

Annexes



Annex 1

3 Applied Activities

Annex 1 outlines a set of 3 activities focusing on the conception and development of 3 posters on the subject of the sustainable development of the local woodland ecosystem in the regional Biosphere Reserve: “From nature to culture and green economy”.

Activity n°1:

Conceiving and Designing Poster n°1: Discovering the local Mediterranean woodland ecosystem in the Biosphere Reserve

► In order to implement this activity, as with the forthcoming ones, the ESD educator (working in a secondary school context here) and the BR officer need to plan the work, especially the field visit. They elaborate the stages of the activity together (see chapter 3 and 4 of this Resource Book, parts 3.2 and 4.4 on the MAB BRs’ management system, management plan and management body, see chapter 6, part 6.2 on the requested characteristics, skills and training for the ESD educator).

Before the field visit, they study several local areas of woodland in the Biosphere Reserve in order to examine their possibilities, diversity and limitations and ultimately choose one local area of woodland where the evolution (succession) of the ecosystem has reached some climax or at least some mature stage of growth. They gather necessary documentation so as to provide the pupils with survey maps, cadastral maps (land registration maps), precisely documenting the history of the forest plot and its uses over time. They also provide scientific research results on the forest area (taxonomy research results, floristic and faunistic inventories, national forest inventories), and any documentation helping to identify the biocenosis composition.

For Activity n°2 and Activity n°3, they proceed in a similar manner, planning the content of the activity (especially the field visit) beforehand. Instructions are specified accordingly.

Step 1, in class, before the field visit:

► In class, the ESD educator (teacher or “guest” co-educator in class) introduces the typical chosen ecosystem in the local area. We recommend choosing the holm oak forest which represents the mature plant formation between 200 and 600 meters around the Mediterranean basin (meso-Mediterranean vegetation belt). With regard to the field visit, the educational team (ESD educator and BR officer) locate, whenever possible, a corresponding forest area in the surroundings.

► The ESD educator shows pictures of a typical holm oak forest as mature and stable forest formation:

- What are the main characteristics of **holm oak** (*Quercus ilex*) as a species? Pay particular attention to: its appearance, shape, its straight but stocky trunk, its robustness, the tough leaves, the fact that it is an evergreen species, its trunk evolving with age.its broad ecological valence...

- In what way has it adapted to the variability of the Mediterranean climate: precipitation and temperature fluctuations, dry sunny summer, rainy and mild winters or sometimes cold weather?

- Where does it grow (on calcareous soils, on “terra rossa”, on shallow grounds and rocky outcrops, on soft grounds)?

- What does a mature holm oak forest look like? Most of the time, it is composed of coppiced woodland. As foliage is dense, light barely penetrates and the undergrowth is scarce, composed of specific companion plants: evergreen shrubs and adapted herbaceous plants (see below).

► The ESD educator shows survey and cadastral maps to explain the history of the forest plot.

- He can describe *Quercus ilex* as a very old species dating back from the Miocene = 15 million years ago.

- During the Neolithic era with its agro-pastoral societies, *Quercus ilex* is favoured as woodland that is suited to clearing and burning.

- With continuous and regular growth through vegetative propagation, the holm oak forest withstood massive consumption as firewood from the middle Ages through to the industrial era with its furnaces and brickworks.

► The ESD educator illustrates this historical overview through the relevant documentation.

He explains how heavy economic demand has maintained growth as coppiced woodlands (from stump sprouts or root suckers).

Also, how it has led mature formation to recede as the tree is being cut faster than it can regenerate (excessive pressure)...

Step 2, in the field:

► Once in the field, the BR officer joins in to further organize the field visit with the ESD educator, possibly accompanied by resource people like a tracker (familiar with species and their habitats).

► After walking inside the holm oak forest, the learners are invited to produce sketches of their environment in the individual notebook they have each received prior to the field visit (part of which is used as a sketchbook).

► They try to capture the plasticity of the trunks, their irregularity, their somewhat undulating curved lines, the elevation of the trees (though not that tall, sometimes joining their canopies to create an arch effect).

Using paint or coloured pencils, the pupils capture the colour and texture of the bark, initially smooth and olive-coloured, growing darker and cracked over the years. They draw and paint details like the big

egg-shaped acorn in the autumn, they concentrate on the varied shrub strata in places, composed of evergreen species like turpentine tree (*Pistacia terebinthus*) and its crimson coloured fruit (in the autumn), the elegant foliage of boxwood (*Buxus sempervirens*) and the scarce herbaceous layer...

► With guidance from the educating team (ESD educator as teacher, BR officer, tracker), the learners compile an inventory of the typical species living in the holm oak forest in their corresponding habitats. To that end, they use worksheets designed to note down and record the information (see Annex 2 of this Resource Book on Indicative Worksheet page 245). The same worksheet is distributed in number to the different groups of learners concentrating on different parts of the environment. The document is designed as a table to be filled in by the participants: First it requires a broad description of the habitat: Is it in the shrub stratum? At the herbaceous layer level? Up or on a living tree? In relation to the tree's roots and surrounding soil? On the trunk and branches? In the crown and foliage? On senescent trees? Then, it requires a specific description of the micro-habitats: in large trunk cavities? In tree bark cracks? In a humid and dark area of the forest's soil? Under the leaf litter? Some specifications can be added concerning the quality of the space, the temperature, the soil qualities (e.g. acidity) of the defined area.

► Once the resources and conditions of identified habitats have been described, and with help from the pedagogical team, the learners relate them precisely to the relevant associated species and compile information in the worksheet. Local species (with heritage value) such as the stag beetle (*Lucernus cervus*) which is associated with dead rotting wood in its larvae state but eats nectar and fruit as an adult insect...or the Aesculapian snake (*Zamenis longissimus*) particularly fond of warm forested habitats (see Figure 1 of this Resource Book, page 13), especially among high growing coppices...(where the tracker can be of precious assistance)...

► Equipped with cameras, the pupils take photographs of any trace of animal presence or life in their habitats. They also record beautiful plant specimens in their environment.

► The learners take time to identify species in their classifications: which class do they belong to within their kingdom?

Are they insects, myriapods, mammals, birds, reptiles, amphibians, or fish? Are they angiosperms or flowering plants? Do they belong to the gymnosperm group of plants? (non flowering seed plants like conifers)? Are they ferns or mosses? Do they belong to the other kingdoms like fungi? Are they mushrooms or lichens? The groups use a colour-coding system to classify the species depending on which kingdom they belong to.

► The BR officer introduces flora and fauna inventories and surveys carried out in the region.

► The ESD educator guides the discussion around qualitative and quantitative elements of the local ecosystem using the inventory which has just been compiled: they discuss species variety, proportion of types of species within their kingdom: what general proportion of bryophytes (mosses, hornworts), what proportion of seed plants (conifers, flowering plants)? What proportion of insects in comparison to mammals?

► The class also tries to evaluate a general proportion of invertebrates (insects, worms, snails...) in relation to the Mediterranean forest as habitat.

► They then refine their results: can the pupils identify an average proportion of coleopterans among the insects? As detritivores, coprophagous, or xylophagous insects, they fulfill important ecological functions. Their number generally indicates the degree of maturity and health of the forest ecosystem.

In comparison, coleopterans represent 30% of the insects within a French national forest like Fontainebleau, insects representing 49% of the number of identified species within that forest, and insects representing 68% of the species in a rich primary forest like *Bialowieza* in the Republic of Belarus and Poland. What about mammals, representing less than 1% of species in most of the earth forest? How are they represented in the Mediterranean woodland? What do these numbers reveal?

Step 3, back in class:

► Back in class, the pedagogical team organizes a group discussion appraising the findings of the field visit.

► The pedagogical team draws the learners' attention to the state of health of the local woodland, introducing some of the issues that will be addressed in Activity n°2.

