Implementing a Landscape Approach: Criteria and tools for the pilot sites

Project title: Translation of OAP activities into acknowledged landscape approaches

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Introduction: The "landscape approach"

The objective of this report is to incorporate a landscape perspective into the activities to be undertaken by the implementing partners of four conservation projects within the Mediterranean Sea Basin. The principles of the "landscape approach" are developed to be applicable to the Mediterranean Region and used as guidance by the implementing partners on different tools and landscape methods. The approach particularly focuses on methods that demonstrate the interaction between cultural practices and ecosystems through time and the corresponding spatial interpretations within the landscape. These tools are cross-tabulated with the implementing partner sites with particularities of the implementing sites and approaches, taking into account availability of data, stakeholders' involvement and specific targets of the implementing sites. The ultimate goal is to assist the partners to apply the best approaches, methods and tools for each site.

The landscape approach includes three main components: general landscape approach principles (GLAP) landscape approach principles (LAP), the practical application defined in the integrated landscape management (ILM), and specific landscape approach principles (SLAP) related to the project.

As discussed in activity 1.1.2, the "landscape approach" emanates from overarching principles related to the nature of landscapes. The general landscape approach principles (GLAP) are:

- Landscapes are shaped by the *connections* and *disconnections* between people and their environment;
- Landscapes exhibit important *biophysical structures* and *land-use intensities*;
- Landscapes have experienced *long-term histories*, which have left land-use legacies that critically determine the functions and values of many contemporary landscapes;
- Landscapes are undergoing *change* at different rates, with a multiplicity of driving forces, processes, actors, and outcomes;
- Landscapes entail broad and diverse sets of *values* and *meanings* for people; and
- Landscape governance can follow a *preservation* or a *stewardship approach*, with the latter becoming increasingly influential.

Within this context, the concept of Integrated Landscape Management (ILM) has been developed, which builds on four central characteristics:

- ILM promotes multifunctional land uses and fulfills a range of land use objectives, which means that we need to make sure to take into account different and at times competing land uses and how different actors of/in the landscape value these, e.g. production space, recreation, identity, etc.;
- ILM works at the landscape scale and includes deliberative planning and co-design of management approaches. The exact "scale" of a "landscape scale" is defined by the particular landscape as a concrete socio-ecological unit. Therefore, it can differ among different landscapes; in fact, one of the basic tenets of ILM is that the scale of consideration *should* be flexible to the case study, while co-design indicates that both top-down and bottom-up approaches should be considered and that local opinions and knowledge should matter in management decisions;
- ILM incorporates inter-sectoral cooperation and the alignment of activities, policies, or investments, acknowledging conflicts and interference with other policy sectors and actors; and
- ILM is participatory, in that it supports collaborative management within a social learning framework.

All these areas are partly overlapping and interconnected. In this project, the "landscape approach" can mean many different things and indeed will be treated differently in the different case study areas. Five different aspects are considered of particular importance for the purposes of this project, namely how traditional land management practices contribute towards biodiversity and how these practices can be adapted into current socio-ecological systems. We term these as the specific landscape approach principles (SLAP) and are as follows:

- Dynamics of landscape and of the practices that change landscapes, capturing the changes of the different landscapes within similar timelines, typically measured in decades to identify periods of continuity and/or change. The identification of the actors that influenced persistence or change of a landscape in each area and period is desirable but not always possible.
- Socioeconomic and policy drivers of landscape changes, with different difficulties involved, in both the identification of actors and the interplay between proximate and distant drivers of landscape change and of "slower" (typically social) and "faster" drivers. As we will see later, the model that we use to conceptualize change and the scale of analysis allows the use of more or less complex groups of actors and driving forces, including policies, spatial and agricultural ones.
- Landscape governance – Stewardship, which refers to a set of rules (explicit policies, but also implicit sets of rules, behaviors and cultural norms) and the decision-making processes of public, private and civic sector actors with stakes in the landscape that affect actions in the landscape. It is inherently a multi-level, multi-sector and multi-actor approach. The interests of stakeholders can both connect and conflict, often at the same time. The higher the level of local involvement in landscape governance, the more "successful" it is in terms of its goals.
- Multifunctionality of landscape and of its uses/users, as all landscapes have value and multifunctionality is an inherent feature of all landscapes, raising the importance of local participation, including land-use planning and landscape management.
- Landscape perceptions as a tool for acknowledging and recording different uses and values of the landscape, as landscapes are perceived in different ways by different groups of people. Different perceptions correspond to different values. Recognizing and mapping these values is important in order to build a common language towards the landscape and assist policy formulation and implementation.

