



IMPRINTING SUSTAINABILITY: From Theory to Practice

PART III IMPRINT+ PRACTICAL GUIDELINES FOR OFFSETTING ACTIONS

Part III is all about action and getting your hands dirty!

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FOREWORD

This report is the materialization of IMPRINT+ Output 1. It consists of a multidisciplinary evidence based state-of-the-art summary research report regarding environmental sustainability, best practices and environmental action and is divided in three separated but complementary parts available to download at <http://imprintplus.org/>

Part I ENVIRONMENTAL SUSTAINABILITY FRAMEWORK: an overview

In Part I you get all the basic introductory theory and data to contextualize IMPRINT+.

Part II IMPRINT+ CASE STUDIES

Read Part II for inspiration and a quick introduction to green entrepreneurship!

Part III IMPRINT+ PRACTICAL GUIDELINES FOR OFFSETTING ACTIONS

Part III is all about action and getting your hands dirty!

The authors would like to thank all project partners for their contributions and express gratitude to the projects, organizations and researchers that kindly provided images to illustrate the report.

ABOUT IMPRINT+

IMPRINT+ aims at the promotion, at a transnational level, of an ecological reasoning based on the changing power of local community and on the participation, empowerment and entrepreneurship of young European citizens. IMPRINT+ is a transectorial project that brings together 6 partners from 5 countries, each with different experiences and perceptions. The project's methodology is based on establishing the state-of-the-art approaches regarding education for sustainability, IT technologies and ecological footprint offsetting. The project starts with an integrative research that will enable the project team to consolidate already existing know-how in the above-mentioned areas and better define the project's innovative edge within its context of use. It will also help the team establish a roadmap that will reinforce the project's up-to-date nature in the long run.

IMPRINT+ is coordinated by the [University of Aveiro](#), in Portugal, in partnership with the [Municipality of Lousada](#), where the project's field actions are taking place; [LeaveNoTrace Ireland](#), a leading Irish NGO in the field of environmental good practices; [ISS Cipolla-Pantaleo-Gentile](#), a science school of Sicily, Italy; [IES Pedro Jiménez Montoya](#), a secondary school of Baza, Spain; and [E.N.T.E.R.](#), the European Network for Dissemination and Exploitation of EU Project Results, located in Graz, Austria.

For more information visit <http://imprintplus.org/> and follow us at <https://www.facebook.com/erasmusimprint>

If you must print this report, make sure you use recycled paper and print on both sides!

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IMPRINT+ aims to provide the tools and the knowledge to empower all citizens to take positive actions towards the environment. In Part III we present practical guidelines to implement different offsetting actions suggested in the **IMPRINT+ App**.

Can we reduce all our individual environmental impact to zero? Probably not, however, as previously seen, it is possible to reduce it to sustainable levels and make use of our “fair share” of the planet’s capacity and resources. As for the things that you cannot reduce any more or avoid doing, such as showering, use motorized transport to get to school or work, well, you can offset!

IMPRINT+ will help you to take positive actions for the planet. Use the **CONVERTER** to simulate which measures you would have to take in order to compensate for the environmental impacts of air travel, private or public transport, daily shower, clothing, paper use, fast food consumption, waste production or even for the hours that you spend with electronic entertainment!

Have fun, offset and earn points by submitting the offsetting activities that you have done: planting trees, removal of invasive plants, collecting waste, building wildlife shelters, wildlife ponds, organic vegetable gardens or even environmental volunteering!

Remember to register all offsetting actions with the IMPRINT+ App!



“ IMPORTANT

An adult should be present and responsible for supervising and coordinating all offsetting actions. All safety measures regarding procedures and equipments must be previously explained to all participants and followed. All participants must use appropriate protective equipment (e.g. gloves, closed shoes, etc.) according to the activity.

3.1 TREES

Have you ever planted a tree? As you will learn with IMPRINT+ CONVERTER, everyone should plant a few trees each year!

When a native tree is planted and it successfully develops throughout the years into an adult tree, have you ever considered the amount of benefits generated by that tree over time? Just think: trees produce clean oxygen (O²), capture carbon dioxide (CO²), neutralize greenhouse gases emissions; they are the building blocks of many habitats and ecosystems where other plants, mosses, lichens and fungi grow, providing habitat, shelter and food for mammals, birds, reptiles, amphibians, insects and other invertebrates; finally, trees provide and support many vital ecosystem services.