► They discuss key questions:

Is the holm oak forest formation developed enough to show real potential in terms of biodiversity (lichens, mycorrhiza, detritivores)? Is the coppiced woodland managed so as to show some real degree of evolution? In places, does it shape into high and dense forest stands?

Is it dark enough to absorb heat? Reduce evaporation? Favour humus-bearing soil? Does humus reflect biological diversity? Are dead trees or senescent trees totally absent? Is the state of conservation of the holm oak forest favorable in terms of natural dynamic?

► The BR officer and the ESD educator highlight the major role of biodiversity in fulfilling precious ecological functions in the ecosystem.

Some plants increase primary production (through the concentration of their seeds, mass and number), some others have the property of concentrating nitrogen (and distribute it to other plants through their roots), numerous species of mushroom and

insects act as decomposers and, as such, are crucial to the life cycle of the forest; some facilitate mineral absorption through tree roots (mycorrhiza), others attack wood (xylophagous insects) and soften it so that other organisms can continue with decomposition. Are these species well represented in the studied ecosystem? They clearly are a sign of the ecosystem's good health and productivity.

► Then, all participants start conceiving poster n°1 entitled: **Discovering the local Mediterranean woodland ecosystem in the Biosphere Reserve.**

Beforehand, with guidance from the pedagogical team, the learners will have placed 3 large panels of paper onto the walls.

They are to agree on the way each panel will be used in the course of the 3 activities:

- Wall panel n°1 corresponds to Poster n°1, wall panel n°2 corresponds to Poster n°2, and wall panel n°3 corresponds to Poster n°3.

- For each poster, **the central part of each wall panel is occupied by a major drawing** illustrating the studied theme of the poster, i.e. for activity n°1, the central drawing depicts the typical Mediterranean woodland ecosystem with the inside of the holm oak forest.

- **Subdivisions are organized on each side** of the central drawing, i.e. for activity n°1, the worksheet results showing the species and habitats inventory are introduced on one side of the central drawing, while

on the other side, chart pies are compiled highlighting the outcomes of the species percentage assessment exercise.

► **For the central drawing:** the learners who produced the best drawings in their individual notebooks during the phase of drawing in the field are invited to draw similar but enlarged parts in the poster.

► **For the side elements,** learners stick as many worksheets as available and reproduce images on the poster indicating species and habitats in all the studied micro-habitats of the forest.

► They conceive a pie chart to show the results of their inventory and percentage assessment exercise: In this pie chart, they divide species by kingdoms corresponding to coloured slices in the pie chart and show the wide domination of invertebrates (among the animal kingdom) in the ecosystem. They show the proportion of mushrooms and lichens. They specify a rough total number of surveyed species (according to local scientific inventories) and the number of species in each kingdom. In comparison, they introduce the pie chart describing species composition and richness in a primary forest used as reference.

What conclusions do they come to?



Activity n° 2: Conceiving and Designing Poster n°2: The traditional and sustainable woodland use system: cultural aspects and values

The ESD educator explains that next step is about developing a better understanding of the traditional woodland use systems and their link to the cultural heritage and diversity of the area through organized meetings, discussions and guided visits with the resource people in the field.

Together with the BR officer, who can play a vital role on this issue, they prepare the field visit: they identify the resource people, the actors involved in woodland use management, also motivated by transmission and education, and draft the main lines of their intervention together.

Step 1, in class, before the field visit:

► To start with, the ESD educator proposes to capitalize on what has been learned during phase 1. In class, he summarizes:

- The natural holm oak forest as old-growth formation is rare.

- Patches of natural forest can be found near inaccessible or rough places spared by logging.

- In general, the common holm oak forest that can be found is often a medium to low rate productivity ecosystem. This as a result of stress caused by long-lasting periods of repetitive logging or fire, but sometimes also due to the “closure” of the ecosystem when mechanical or hand clearing and brushing practices that help forestry activities and ecological functionality to perpetuate... have disappeared.

► He points out 2 conclusions from Activity n°1:

- In its wide extent the Mediterranean woodland has become a mosaic of ecosystems. Since the Neolithic era, the holm oak forest has been “opened” by regular natural fires started by thunder or by human communities who have used it extensively. It has become a land mosaic of shrub areas, scrublands garrigues, grazing areas and in places agroforestry and sylvopastoralism areas where rural communities carry on raising animals (pigs in oak stands...), growing cereals under tree cover.

- In the best cases, the woodland is still managed as a mosaic of well maintained agricultural landscapes but it can also be threatened by agricultural decline and the abandonment of good practices or threatened by destructive practices like repetitive fire, slash-and-burn ill mastered practices, overgrazing, clear-cutting...

► As a preliminary to the second field visit, the ESD educator shows pictures of traditional woodland management systems based on cultivation, growing practices, breeding practices (see chapter 8 of this Resource Book, box page 181 on Possible brainstorming activities).

Step 2, in the field:

► Back in the field, the BR officer introduces the resource people who are going to animate parts of the visit.

It is possible to start with professionals from the pastoral activity, mixing generations, with a traditional shepherd, a dairy farmer, a shearer, contemporary breeders.

The idea is first to establish a connection between the current state of the forest and the human activity, then to show the woodland use management as a sustainable, fertile and currently adequate land use system, finally to explore the cultural and ethical dimension of these practices as living heritage.

► The traditional shepherd leads the group to specific areas and establishes connections between modified states of the forest like garrigues and his pastoral activity.

He points out the plant cover composed of scattered shrubs on compact limestone:

- How it used to be woodland composed of holm oaks;

- How it was burned to obtain pasture land;

- How the use of seasonal slash and burn practices to renew, enrich the herbaceous layer and provide fodder grass... has been common;

- How this technique can be destructive;

- How intensive repeated fires on the same area can lead to plant cover and soil destruction;

- How fire can be an auxiliary with the practice of controlled burn; how it is ill mastered and badly used today;

- How a neglected pasture land can grow back faster into a Kermes oak (*Quercus coccifera*) garrigue or phrygana (in Greece). The Kermes oak being particularly adapted to fire and bringing in a floristic association of shrubs and herbaceous plants: thyme, rock rose, coronilla, buckthorn... enriching the local mosaic of ecosystems and biodiversity;

- How the repeated use of fire will transform this garrigue of shrubs into a low garrigue of thorny and aromatic plants: the rosemary garrigue, made of lavandula, juniper, thyme, condimental and essential oil plants.

► The learners take notes in their notebook and pick up one sample (for the whole group) of the main species composing the garrigue formation(s) they are visiting. They will later make a herbarium from them, illustrating the ecosystem.

► Then the shepherd or the breeders highlight the sustainable dimension of his woodland management through pastoralism.

► They show how the holm oak forest offers diversified pastoral resources in relation to its plant strata: bunch grasses (*Brachypodium*) on the soil, bushes like buckthorn (*Rhamnus alaternus*), tree heath (*Erica arborea*) and even manageable foliage that can be reached by the animals or cut by the herders and breeders.

They explain how their management of pastoral resources is about balancing the pressure of grazing and the resources of the environment; how adapted and subtle management is at stake, assessing the impact of each action...

- How heavy grazing on the soil strata will transform it: *brachypodium* being replaced by brome grasses;
- How the disappearance of woody shrubs will alter the tree layer;

- How breeders or herders can enrich the herbaceous layer and the grass land with seedling grasses.

- ▶ The learners are invited to spot and photograph some impacts of sustainable pastoral management on the forest (clearings, differences in tree cover, balanced pasture zones).

- ▶ Then the professionals from the pastoral activity show the tools, objects and practices used during their sylvo-pastoral management? How do they sow? Obtain seeds? Prepare them? Improve parts of the woodland by selective clearing or hand-brushing it? What actions and tools does this management involve?