Drivers, actors and changes of landscapes

Driving forces (or: Drivers) of landscape change form a complex system of dependencies and interactions and affect a whole range of temporal and spatial levels. Five groups of driving forces are identified: political, economic, cultural, technological, and natural driving forces. According to Plieninger et al. (2016), driving forces can be distinguished between proximate and underlying drivers.

- Proximate drivers refer to human activities at the local level that result in landscape change, such as agricultural expansion or extension of settlements.
- Underlying drivers comprise the fundamental social and natural processes (e.g. human population dynamics, agricultural policies, markets, or culturally embedded attitudes and beliefs) that underpin the proximate drivers and either operate at the local level or have a more indirect impact from the national or global level.

These driving forces act upon actors. Actors make decisions, act accordingly, and influence other actors and the environment with their actions. Actors can be individuals, agencies, and institutions, representing the whole range of organizational scales. Actors can be distinguished between (a) those that affect driving forces (e.g. policies and markets, administrative entities, etc.) and are associated with underlying driving forces; and (b) actors that directly change land (e.g. farmers, industrialists,

people that build in the land, etc.) who are associated proximate driving forces. The same actor can of course, be an actor in proximate causes (e.g., as an urban investor) and an actor of underlying drivers (e.g., through his/her political activities in the context of designing planning regulations). Generally, actors are to some degree autonomous and therefore control their own actions. They often share an environment through communication and interaction.

Description of the case studies

In this section a short description of the case study areas is given, based on the data provided by the implementing partners. The tabulated form is given in the Appendix.

Lemnos Island - Greece

In **Lemnos Island** (LEM), Greece, there are four (4) different study areas: (i) Vigla (97,83 km2, 1240 people), (ii) Fakos (54,5 km2, 1154 people), (iii) Ifaisteia (61,2 km2, 1101 people), and (iv) Fysini, Poliochni (46,52 km2, 439 people). The whole island is relatively level with gentle rolling hills up to 430 m. The characteristics of the four areas of study are:

- Vigla study area, at the northwest part of Lemnos. The study area includes the communities of Kaspakas, Sardes, Katalakkos, Dafni and a small part of Kornos. The whole area is semi-mountainous with patches of smoother slopes found on the northern shore of Katalakkos and Dafni (towards Gomati and Papia, respectively). The relief and soil limitations have led to specific land management and land use practices, as the majority of agricultural land is grasslands (70%) with small patches of arable land occurring where the slopes allow ploughing by mechanical means.
- Fakos study area, at the southwest part of Lemnos and includes the communities of Kontias, Tsimandria and Portianou. The study area presents a mixed landscape as the hilly areas to the western part are succeeded by the fertile irrigated plain of Kontias, while the -uninhabited- peninsula of Fakos at the south has always been used for grazing. This mixed landscape character has led to a mixed pattern of arable farming and livestock breeding that is still present today, characterised by the presence of both grazing lands (65%) and arable farmland (34%), while 16% of the agricultural land is irrigated, fed with water by the dam in the uplands part of Kontias.
- Ifaisteia study area is located at the northeast part of Lemnos. It includes the communities of Kontopouli, Repanidi and Kalliopi. The study area is mainly oriented towards arable farming, and its character can be described as a mosaic agricultural landscape. The smooth relief and soil characteristics have led to the development of mostly land farming practices as grazing land constitutes only 7.9% of the Utilized Agricultural Area. A special characteristic of the area is the presence of Lake Chortarolimni, which is used as communal grasslands.
- The study area of Fisini-Poliochni, in the southeast tip of Lemnos. The study area, which comprises of the communities of Kaminia, Fisini and Skandali, presents signs of abandonment and has been heavily affected by the presence of wild rabbits for the past 15-20 years. Especially in Fisini, agricultural land abandonment has reached 75%. The character of this study area is still dominated by arable farming despite the abandonment, as the proportion of grazing land to the Utilized Agricultural Area is only 19%.