Besides, tree planting can be fun! Just remember, always plant native tree species from your region and at the right time of year!



1. The best time for planting trees is during the dormant season: in autumn after leaf drop or in early spring before bud break.

2.

Choose an appropriate location according to the tree species characteristics: consider climate, surrounding habitat, soil type, lighting conditions, moisture, etc.

3.

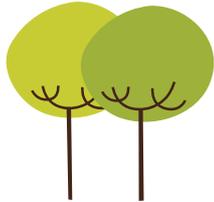
Dig a hole 3 times wider than the root ball, but no deeper than the root ball.



4.

Make sure that the root flare is above the soil and not covered (use a piece of wood or the shovel handle placed horizontally to check the height).

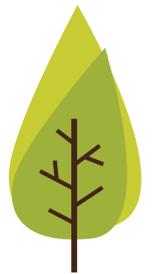
- 5.** Confirm if the soil on the sides of the planting hole is not compacted and the base of the planting hole where the root ball sits is firm and stable.



- 6.** Set the tree in place and remove the container or wrappings.



- 7.** Make sure the tree is vertical and start to fill the planting hole with backfill soil, but leave the top of the root ball uncovered.



- 8.** Make sure the tree is stable and stake if necessary, be careful and do not damage the roots.



- 9.** Water to settle the soil, but without over packing it.



- 10.** Finally, mulch over the backfill area (never against the trunk) to reduce competition with weeds and to conserve soil moisture.

[Click here](#) to see a tree planting video #1

[Click here](#) to see a tree planting video #2

3.1.2 CHOOSING TREES

Always plant native trees! Use the following list as guidance and know more at the [European Atlas of Forest Tree Species](#).

PORTUGAL



Alnus glutinosa (L.) Gaertn., common or black alder.

Betula pendula Roth, silver birch and downy birch
(*Betula pubescens* Ehrh.).

Castanea sativa Mill., sweet chestnut.

Corylus avellana L., European hazel or common hazel.

Fraxinus angustifolia Vahl.

Ilex aquifolium L., European holly.

Juglans regia L., common, English or Persian walnut.

Juniperus oxycedrus L., prickly juniper.

Olea europaea L., olive.

Pinus pinaster Ait., maritime pine.

Pinus pinea L., stone pine.

Populus alba L., white poplar.

Populus nigra L., black poplar.

Prunus lusitanica L., Portugal laurel.

Quercus ilex L., holm oak or evergreen oak.

Quercus pyrenaica Willd., pyrenean oak.

Quercus robur L., pedunculate oak.

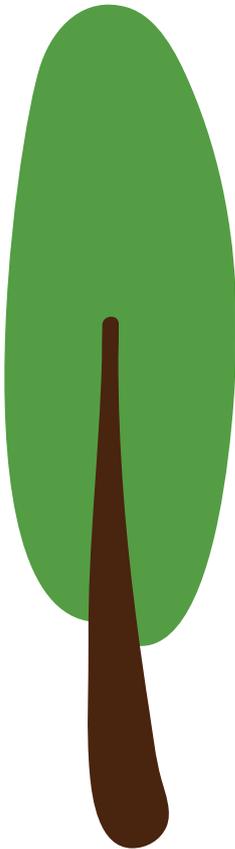
Quercus suber L., cork oak.

Salix alba L., white willow.

Sambucus nigra L., elder.

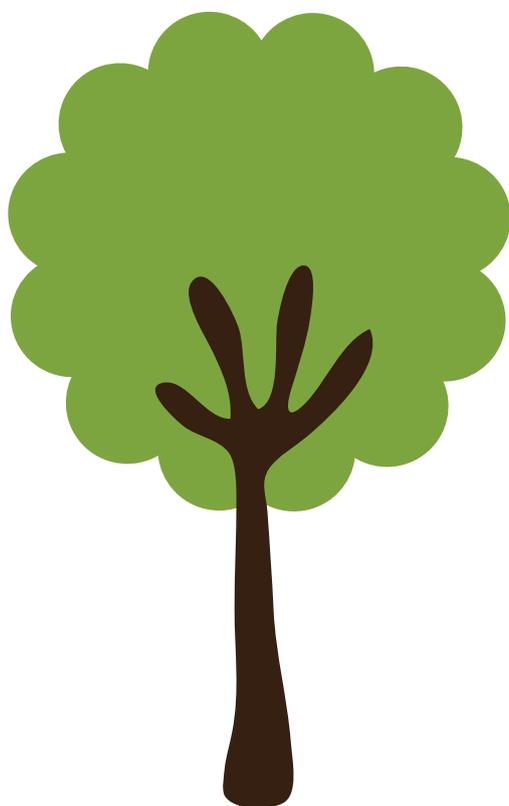
Ulmus minor Mill., field elm.