- ▶ The shepherd can show his traditional tools: pruning knife, billhook, hoe, crook, satchel; he can even show the use of them, miming some situations.

Other tools and objects can be introduced, comparing traditional ones and more modern ones like the sheep shearing hand clippers and the electric sheep shears, or the dairy professionals with moulds and cheese strainers used during the processing of cheeses.

- ▶ The professionals talk about the evolution of their tools and techniques.

- ▶ The learners proceed with quick sketches of the tools or compile short texts describing the actions implied by these practices and techniques using their newly acquired simple technical vocabulary.

- ▶ In addition to the pastoral activity, the pedagogical team invites the learners to discover traditional agro-sylvo-pastoral systems which create typical cultural landscapes whose high social and historical value has been underlined and enhanced by the UNESCO World Heritage Convention.

- ▶ The ESD Educator and the BR officer introduce the concept of **cultural landscapes** to learners, particularly the second category of “organically evolved landscapes” which result from an initial social and economic imperative.

The region of the Serra de Tramuntana in Majorca with its system of terraces and paved roads is a good example of cultural landscape, particularly of “continuing landscape” in the category of the “organically evolved landscapes” as typical Mediterranean agricultural landscape which retains an active social role in contemporary society closely associated with the traditional way of life.

The *Montados* (in Portuguese), *Dehesas* (in Spanish), *subérais* (in French) situated in the Alentejo region (south-central region) of Portugal, could also soon be

classified as cultural landscapes on account of their exceptional universal value.

However, while this classification as cultural landscapes due to the “outstanding universal value” of the sites is significant, it is worth noting that traditional woodland use systems are common around the Mediterranean basin.

- ▶ The educating team describes the old agrarian ecosystems shaped by the association of scattered trees (oaks) and an underlayer of herbaceous plants. The trees are very often oaks, sometimes holm oak (*Quercus ilex*), mostly cork oak (*Quercus suber*).

It is particularly relevant to require the participation of contemporary operators from *Dehesas* or *Montados* at this stage of the activity.

- ▶ They can present these areas as multifunctional systems of woodland use, sometimes defined as pasture areas, sometimes as cereal cropping areas, often as woodland exploitation areas through the production of cork.

- ▶ Whichever representatives are present - cork harvesters, farmers, breeders - they introduce *Dehesas* or *Montados* as fertile ecosystems fulfilling a number of ecological functions.

- ▶ Although in the field, the learners are invited to work in a group and constitute a **collective web chart** with the central concept of *Dehesas* or *Montados*. They plan to use a large-sized sheet of paper for this purpose and remember to take it in the field (see chapter 8 of this Resource Book pp 182-183, on the organization and the illustration of web charts).

- ▶ To begin with, they determine by themselves the first 3 following satellites: **Natural Resources, Conservation of Habitats and Monitoring**, in which they list for instance all the characteristics connected to natural and maintained soil fertilization, a fundamental aspect of *Montados* sustainability.

- ▶ In the satellites, learners can quote the cork oaks’ tree tops which stay green (foliage is renewed once a year) and enrich the soil with the organic matter and nutrients from the litter; the importance of animal droppings (birds of prey such as *Aquila adalberti*, *Circaetus gallicus*, *Hierattus pennatus* nest in the *Montados*); the symbiotic association of the cork oak’s roots system made of extended but also superficial roots (a particularly suitable habitat) with an important number of mycorrhizic mushrooms species, allowing the transfer of nutrients to all layers of soil...

They make complementary drawings on these aspects in their individual notebook.

- ▶ Then, the resource people put the emphasis on *Dehesas* or *Montados* as ecosystems based on integrated sustainable management.

From these explanations, the learners derive other satellites to their web chart like **Carrying Capacity, Production Activities, Monitoring System**.

They then fill in their chart with the corresponding terminology (that they phrase themselves) of fitting practices.

► The pasture areas for instance are presented as **integrated management places** for 1. herbaceous plant biodiversity (more than a hundred herbs species have been registered in a 1000 m² Montados plot) favoured by farmers in their enrichment of their genetic pools, associated with 2. scattered cork oak formations (and their natural fertilizing capacity) and 3. indigenous cattle breeds, particularly adapted to this production system.

Alternatively, what is sustainable practice in harvesting cork? Resource people refer to the right time of the year to separate the cork from the tree without causing damage. The best time to check the right humidity rate in the plant's tissues; the first harvest and the poor quality male production cork; the years spent waiting in order to produce high quality cork; the crown or necklace process: a horizontal cut around the plant; the vertical cuts process named "rulers" or "openings"; the delicate extraction process without damaging the underlying "phellogen" or the tree will die...

► Learners record these aspects in their chart and proceed to complementary drawings or make documentary photographs that they compile in their notebook.

► Then the resource people (operators) elaborate on the **cultural aspect** of *Dehesas* or *Montados* or other traditional sylvo-pastoralism systems (like chestnut groves, pig rearing under oaks, cereal cropping, olive groves).

They explain how these systems, as traditional woodland use systems, also define themselves through the knowledge associated to them: theoretical knowledge on species and natural habitats that can be reinforced by scientific knowledge, but also practical knowledge related to resource use and management.

► How this local knowledge is connected to know-how, techniques learnt, material, craftsmanship (from cheese processing, ham, bread or oil making, cork production, cork manufacturing into object (lamp sheds, furniture, cork stoppers), local architecture and housing etc.), taste, products, gastronomy. How also this knowledge is often connected to beliefs, rituals, celebration occurrences, like celebrating dates, village feasts, agricultural rites, markets, festivals, local fairs, all kinds of gatherings and social events for the communities.

► Before proceeding with their web chart, learners are invited to **create a repertory** (kind of compendium) of techniques, tools, products and rites.

In the field, they each take time to compile notes, drawings, photographs in their notebooks, to write texts **describing techniques and actions that form practices**, like, for instance, cork harvesting:

► They break the practice down into several steps (cutting, leverage, collecting...) using the appropriate **vocabulary** and including photographs or drawings of the specific tools (like the hatchet with real sharpness and a handle cut in a bevel) or other tools connected to the storage of bark pieces.

► For the hand-made or manufactured products derived from traditional woodland use systems, the pedagogical team plans visits to local infrastructures or local farms where these products are being processed such as cork stopper manufacturers or in other cases, olive farms, ham processing farms, cheese dairies...

► Learners again concentrate on compiling techniques and **describing the qualities of products**.

► **Tasting sessions** are organized, during which the learners identify and describe subtle differences in textures, densities, tastes, flavours which they compile in their repertoires.

► According to the woodland management systems they concentrate on (e.g. pork rearing under oaks, sylvo-pastoral activity from goats or sheep, additional cultures like olive groves introduced in forests), learners highlight the qualities of very often **guaranteed quality labeled products**...

These can be soft, extremely fresh, refined, hard, pressed cheeses, Pélardon in the National Parc des Cévennes in France or Banon made from Rove goats (*Capra aegagrus hircus*) in southern Provence, or elsewhere in Greece including different types of Fêta cheeses, Kasseri, Kafelotyri...

They may also look at Prisuttu, Corsican raw ham, refined for months and produced from pigs under chesnut trees which give the cured meat a light taste of "hazelnut".

Also Portuguese ham, produced in the typical context of Montados, under Belotta dulce (*Quercus ilex rotundifolia*) whose acorns are sweet, directly influencing the quality of Alentejo ham.

They may be olives, an extremely varied and much consumed product around the Mediterranean and in South East Europe. Learners concentrate on their regional varieties, which are sometimes numerous, from black olives from Nyons, la Pichedine in Nimes (France), to spicy olives in Morocco, Picudo in Baena (Spain), Verdeal, Madural in Mirandella (Portugal)...

