected reduction in energy use in kWh	40000	50000
Reduction in/avoidance of waste generation in tons	10	8.8
Tons of aluminum to be recycled	2.0	2.0
Tons of non-aluminum to be recycled	20	29.0
Education		
Number of teachers expected to be trained to deliver academic improvement programs	20	60
Number of schools expected to be impacted by academic improvement programs	16	26 ^e

^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) Environmental March, 2) Environmental A Mariña, 3) Emapic calculators for EF, 4) Other disperse activities, i.e. online course, composting.

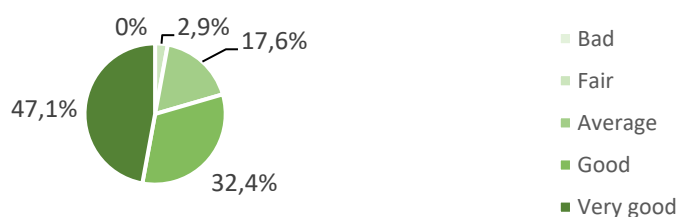
^d Restored bodies of water were where the cleaning of the natural environment took place: (1) fresh water from the Lagar river (A Coruña), (2) Bens beach (A Coruña) and almost 12 beaches of the Mariña Lucense (12 days of beach cleaning in the Marina).

^e Study centers directly affected by the academic improvement programs are: 15 at UDC (Faculty of Sociology, Faculty of Communication Sciences, Faculty of Philology, Senior University, Faculty of Sciences, Faculty of Labor Sciences, Higher Technical School of Civil Engineering, Faculty of Economics, Faculty of Education Sciences, Faculty of Physiotherapy, Faculty of Law, Technical Superior School of Architecture, Study-Support Building in Ferrol, University School of Industrial Design, Ferrol University Cultural Center), and 11 at A Mariña (CEIP Cervo (Cervo), CEIP Gregorio Sanz (Ribadeo), CEIP Juan Rey (Lourenzá), CEIP Fondo Nois (Foz), IES Marqués de Sargadelos (Cervo), IES Perdouro (Burela), IES Monte Castelo (Burela), IES Alfoz Valadouro (Alfoz), CPR Landro (Viveiro), CPR Martínez Otero (Foz)).

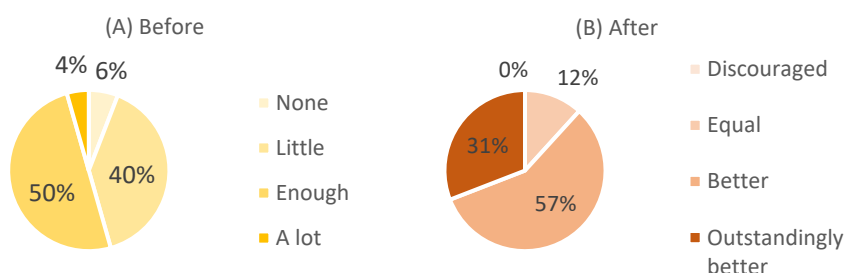
4.3. EVALUATION

The assessment of more than 50% of participation, included at 'Environmental March 2023', was done using a webform in which 68 assessments by anonymous participants were obtained (Graphic 1) with an overall assessment of **79,5% Good or Very good**, percentage that also recommends other people to participate in future editions of Environmental March at the UDC.

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 Graphic2 reflect that despite the fact that 46% respondents said they had zero or low prior knowledge, then 88% of them achieved a perception of improvement in their knowledge, and 31% considered it key to their training.



Graphic 1. Overall rating of Environmental March 2023



Graphic 2. 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...".

On the other hand, on April 21st, 2023, the presentation for the 'A Mariña Environmental Project' was held, inviting the press. Students and staff were also present at the event that took place at CEIP Fondo Nois (Foz). The event was attended by Raquel Vázquez, director of the San Cibrao Aluminum plant, Martina Dono, Technician of the UDC Office for the Environment, Francisco Cajoto, Mayor of Foz and Xoán Bieito García, Director of CEIP Fondo Nois (Image 6). The local media echoed the news, which was published in the following newspaper (Image 6), El Progreso (<https://www.elprogreso.es/articulo/a-marina/mas-de-mil-a/202304211807341658572.html>).



Image 6. Presentation ceremony of the 'A Mariña Environmental Project' (left); Clipping from one of the newspapers that covered the news of the closing ceremony (right).

Other news related to the program can be consulted at the following links:

<http://www.edu.xunta.gal/centros/ceipfondonois/node/1151>

<http://www.edu.xunta.gal/centros/iesmarquessargadelos/taxonomy/term/203>

Acknowledgements

Co-financing

Alcoa Foundation

Participants

Domingo Calvo Dopico, Vice-Rector for Economy and Strategic Planning

Pedro Vega Marcote, teacher of Science Didactics

M^a Jesús Rodríguez Guerreiro, teacher of Chemical Engineering

Collaborations

Green Campus UDC Committees

OMA-UDC Scholarship students

Faculty and staff of the UDC

Teachers and staff of A Mariña – Lugo, Primary and Secondary Educational Centers

Project coordination:

Manuel Soto Castiñeira, director of UDC Office for the Environment

Management:

Martina Rey Dono and Verónica Torrijos, Technicians of UDC Office for the Environment