ITALY



- Acer pseudoplatanus* L., sycamore maple.
Alnus cordata (Loisel.) Duby, Italian alder.
Alnus glutinosa (L.) Gaertn., common or black alder.
Carpinus orientalis Mill., oriental hornbeam.
Castanea sativa Mill., sweet chestnut.
Celtis australis L., southern nettle tree or European hackberry.
Corylus avellana L., European hazel or common hazel.
Cupressus sempervirens L., Mediterranean or common cypress.
Fagus sylvatica L., European beech.
Fraxinus ornus L., manna ash.
Ilex aquifolium L., European holly.
Juglans regia L., common, English or Persian walnut.
Juniperus oxycedrus L., prickly juniper.
Olea europaea L., olive.
Pinus halepensis Miller, aleppo pine.
Pinus nigra J.F. Arnold, European black pine or black pine.
Pinus pinea L., stone pine.
Populus alba L., white poplar.
Quercus cerris L., Turkey oak.
Quercus ilex L., holm oak or evergreen oak.
Quercus pubescens Willd., pubescent oak.
Quercus suber L., cork oak.
Salix alba L., white willow.
Sambucus nigra L., elder.
Ulmus minor Mill., field elm.

SPAIN



Alnus glutinosa (L.) Gaertn., common or black alder.

Castanea sativa Mill., sweet chestnut.

Celtis australis L., southern nettle tree or European hackberry.

Corylus avellana L. European hazel or common hazel.

Cupressus sempervirens L., Mediterranean or common cypress.

Fraxinus angustifolia Vahl, narrowed-leaved ash.

Ilex aquifolium L., European holly.

Juglans regia L., common, English or Persian walnut.

Juniperus oxycedrus L., prickly juniper.

Olea europaea L., olive.

Pinus halepensis Miller, Aleppo pine.

Pinus nigra J.F. Arnold, European black pine or black pine.

Pinus pinaster Ait, maritime pine.

Pinus pinea L., stone pine.

Populus alba L., white poplar.

Populus nigra L., black poplar.

Prunus spinosa L., blackthorn.

Quercus ilex L., holm oak or evergreen oak.

Quercus pyrenaica Willd., Pyrenean oak.

Quercus suber L., cork oak.

Salix alba L., white willow.

Sambucus nigra L., elder.

Ulmus minor Mill., field elm.

3.2 ORGANIC VEGETABLE GARDEN

“

Reduce your **food miles** by locally growing organic herbs and vegetables!



CREATE A VEGETABLE GARDEN IN 10 STEPS

- 1.** First of all, consider the following factors: vegetable garden size, type of plants, amount of time that is available for gardening and maintenance, individual plant requirements and sowing, planting and growing seasons.
- 2.** Analyse all possible locations for your vegetable garden and consider:
 - sun exposure: most plants need 6-8h of sunlight. Prefer south-facing locations and protected from strong winds;
 - access to irrigation water;
 - soil quality: look for well drained soils and rich in organic matter;
 - terrain slope: prefer level terrains;
 - possible sources of pollution and contamination;
 - accessibilities and storage of equipment (shovel, buckets, gloves, etc.)
- 3.** Plan your vegetable garden layout: make a drawing including the pathways, growing beds, water points, irrigation system, compost area, etc.
- 4.** Mark the perimeter of the vegetable garden. Identify wild edible, medicinal or ornamental small plants and shrubs that you want to keep and remove unwanted grass, shrubs or any other vegetation.



5. Mark out the paths and the growing beds: make sure that you can easily reach the center of the growing beds from both sides of the pathway. This way you avoid stepping and compacting the soil. [[About raised beds construction](#)].
6. Prepare the soil by digging the first 20-30cm and, if needed, add compost or animal manure to the bottom.
7. Plant and sow according to individual species requirements (depth, spacing, season, etc.). When possible, use regional plant varieties because they are best adapted to local conditions. Favour non-transgenic and organic seeds.
8. Make a border around the vegetable garden with aromatic herbs, flowers and small edible shrubs such as blueberries, raspberries, etc.
9. Build a compost bin. Remember that all waste from the vegetable garden can be composted as well all raw vegetable waste from the kitchen.
10. Do not neglect the maintenance of your vegetable garden: water when needed, remove weeds, add compost, be aware for signs of pests and diseases, keep pathways clear of weeds, etc.