It is interesting to describe condiments, labeled olive oils obtained from different olive varieties in the same region; also culinary preparations (like tapenade, aioli from French Provence but also from Cataloña (Spain), from Italy, or recipes based on olives and made differently depending on the region (such as brandade made from cod fish).

► In their repertory, learners relate the woodland use systems (their management, practices and productions) to social events, that punctuate the lives of the various communities, such as celebrations marking the harvest, local fairs, exhibitions, tasting sessions...

► **Back to making their collective chart**, they add 3 new or more satellites which can be: **Communication, Education, Cultural Aspects** that work as entries under which they sum up what aspects (original know how, practice, technique, taste, products...), according to them, should be emphasized and better communicated and transmitted to visitors, young generations, or local inhabitants from the region.

Step 3, back in class:

Then, back in class, all the participants, monitored by the educators, **conceive poster n°2** entitled: "The traditional and sustainable woodland use system: natural resource management and cultural aspects".

► **On the central panel**, they draw a typical example of a woodland use system based on integrated management showing careful and accurate practices. For sustainable pastoral activity for instance, they draw and paint pasture in holm oak forest showing several levels of resource extraction, monitored grazing impacts, pastoral corridors...

► For *Dehesas* or *Montados*, they draw and paint stages of cork harvesting between the first "démasclage" on young trees (20 year old) and proper "écorçage" on mature specimens (around 50 years old); they represent *Dehesas* in spring as a fertile ecosystem, with thick and green undercover, with herbaceous plants in blossom, and with localized presence (through close up images in circles) of identified animal species...they illustrate integrated management through the complementary management of 1. the biological diversity of herbs, 2. the trees as a fodder resource and source of ecosystem enrichment, and 3. the indigenous cattle breeds (or sheep breeds).

► **From their individual repertory and from their collective chart**, they select the best developments and illustrations and **reproduce or stick parts on each side of the central panel**.

They pick up and highlight the indispensable technique, practical knowledge, action, tool, traditional ecological knowledge, meaning system, belief, idea, that is essential to valorize the traditional woodland use system that they have studied and that they are finally illustrating with this poster.

► The ESD educator takes advantage of the poster-making phase to propose **an extrapolation exercise on values**.

► He invites pupils to "name" the characteristics of the traditional woodland use system that they have just drawn and illustrated, such as for the pastoral activity: Different levels of resource extraction;
Different grazing impacts;
Different sized paddocks or parks for grazing;
Combinations of resources;
Grazing routes...

For cork harvesting:

Moisture level;
Minimum threshold for thickness;
Interval to wait between extractions;
Hand arrangement of cork planks in stacks;
Workers specializing in cork removal;
Firm but precise touch of the extractor...

► Then, the learners translate these characteristics into a **vocabulary of values** that refers to convictions or behaviours that our universal community finds important:

Balance;
Alternative;
Measured;
Options...

Or:

Knowledge;
Awareness;
Expertise;
Technique...

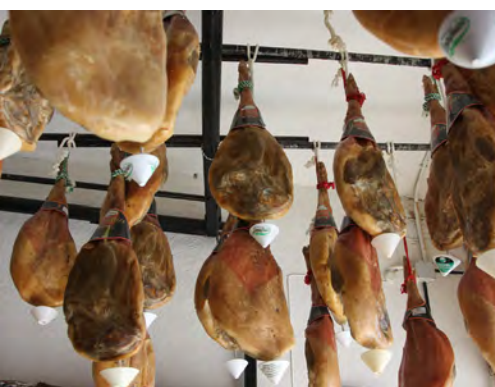
Or:

Responsibility;
Care;
Respect;
Sustainability;
Monitoring;
Holistic;
Cosmology;
Cultural identity...

► The ESD educator and the BR officer can conclude this activity n°2 with a final analysis of the traditional woodland use systems, by **highlighting their cultural aspects and local heritage**.

► They bring in clarifications:

- These systems cannot be reduced to simple forms of ecosystem management. They bear distinctive cultural aspects that make them real territories, or "terroirs" managed by local populations.
- The territory shapes itself, grows an identity through a sense of ownership that animates its inhabitants and which contributes to capacity building.
- When individual feelings of identity and a sense of belonging are shared and fuelled by the historical context (capacity to act collectively and valorize local interests), they can give rise to territorial identity.
- But for a territory to emerge and grow, it also needs to be involved in a development scheme, through the valorization of one or several local resource(s).
- Resources in the broad sense of the term, not only tangible, commercial goods but also collective, non tangible goods like landscape, micro-climate, water resources, myths, historical characteristics, forest... can constitute potential resources to highlight in the context of local development projects.



Activity n°3: Conceiving and Designing Poster n°3: Towards a sustainable contemporary woodland management: an example of green economy

- ▶ After studying the woodland use systems in depth, learners concentrate again on the Mediterranean woodland or “forest” as a whole, in Activity n°3.
- ▶ In class, the pedagogical team raises a few questions and gives advice as preliminaries to an open discussion with the various actors involved in the woodland (stakeholders, users), before elaborating a common management plan of the local woodland (i.e. for learners, educators, resource people).

Step 1, in class before the field work:

- ▶ The ESD educator and the BR officer sum up what has been learned so far:
 - The Mediterranean woodland is a mosaic of ecosystems;
 - Some of them are well-maintained or semi-maintained agricultural landscapes, that learners have just studied as traditional woodland use systems;
 - In parts, the Mediterranean woodland exists as “wilder”, “unused”, sometimes “abandoned” natural space;
 - It is difficult to associate “wilderness” to these patches which have always been known and “traversed” by local populations and used for their multiple resources;
 - However, these patches are “forest”. They must be maintained, preserved as naturality patches, natural habitats for local species, areas of conservation for biodiversity...the necessary pre-requisite for the maintenance of the woodland use systems themselves and their varied local knowledge;
 - As woodland use systems are found in parts of the woodland, it appears that the woodland itself, in all its mosaic, with its wild and unused parts, is the natural “matrix” of the woodland use systems;
 - Does it not require specific management regarding the preservation of life biodiversity?
- ▶ The ESD educator and the BR officer ask learners about their representations of the Mediterranean woodland.
 - They know it is largely a “hand-made” forest. They have seen in Activity 1 how it is not a highly productive forest in terms of biomass but how it maintains a high biological growth due to the low rate of biomass collection on the part of the local population.
 - In addition to these considerations, is it still not as “forest” an “archetype of nature”?
 - A place where human presence is minimal? Where they can find rest and peace? Where they can escape the constraints of modern life for short moments?
 - The educators suggest that the learners make a survey, a kind of investigation among themselves about the motivations, the activities that bring them to visit the Mediterranean forest...so as to better grasp

the expected demands on the part of the public that would shape the social functions of the Mediterranean forest.

- ▶ Following this inquiry phase, the educators invite pupils to prepare the general discussion with all woodland actors; this by means of several interviews of the different types of woodland actors in the field...as concrete exercises to raise questions and engage the general discussion that will follow.
 - ▶ First, the educators split the class into several groups, each in charge of an interview designed for a specific group of woodland protagonists.
 1. Group A will interview the BR manager and officer and collaborating researchers as representatives of conservation, scientific research and monitoring;
 2. Group B will interview the woodland or forest operators (foresters, loggers, herders, manufacturers of essential oils...);
 3. Group C will interview the general public as forest users (families, connoisseurs, people practising sports or activities illustrating the social and recreational demand on the forest);
 4. Group D will interview the forest managers, owners, rangers, representatives of local governments and institutions (there can be connections and possibilities to reduce the number of interviews by merging group A and D for instance).

Step 2, preparing an interview in class, and then leading it in the field

- ▶ Group A thoroughly prepares questioning for the conservationists and environmental experts with help from the BR officer:

What is it that learners want to know about conservation policies applied to the Mediterranean local woodland? They seek to specify:

 - As forest management is not only about wood production but about conservation of biodiversity, of specific natural habitats, of genetic pool and heritage, what methodology is adopted in the field?
 - How is the Biosphere Reserve zonation applied on the ground? Where is the core area situated? What does it consist of? What kind of management plan in terms of conservation? (see chapter 3 of this Resource book page 67 on the MAB BRs' zoning system).
 - As current environment policies from institutions (EU, IUCN, Natura 2000, ONF in France) favour the creation of strict nature reserves or wilderness areas, of old growth stands where plots are kept without management intervention, have Biosphere Reserves integrated such plots?
- ▶ Once they are ready with their questions, learners visit the local Biosphere reserve and get specific answers from specialists.
 - Are the conservation stands situated at the heart of the core zone? What is the level of protection in these stands? How much space is covered? Are the protected

plots (usually small) connected in networks? What level of protection in the buffer zone?

- What faunistic inventories have been carried out? What data banks have been compiled on the reproduction and population of some remarkable species of the woodland ecosystem such as prey birds: *Aigle Royal, Circaète Jean-le-Blanc, Faucon pèlerin, Vautour fauve...*

- What work has been carried out on ecological corridors?

► As they go through their questionnaire to the BR specialists and conservation protagonists, some pupils within the group are in charge of leading the interview and asking questions while others compile detailed answers in their notebook.

► They draw sketches and diagrams when necessary, gather documentation (photos, results from inventories and studies), identify the different plots and corridors, draw maps, produce drawings to visualize better.

► On leading the interview, learners concentrate on interactions between forest managers, engineers, and the Biosphere Reserve management team, on their collaborative efforts. They compile a report about the collaboration, on exchanges in management: What are the lessons learnt? The next steps identified? The follow-up to envisage?

► They also extend their survey to subjects like mitigation of climate change harmful impacts on the Mediterranean forest:

What measures are adopted and experimented to counter the effects of climate change: low wood harvesting rate increases severe forest fire risk; forest die-back linked to climate change still increases biomass as fuel on the soil, so:

What measures are proposed towards adapting tree populations? Reducing population density? Reducing stocking density? Introducing adapted species? What action to counter the effects of extended droughts which reduce fuel humidity and increase fire risk? What measures to combat severe recurrent fires... like setting up firebreaks as protection against fire blazes?

► Group B concentrates on questioning some “professionals” of the woodland, the “economic” operators in the sector, who are foresters, loggers, breeders, technicians.

► The educating team helps the learners to enquire about shared management from these actors, through for instance sylvo-pastoralism as a forest management technique. To extend the use of sylvo-pastoralism as a contemporary forest management technique, beyond its use in localized traditional woodland use systems like *Dehesas* or *Montados*, would mean that it develops into an economically fruitful enterprise for all parties: for the breeders, for the foresters and loggers, but also for the forest managers and representatives of owners who have to manage the forest as a public or private asset at the regional level.

What are the modalities of a multi-economic use of the forest? How can it fit in with the context of bio-economy development? What are the conditions for good cooperation between foresters and breeders in the woodland?

What does a balanced intervention from each actor consist of?

► In order to help the learners in formulating the right questions, the educators propose to perform a role play as a teaser to draft the interview.

► In turn in their groups, the learners are guided into playing the role of a herder, a forester, an engineer discussing about forest management.

Putting themselves in situation, they formulate different scenarios:

• What does the herder appreciate for instance?

H – I appreciate having access to varied and improved pastoral resources, to fodder, especially during the dry summer and along wooded rangelands.

• What does the forester appreciate, and so on...?

F – I appreciate the cleaning and brushing up of the undercover by your animals which often help the trees to regenerate.

I appreciate the guided movement of your animals (cattle) passing through my plot as they create openings easing forestry work.

H – As my herd does not reach the tree crown cover resource (above 2 meters), I appreciate it when you carry out commercial thinning of the woodland leading to improvement of the undercover and fodder enrichment.

• Then, what each partner does not appreciate:

H – I don't appreciate it when you carry out overly strong thinning, or even worse, clear cuts...which create too much light and cause some essential pastoral plant species to disappear.

F – I don't appreciate overgrazing by your animals which totally mow the undercover, causing strong biodiversity loss and destroying the mosaic of tree stands.

E – The forest engineer can expose at what stage the situation becomes critical for local woodland management sustainability...

► From this role play, the learners derive pertinent key questions to put to the forest operators. It is essential that learners interview the different actors together in order to assess the real situation in the field.

Are the conditions for sylvo-pastoralism activity fulfilled? How is it possible to realistically associate breeding production and wood production on the same plot? In what way can woodland pasture and commercial thinning be compatible for a sustainable production of wood and fodder in the forest?

► They ask relevant strategic questions to the foresters: Does the region invest in fuel wood? Can the foresters derive sustainable activity from timber wood thinning, sometimes wood cutting, use of forest die-back caused by climate change?

What are the local market opportunities? Development of new energies (collective or individual wood-burners)? Of local manufactures (recycling or manufacturing timber products, further wood-processing, paper)? Promotion of local wood (through labeling)?:

► They do the same to the breeders:

Is pastoral rearing or farming an activity which is supported locally? Does the production of woodland pastoral resources allow sustainable rearing production? Is the herbaceous layer enrichment favoured by management? Are side-productions like cheese, the gathering of non-timber forest products like mushrooms, a source of additional incomes?

Are the herders paid by the local community authorities to maintain and clear brush hiking trails, bike trails, firebreaks?

► Group C concentrates on the social function of the Mediterranean woodland by interviewing the general public on their expectations concerning the forest.

- What uses do they make of it?

- What are the typical activities of visitors in forest?

- Isn't the simple outside free visit to the woodland a recreational activity practised by most families? What is the exact purpose of it?

- To get some fresh air? To take a breath of "nature"? Escape city life? Stroll around with no particular aim and have a break?

- Learners try to collect some direct information from people in the street.

► They compile notes and try to identify typical visits.

- What kind of other uses, of more specific and intentional visits to the woodland?

► With help from the educating team, learners try to list these uses:

- A place for observation, for discovery, for general or specific knowledge (for curious observers, for amateur or confirmed botanists, zoologists, entomologists, ornithologists...);

- A place of reference for historical remnants (for archaeologists, historians, through archeological vestiges, vernacular architecture, traces of infra-structures, monuments);

- A place to practise sports (from hiking and discovering local forested areas, to practising mountain bike, rock climbing, jogging, to more damaging sports like quad-biking or moto-cross);

- A place to enjoy for its beauty: the educators expand on the aesthetic aspects of the Mediterranean woodland. As such, it has been the "motive" and subject of numerous painting works, a recurrent theme for art movements and schools of painting.

► The educators show pictures of these corpus of works: Van Gogh in the Alpilles, Cézanne and Mount Sainte Victoire, Paul Guigou and the Luberon Massif, Henri Manguin, Pierre Bonnard and the Maures Massif and St-Tropez Gulf, the vegetal landscapes by August Macke in Tunisia, Henri Matisse in Collioure and Spain with the Albères Massif...

► The educators show figurative and recognizable painting reproductions celebrating the beauty of the Mediterranean woodland landscapes in its particular light: the green of foliage (from the grey green of olive trees to the dark green of cypressus), the blue of the sky, the white of lime stone cliffs and "plateaux", the pastel colours of building stones, of rocks and geological substrata, a range of pale pinks and yellows from terra cotta to sandstone...

► Learners enquire about these specific uses of the forest among the local population: who goes to the woodland on the track of painters or because his/her curiosity has been triggered by some painting works? Who goes to the local woodland as a living garden or territory for applied knowledge and experimentation?