DO NOT USE SYNTHETIC CHEMICAL FERTILIZERS, PESTICIDES OR HERBICIDES!



[School gardening resources \(RHS\)](#)

[A crop-by-crop guide to growing organic vegetables \(Mother Earth News\)](#)



3.3 WILDLIFE SHELTERS

Every animal needs a home and in the following section you will learn how to build houses for birds, bats, amphibians, reptiles and bugs!

Habitat lost and fragmentation, overexploitation, alien invasive species, climate change,... Biodiversity is facing many threats and it needs your help! By building wildlife shelters and placing them in appropriate areas you are contributing to the protection of local biodiversity.



VERY IMPORTANT

Always Leave No Trace in any habitat and do not disturb plants or animals.

Never remove any wild animal or plant from nature and keep in mind that all wildlife species are protected under national and EU law. Wildlife colonization must come naturally to your garden, pond or wildlife shelter.

Always have adult supervision and adequate use of protective equipment and clothing when using tools.

3.3.1 BIRDS



There are more than 10.000 species of birds in the world and Europe is home to more than 530 regularly occurring wild bird species! Like every other animal, birds need a home, so why not help local biodiversity and build nest boxes?

Birds exist in every continent and are capable of remarkable achievements, for example they can travel great distances: the bar-tailed godwit (*Limosa lapponica*) holds the record for the longest non-stop flight, having travelled [11.500 km from Alaska to New Zealand](#) in 9 days and the Arctic tern (*Sterna paradisaea*) is capable of travelling 90.000 km every year! Birds are also a very important group of animals because they are crucial for seed dispersion, pollination, food webs and nutrient recycling. At last, who does not appreciate a bird song or their majestic flight?



Explore these websites for information and instructions about bird nest boxes building and make your own research to find which species are more common in your area.

[BTO Nestbox Guide \(BTO\)](#)

[Frequently asked questions \(RSPB\)](#)

[How to make a house martin nest \(RSPB\)](#)

[Nest Watch \(Cornell Lab of Ornithology\)](#)

[Nestboxes \(RSPB\)](#)

[Nestboxes for owls and kestrels \(RSPB\)](#)

[Nestboxes for small birds \(RSPB\)](#)

[Make a nest box \(Looking out for birds\)](#)

[Making a nestbox \(RSPB\)](#)

[Nest box activity \(RSPB\)](#)

3.3.2 BATS

There are more than 1,200 bat species in the world and in Europe there are about 45 species of bats, accounting for 20% of all European mammals. Bats play a key role in maintaining ecosystem services across different habitats by controlling pests, acting as pollinators or seed dispersers. Nevertheless, bats, like many other groups of animals, are facing many threats such as habitat loss, fragmentation and also persecution, leading to the decline of many populations.



You can do something to help these animals! Want to learn how to build a house for bats? Explore the following websites and make your research to find out which species are more common in your region and learn more about their biology, habitat and diet.

[Bat Box Information Pack \(Bat Conservation Trust\)](#)

[Bat boxes \(Bat Conservation Trust\)](#)

[Build a bat box \(RSPB\)](#)

[Common Questions about Bat Houses \(Organization for bat conservation\)](#)

[EUROBATS](#)

[Living with bats \(Bat Conservation Trust\)](#)

[Put up a bat box \(BBC Breathing Places\)](#)

[Tenho morcegos em casa, o que devo fazer? \(in Portuguese\) \(ICNF\)](#)



3.3.3 HERPETOFAUNA



Did you know that you can make shelters for amphibians and reptiles with simple natural materials? And that there are 151 species of reptiles and 85 species of amphibians in Europe? Contribute to their conservation and build shelters for their hibernation during winter or to take refuge in during the summer heat.

Amphibians and reptiles are very important in ecosystems but also to the health of your vegetable garden! For example, adult amphibians are very effective predators of slugs, worms, insects and many other invertebrates and therefore, are an excellent natural pest control. Reptiles will also naturally help to keep away undesired inhabitants from your vegetable garden: they are natural predators of invertebrates and small mammals such as rodents!