► Once learners of group C have enquired about the plurality of these social demands, they can share their results and merge with group D and look into the way these expectations are taken into account by forest managers in their management plan.

► Group D (merged with group C) prepares their interview of forest managers who can be administrators of wooded heritage either for their own account or for the account of somebody else.

How is it possible to combine all these uses of the forest from the mere stroll with your dog to practising sport, hiking or motorcycling, to observing fauna or flora or visiting cultural elements of local heritage like historical remnants or architectural heritage?

► Learners try to pinpoint these important issues:

- Doesn't the practice of some sports like mountain-biking or moto-cross imply the creation of special trails? Of staging areas? Of specific beaconing so as to ease direction in forest and block access to some sites?

- Isn't it possible to combine several itineraries, needs and visits such as strolling, hiking and observing?

- Have managers clearly invested in welcoming a varied public with varied expectations? Have they developed **green tourism** as the driving force of management?

► From what they have learned and reviewed with the help of the educating team, the learners of groups C and D must be able to formulate key-observations and key-questions to the forest managers on the key-subject of **green tourism** derived from the identified social functions of the forest.

► First, learners sum up and present the social representations of the forest as **landscape**, explaining how landscape as a multi-aspect resource can be valorized and highlighted in forest management.

► They are able to summarize to forest managers the following representations of the woodland as landscape:

- The "educational forest" with the geographical landscape, a place of scientific interest, of observation, where observers can learn and experiment; also with the historical landscape which keeps traces and memory of the past through cultural elements;

- The “aesthetic forest” as landscape, a subject of beauty and admiration, also connected with history of art, the subject of past and often contemporary artistic productions and part of the local artistic heritage;
- The “symbolic forest” as landscape which has often been the ground for myths, legends, local stories and representations surviving centuries and still creating fear feelings and emotions.

► Then, they address the key-questions to the managers:

- Have all these aspects of the forest as landscape been valorized? Has the spirit of the place been communicated?
- Have the specific natural aspects of the local forest been enhanced? Like tree stands? Woody species biodiversity? Biological stations as observation sites of the richness of local plants?
- Have the cultural aspects also been enhanced in relation with architectural heritage and historical heritage? For example: archeological vestiges, burial sites, mass graves, Celtic oppida, but also ruins of roman aqueducts, roman quarries, and roman ways, or medieval chapels...
- Have links with History of Art been enhanced? With local recognized painters?

With historical production from major artists in the area?

- Has the connection between regional forest and possible links in literature (Greek poets, Dante...) been exploited?
- Has proper analysis of the social demand and the aesthetic aspects of the forest been taken into account to grasp better the local perceived landscape?
- Have a range of approaches in management been derived from this assessment?
- Have new green tourism initiatives been implemented and have they been followed by the public?

Step 3, back in the class

► Once the interviews are completed, learners go back to their class where all local woodland actors are invited for a general discussion and for the creation of Poster n°3.

► In groups, learners present the results of their survey, of their interview, by stressing the important points and issues that they have identified.

► The educator and the BR officer facilitate the discussion.

They follow the debate, make sure that all participants feel at ease and can express themselves, their values and points of view.

► They prompt discussion starting from these key-points:

- Cannot green tourism in the forest and a limited controlled tourist attendance be the driving force of forest management?
- Does it not imply a win-win system economically-speaking, with commercial exchanges between managers, local actors, local population, and professionals from the tourism sector?

The discussion allows a full exploration of this possibility:

- Doesn't the necessary investment in facilities and the installation of appropriate equipment (visitor reception areas, parking areas, network of various outdoor trails, appropriate trail markings, systems of markers and signs, security and protection fences) imply that wooded areas will be better maintained and monitored by land management specialists (forest managers and owners, BR managers, specialized institutions)?
- Isn't the key factor of success a balanced combination of initiatives, each carried out by professionals in the field, expressing diversified competences and requiring constant collaboration on the part of all actors?
- What is the active role of the BR Management Body (BR manager, BR officer, BR educator) in the forest management plan? In what way does the BR management plan coincide with the forest management plan issued by local authorities in charge of the managed territory? (see chapter 4 of this Resource book pp 84-92 on the development of BRs' management plan).

- How can the BR team help in managing the forest territory in time and space?

- Isn't cultural tourism a way to escape mass tourism and to extend the tourist season throughout the year, reducing over-frequentation and overcrowding of the site?
- Shouldn't the logistics of trail marking be reinforced or more efficient? How to introduce a true logistical plan of trail marking? Of information? With real prohibition (blocked access) and monitoring?
- Have measures such as setting up partial forest area closure to the public been considered? Total closure for security reason (fire prevention)? Limited access? In what way to help identifying areas of trampling? Of flora distinction? Of fauna disturbance? Of increased rate of fire?
- How to fight actively against the deposit of waste? Of dumping? Against all practices damaging trails, tracks and sometimes trees? How to introduce efficient communication systems and “educational” tools on the use of forest?
- How not to exclude anybody and contribute to developing or boosting new and unexploited sectors of production like new crops in forest: olive groves, aromatic plants groves, which can demonstrate their environmental function as fire-fighting capabilities, for instance as “green” fire breaks?

► Once all these issues have been addressed and discussed, the learners, with the educational team and the resource people, summarize every point and **conceive Poster n°3**: an example of applied green economy through the sustainable woodland management plan.

It takes the form of a large format detailed concept map (see chapter 8 of this Resource book pp 184-188 on the development of concept maps) containing all the necessary entries and developments and highlighting the relations and mutual benefits related to the economic, social and environmental aspects of local woodland management.



Annex 2

Indicative Worksheet for the Water Quality Test

Name / Group:	
Sampling Site:	
Date /time:	
Temperature:	
Type of Water:	<input type="checkbox"/> Fresh <input type="checkbox"/> Saline <input type="checkbox"/> Sea
Physical Properties	
Odor: ¹	
Color: ²	
Turbidity: ³	
Other observations:	
Water Quality Factors	
Acidity (pH)	
Dissolved Oxygen (DO mg/L): ⁴	
Alkalinity: ⁵	
Phosphates (mg/L): ⁶	
Nitrates (mg/L):	
Hardness: ⁷ (mg/L equivalents of CaCO ₃)	

1. Certain odors may be indicative of organic or non-organic contaminants that originate from municipal or industrial waste or from natural sources.

2. Can be caused by decaying leaves, plants, organic matter or by the presence of copper, iron, manganese, etc.

3. A measure how much light can filter through the water sample. Caused by the presence of suspended matter (organic and inorganic).

4. Dissolved oxygen is by diffusion from the surrounding air; aeration of tumbled water; and as a product of photosynthesis of aquatic plants. Its levels may be reduced due to overfertilization, rise of temperature, etc.

5. Alkalinity is a measure of the acid-neutralizing capacity of water. It is usually reported as equivalents of calcium carbonate (CaCO₃) (same as hardness).

6. Phosphates and nitrates are naturally found in water, and plants require these nutrients to grow. Elevated levels in water (inputs from sewage or fertilizers), can lead to eutrophication (excessive algal growth and subsequent oxygen deficiency) in freshwater which has an adverse effect on wildlife.

7. Hardness is most commonly associated with the ability of water to precipitate soap. Chemically, It is often defined as the sum of polyvalent cation concentrations dissolved in the water, the most common being calcium (Ca₊₊) and magnesium (Mg₊₊).