Explore the following websites for instructions on how to build wildlife shelters for these animals and make your own research and investigate about your local herpetofauna diversity!

[Amphibians in your garden: your questions answered \(Natural England\)](#)

[Create an amphibian home \(BBC Breathing Places\)](#)

[Hibernacula activity \(Froglife\)](#)

[Make a frog and toad abode \(RSPB\)](#)

[Make a wood pile \(BBC Breathing Places\)](#)

[Making a toad home \(Froglife\)](#)

[Reptiles in your garden: your questions answered \(Natural England\)](#)

[Toad abode activity \(Froglife\)](#)

3.3.4 BUG HOTEL



Bugs also need a place to live so why not build them a magnificent “hotel”? You will be amazed with the diversity of insects and other invertebrates that will take shelter and live in community! Think about how important they are in food webs and nutrient cycling.

Want to know more? Make your own research and observations and check out these websites for ideas!



[Build a bee home \(BBC breathing places\)](#)

[Build a bug hotel \(RSPB\)](#)

[Building an insect hotel habitat \(The wildlife trusts\)](#)

[How to build an insect hotel from found materials \(Inhabitat\)](#)

[Insect hotel activity \(Froglife\)](#)

[Make a bug Hotel \(RHS school gardening\)](#)





3.4 POND

Wildlife ponds are important but threatened habitats! Did you know that besides being a high biodiversity habitat, ponds are essential for the reproduction of many plants and animals? When you build a good wildlife pond you are directly encouraging local biodiversity, contributing to flood control, CO₂ sequestration and other ecosystem services. Besides, they look beautiful in any garden or park and can be even used as a living lab for educational purposes!

HOW TO BUILD A POND IN 10 STEPS:

- 1.** When choosing the site, consider:
 - slope: look for a flat terrain or with minimal slope;
 - sun exposure: good exposure with partial shading;
 - nearby ponds, streams or other water bodies;
- 2.** Size and depth: at least 5m² in area and 30cm in depth at the deepest part for small ponds and up to 70 cm for larger.
IMPORTANT: always consider safety issues, accessibility, local regulations and permissions.
- 3.** Retain water in the pond: the most common option is to use a pond liner – never use plastic.
In alternative, if the ground has a high content in clay, you can compact the bottom to make it more impermeable.

4.

Plan your pond construction:

- make a layout of the site;
- design the pond shape, plan the shallow and the deep parts. Avoid steep slopes and aim for minimal slope along margins;
- list materials and equipments to be used in the construction and ensure that you have enough participants;
- consider building a fence around the pond to restrict access to young children and animals.

5.

Mark the perimeter of the pond and clear the vegetation.

6.

First, remove the topsoil (organic layer) and then, excavate the inorganic layer to the desired depth and store separately both layers. Remove any stones or roots than can damage the liner and compact the bottom of the pond.

7.

Apply the protective layer: use old carpet, straw or any other material that will prevent the liner from being damage.

8.

Apply the impermeable liner, fill the bottom with water and secure the liner in the outer margin with soil and stones.

9.

Place some bigger stones inside the pond. In alternative, you can cover all the surface with smaller rocks.

10.

Colonization will happen naturally! Optionally, you can add a few native aquatic plants.



MORE INFORMATION [Pond creation \(Froglife\)](#)

“

IMPORTANT

- Never introduce fish! They will feed on dragonfly larvae, tadpoles and frog spawn, reducing biodiversity!
- Never introduce invasive aquatic plants (e.g. *Elodea canadensis*, water hyacinth *Eichhornia crassipes*, etc.) or animals (e.g. pond slider *Trachemys scripta*, *Gambusia spp.*, etc.).
- Even in small sallow ponds, take all measures necessary to ensure the safety of young children.

3.5 INVASIVE PLANT SPECIES

The spread of alien invasive species is amongst the top threats to biodiversity and it is time you do something about it! Get to know some of the most common species and learn how to control them.

Investigate which are more problematic in your region, where they are and which type of control methods are more successful. Contact your local environmental NGO's, municipality, environmental and forestry services or invasive species control projects that you know of.

NB: Remember it is very important to seek expert advice on the removal of invasive species, as attempting to remove it using the wrong method, can actually increase the spread rather than prevent it.