Annex 3

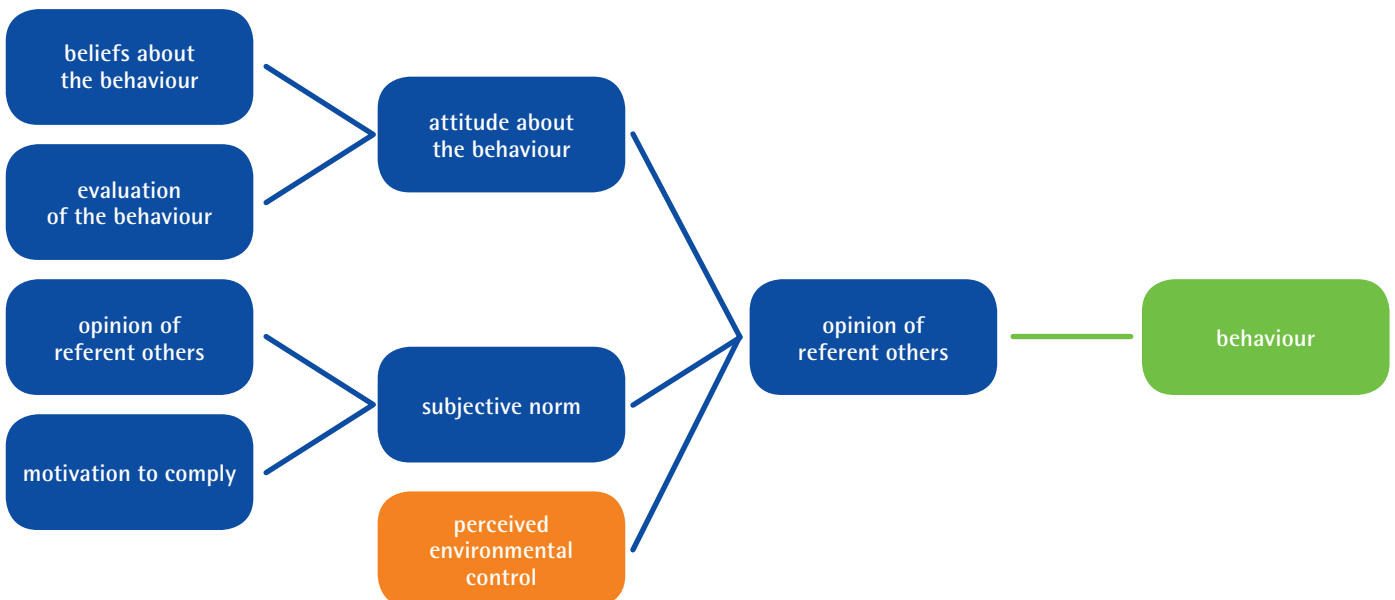
Behaviour change models

Motivating people to adopt a responsible and environmental friendly lifestyle is one of the challenges of ESD. The notion that by increasing one's knowledge on a topic, an educator could change their attitude towards this topic, thus create the desired behaviour change is outdated. Today ESD practitioners recognize that changing behaviour is far more complex even if knowledge and attitude are important factors (variables) in this process.

There are three prevailing models depicting the factors that need to be addressed when seeking to change behaviour through an intervention and these are schematically presented below. Variables repeatedly found in these models include knowledge, attitudes, perceived competence (self-efficacy), locus of control (LoC), and intention (refer to the following table for clarifications).

Ajzen & Fishbein (1990) worked on the question when attitudes anticipate behavior, developing the Theory of Reasoned Action, upon which an act (i.e. a behavior) depends on the person's intention to perform it. The intention depends on the attitude of the individual toward the behaviour and the subjective social norm (these refer to the belief of an individual with regard to the wishes of others and his/her incentive to comply with them). *For example, if a student does not cut flowers within a DA this act is likely to depend on: his beliefs as to the consequences of such an act (e.g. disruption of the ecosystem, reduction of the population of the species, etc.) his/her assessment on the effects of these consequences (e.g. how bad is it if an ecosystem is disturbed or a population reduced), as well as his beliefs about the wishes of others (e.g. fellow students, teacher, guide, etc) and his compliance to them (e.g. the guide would not want me to remove any flower, and I want to do what he wishes/expects from me).*

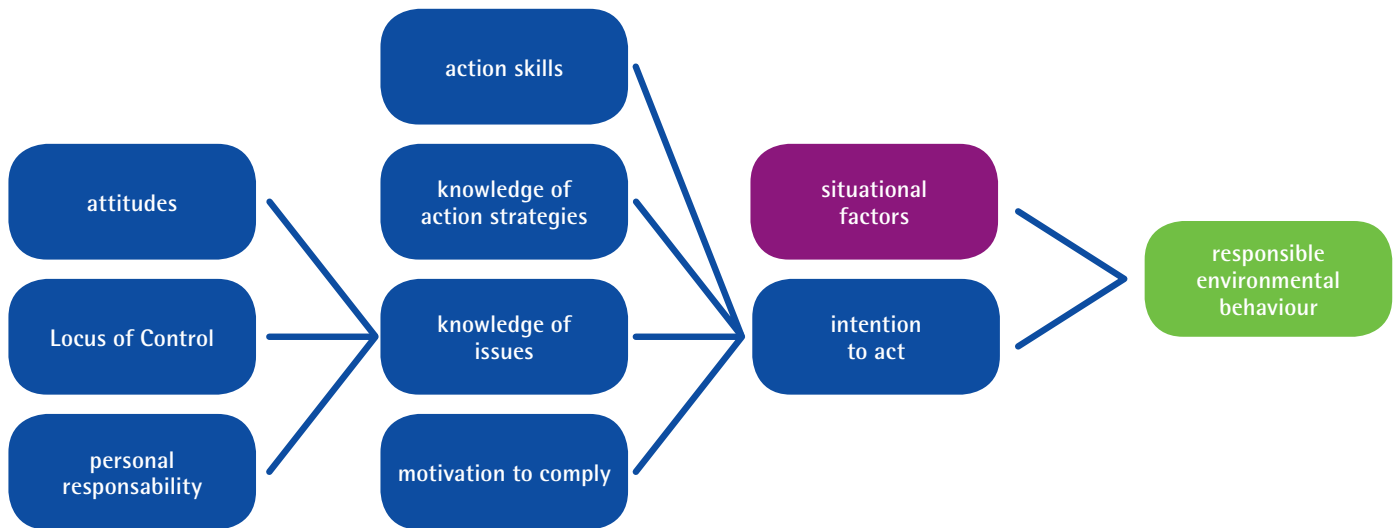
The Theory of Reasoned Action initially concerned actions under the volitional control of the individual. However, as actions differ in the degree of control one has over them (or thinks he has), the theory was expanded and renamed the **Theory of Planned Behaviour**.



Ajzen's model of Theory of Planned Behaviour, published in 1991.

In 1986-87 Hines, Hungerford and Tomera published a meta-analysis on previous research about behaviours toward the environment. In this the model of “**responsible environmental behavior**” emerged in which important variables that are considered “indicators” of pro-environmental behavior include knowledge, intent and the Locus of Control of the individual.

According to this model, the responsible environmental behavior appears to be associated with situational factors (such as social parameters, economic incentives, etc.) and the intention to act. The intention is influenced by the action skills, the knowledge of issues, the knowledge of action strategies, as well as personality factors.



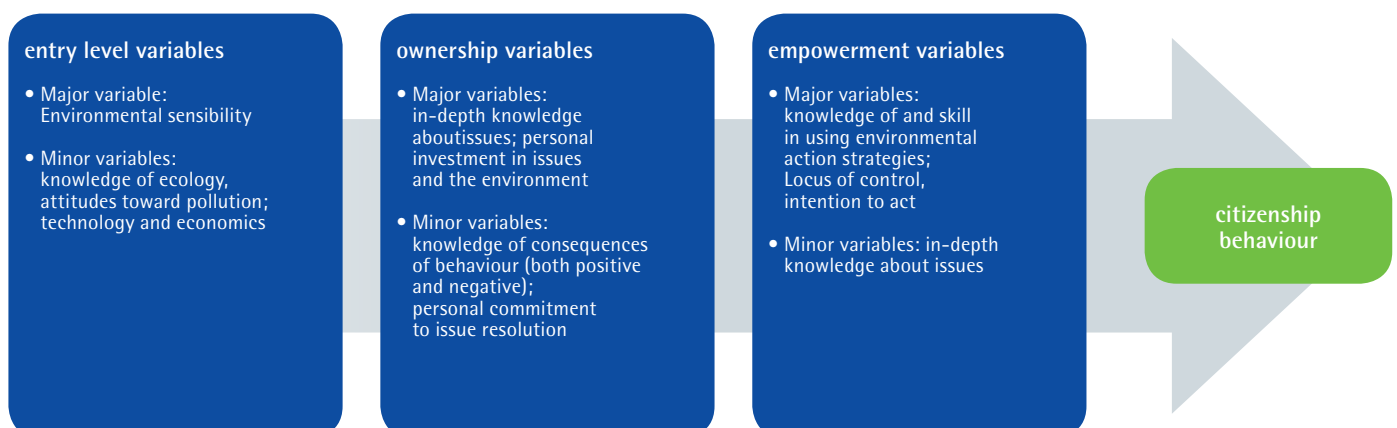
The model of responsible environmental behaviour developed by Hines, Hungerford & Tomera in 1987.

It seems that the relations between all the factors of the previous model are very complex, so there is uncertainty in predicting behaviour. In 1990 Hungerford & Volk suggested a modified model for responsible citizenship behavior, using several variables as key indicators that are categorized in three groups as:

A: entry-level variables that concern the conditions to achieve responsible behavior,

B. ownership variables that refer to the personalization of the issues by the individual, his/her commitment to their resolution, etc.,

C. empowerment variables that include knowledge of action strategies, Locus of Control, Intention to act, etc.



The modified model of responsible citizenship developed by Hungerford and Volk in 1990.

Clarification of terms:

Attitudes: are influenced by the individual's beliefs regarding the consequences of the act. People with more positive attitudes are more likely to report engaging in environmentally responsible behaviours than those displaying less positive attitudes. The researchers identify two types of attitudes: attitudes toward ecology / environment and attitudes toward taking environmental action (e.g. recycling, conserving energy, etc.).

Knowledge: as with attitudes, although knowledge is necessary, simply providing the facts will not lead to great changes in behaviour. Two types of knowledge have been identified: declarative knowledge (knowledge of issues) and procedural knowledge (knowledge of action strategies). For people to act on their concerns declarative knowledge is not sufficient; people also need to understand how to proceed or obtain the necessary skills to do so: Therefore providing both types of knowledge is necessary for changes in behaviour to occur.

Self-efficacy: People tend to seek out situations where they can use their knowledge and, by doing so, make a difference. Correspondingly, they avoid situations where they feel they have insufficient information to guide their behaviour and where there is a risk of looking foolish, helpless, or ignorant.

Locus of control: The LoC refers to a person's belief on his/her ability to bring about change in things and situations his/her life, in other words, it expresses to what degree he/she considers himself/herself as having control over things and situations. People with a strong internal LoC would be expected to take action more readily than those who feel that the power to affect change is out of their hands (external LoC).

Intent is one more factor suggested to affect, or even predict, behaviour. Before an individual will deliberately take action, that individual must have the intent to take it.

Annex 4

Acronyms

BR(s)	Biosphere Reserve(s)	SIA	Strategic Impact Assessment
CBD	Convention on Biological Diversity	SPA(s)	Specially Protected Area(s)
CEE	Centre of Environmental Education	SPAMI(s)	Specially Protected Area(s) of Mediterranean Importance
DA(s)	Designated Area(s)	TEEB	Economics of Ecosystems & Biodiversity
DESD	Decade for Education for Sustainable Development	UfM	Union for the Mediterranean
EEA	European Environment Agency	UNECE	United Nations Economic Commission for Europe
EIA	Environmental Impact Assessment	UNEP	United Nations Environment Programme
ESD	Education for Sustainable Development	UNEP/ MAP	United Nations Environment Programme/ Mediterranean Action Plan
EU	European Union	UNESCO	United Nations Educational, Scientific and Cultural Organization
FAO	Food and Agriculture Organization	UV	Ultra Violet
GHG(s)	Green House Gas(es)	WFD	Water Framework Directive
IEEP	International Environmental Education Programme	WMO	World Meteorological Organization
ICZM	Integrated Coastal Zone Management		
IPCC	Intergovernmental Panel for Climate Change		
IUCN	International Union for Conservation of Nature		
IWRM	Integrated water Resources Management		
LoC	Locus of Control		
MA	Millennium Ecosystem Assessment		
MAB	Man and the Biosphere		
MAP	Madrid Action Plan		
MB	Management Body		
MP(s)	Management Plan(s)		
NGOs	Non Governmental Organisations		
PA(s)	Protected Area(s)		
PBL	Problem Based Learning		
PCB(s)	Polychlorinated Biphenyl(s)		
SAC(s)	Special Area(s) of Conservation		
SCI(s)	Site(s) of Community Importance		
SD	Sustainable Development		



*Simiane-la-Rotonde village, © Olivier Brestin
Luberon-Lure BR, France*

*Lavender and wheat crops, Luberon-Lure BR, France,
Vachères region, © Olivier Brestin*



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UNESCO MAB

The Man and the Biosphere (MAB) Programme is an Inter-governmental Scientific Programme aiming to set a scientific basis for the improvement of the relationships between people and their environment globally. Launched in the early 1970s, it proposes an interdisciplinary research agenda and capacity building that target the ecological, social and economic dimensions of biodiversity loss and the reduction of this loss. The agenda of the MAB Programme is defined by its main governing body, the International Coordinating Council, in consultation with the broader MAB Community. For implementation of its interdisciplinary work on-ground, MAB relies on the World Network of Biosphere Reserves, and on thematic networks and partnerships for knowledge-sharing, research and monitoring, education and training, as well as participatory decision-making.

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UNESCO Venice Office

The UNESCO Office in Venice fosters cooperation to contribute to peace, stability and sustainable development in Europe, especially in South East Europe and the Mediterranean area, through activities in the field of science and culture. In the field of culture the Office is investing in cultural diversity for peace and social cohesion, in the safeguarding of cultural heritage, the protection of cultural diversity and the promotion of pluralism and dialogue between cultures. In the field of Science the Office is implementing programmes for strengthening the scientific and technological system, both in terms of policy and of research capacity, for natural hazards risks reduction, the responsible management of natural resources and the promotion of sustainable development through its network of MAB Biosphere Reserves.

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MIO-ECSDE / MEDIES

The Mediterranean Information Office for Environment, Culture and Sustainable Development (MIO-ECSDE), is a non-profit Federation of NGOs from the Mediterranean region working in the field of Environment and Sustainable Development. Established since 1995 MIO-ECSDE acts as a technical and political platform for representation and intervention of Civil Society in the Mediterranean scene.

The Mediterranean Education Initiative for Environment and Sustainability (MEDIES) is MIO-ECSDE's main Initiative on ESD, launched in Johannesburg WSSD in 2002. Its main objective is to provide capacity building on ESD through publications, trainings and the facilitation of an e-network of ESD Educators from the Mediterranean Countries.

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University of Athens

The National and Kapodistrian University of Athens (UoA), founded in 1837, is the first University of Greece and the Balkan peninsula. Nowadays UoA undertakes a series of initiatives on sustainable development such as the "Chart" on Sustainable/ Green Universities adopted in 2011 by all Greek Universities, and the coordination of the Mediterranean Network of Universities on ESD. In 2012 UoA established a UNESCO Chair on "Sustainable Development Management and Education in the Mediterranean".

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