Acacia dealbata | **silver wattle (en), mimosa (pt, es, it)** | [fact sheet I](#), [fact sheet II](#)

Acacia longifolia | **Sydney golden wattle (en), acácia-de-espigas (pt), Acacia a foglie lunghe (it)** | [fact sheet](#)

Acacia melanoxylon | **Australian blackwood (en), austrália (pt), acácia negra (es), acacia dal legno nero (it)** | [fact sheet I](#), [fact sheet II](#)

Arundo donax | **giant reed (en), cana (pt), canna domestica (it), caña común (es)** | [fact sheet I](#), [fact sheet II](#)

Carpobrotus edulis | **ice plant (en), chorão-da-praia (pt), uña de gato (es), fico degli Ottentotti (it)** | [fact sheet I](#), [fact sheet II](#)

Cortaderia selloana | **pampas grass (en), erva-das-pampas (pt), hierba de las Pampas (es), erba delle Pampas (it)** | [fact sheet I](#), [fact sheet II](#)

Robinia pseudoacacia | **black locust (en), robínia (pt), robinia (it), falsa acacia (es)** | [fact sheet I](#), [fact sheet II](#)

Tradescantia fluminensis | **Wandering Jew (en), erva-da-fortuna (pt), tradescanzia sudamericana (it), amor de hombre (es)** | [fact sheet I](#), [fact sheet II](#)

Pittosporum undulatum | **Pittosporum (en), árvore-do-incenso (pt), pittosporo ondulato (it)** | [fact sheet I](#), [fact sheet II](#)

Phytolacca americana | **American pokeweed, fitolaca (es), tintureira (pt), fitolacca americana (it)** | [fact sheet I](#), [fact sheet II](#)

EXPLORE THESE WEBSITES FOR MORE INFORMATION



[Atlas das plantas aloctonas invasoras de Espanã](#) (in Spanish)

[A thematic contribution to the National Biodiversity Strategy Plant invasion in Italy - an overview](#)

[Delivering Alien Invasive Species Inventories for Europe \(DAISIE\)](#)

[EASIN \(European Alien Species Information Network\)](#)

[Fichas del Atlas de las plantas alóctonas invasoras de España](#) (in Spanish)

[Invasoras](#) (in English and Portuguese)

[The European Network on Invasive Alien Species \(NOBANIS\)](#)

FIGHTING THE INVADERS

It is not an easy fight! Biologists prefer to use the term “control” instead of “eradication” because some invasive species, once the invasion reaches a certain level, are very difficult to eradicate completely, making almost impossible to reverse the invasion. Therefore, early detection is very important to amplify the chances of success.

Your help is fundamental to win this battle! Learn more about biological, chemical and physical control methods in this [series of videos](#).

3.6 WASTE

In 2008, an average European citizen produced 444 kg of household waste and indirectly generated 5.2 tonnes! It can be very challenging to avoid making any waste at all because almost inevitably we produce it in our daily routines. Despite the fact that we need to make all possible efforts to reduce the production of waste, starting with our buying choices, it is time to take practical action and make our local communities cleaner!

However waste can cause greater problems when it is found in natural environments. It is important that while we are trying hard to reduce the amount of waste we create, the waste materials that are created are sent to the appropriate places to be managed effectively. Litter and waste present significant threats to our native wildlife. Collecting litter on an organised litter pick, is a great way to clean up our natural areas and protect the wildlife that live there.

IMPRINT+ challenges you to contribute to the improvement of the environmental quality your local community and to make planet Earth more clean! For sure you can identify litter near you: at the beach, in the urban park, at the corner of your street or even in your school playground. Organize a group of friends or get in touch with local environmental NGO's and ask for their help. Identify areas that need intervention, plan a cleaning action and act! Collect safely as much waste as possible and dispose of it properly!



FOR INSPIRATION!

“Limpar Portugal”

Did you know that in Portugal on the 20th of March of 2010 an unprecedented event took place, when a group of citizens was able to organize a nation wide event with more than 100.000 volunteers that collected 50.000 tons of waste from the forests, resulting in the cleaning of more than 10.000 sites? The event had massive participation at several levels gathering both private and public, individual and collective and profitable and non-profitable entities: at least 155 schools participated, 147 groups of scouts, 484 private companies and public institutions, 18 fire-fighters departments, 290 city councils and around 3.000 parish councils.

Versova beach cleaning

[Watch this video](#) to see an extreme example of a beach cleaning in Mumbai, India. Started by a civic movement, more than 500 volunteers collected trash during the weekend, resulting in the removal of around 610.000 kg of waste!