The main issues that affect the landscape are:

- Land abandonment and degradation (especially in SE Lemnos and the study area of Fisini-Poliochni, but not limited to this area): This process of retiring land started in the 1960's (including processes of rural exodus and abandonment of terraced cultivations), exacerbated as a result of the CAP, especially of its 2005 reform.

- Wild rabbits: Land abandonment, in turn, has allowed the increase of wild rabbit populations, causing significant crop yield losses (as well as habitat destruction), and rendering livestock farmers more dependent on purchased feeds.
- Loss of mosaic landscape diversity and connectivity / Intensification of agriculture: Abandonment of traditional sheep yards ("mandras") and concentration of land and livestock capital in fewer hands has been a constant trend since the 1960's (for similar reasons as above).
- Loss of local breeds: Uncontrolled livestock imports also took place after year 2000, displacing local breeds (especially of sheep) with more productive (Greek and foreign) breeds.
- Overgrazing: Changes in breeds used and increase in livestock numbers have led to overgrazing in the main rangelands (especially in SW Lemnos and in parts of NW Lemnos); even so, the rangelands and fodder crops of Lemnos cannot cover livestock needs, rendering farmers' dependent on imported feeds.
- Desertification: The above factors have led to increased desertification risks and habitat loss all over Lemnos, causing disruption of the territorial balance of the mandra system.

These are linked to several socio-economic drivers, which can be grouped in two broad categories:
a) Lack of capacity building, low awareness, loss of Traditional Ecological Knowledge (TEK) regarding local agricultural practices and shift towards unsustainable practices, resulting in a wider loss of appreciation for the value of the land itself.
b) Weak organization, low vertical integration, lack of marketing strategy, lack of capable supporting structures and networks to forward final products in the markets outside the island, resulting to a significant loss of added value for products derived from traditional agricultural practices, while exposing the majority of practitioners to unfair competition (with the exception of wine production).

The targeted Landscape approach has the following objectives:

- Identify changes and dynamics in the agricultural landscape through time
- Evaluate-validate changes identified using community-based methods
- Identify drivers of changes using community-based methods

Shouf Biosphere Reserve - Lebanon

In Lebanon the **Shouf Biosphere Reserve** (SHO) area is approximately 500 km2 large and includes 122,000 inhabitants. Altitude ranges from 1200-1980 meters. It is located along a mountain range comprising the Barouk and Niha Mountains, which is a southern extension of the Mount Lebanon Range. The range runs parallel to the Mediterranean coast. The Beirut-Damascus highway and the town of Jezzine define the north and south borders of the reserve. The western slopes of the range face the Shouf region; the eastern slopes face Mount Hermon and form the western escarpment of the Beqaa Valley.

The West Bekaa Hima Sites are Himas, community based managed areas, established in the West Bekaa region as extension of the Shouf Biosphere Reserve towards the Bekaa Valley (Chouf Mountain Landscape). These Himas include Hima Kherbet Kanafar, Hima Ain Zebdeh, and Hima Aitanit.

The area can be divided in three agro-ecological zones:

(i) the western low to mid altitudinal zone, characterized by more or less narrow valleys perpendicular to the north-south mountain axis, with very rich cultural landscape elements including agriculture stone-wall terraces that are interspersed with semi-domesticated (e.g. genetic selection of individuals, pruning, grafting) oak and pine trees and forest stands with

mutliple uses for wood, fruits, herbs and honey collection, and natural forests, maquia and garrigue vegetation covering the steep rocky slopes and the riparian zones;

(ii) the mid to high altitudinal zone including natural oak and cedar forests - the Southern half of Mount Lebanon host the largest stands of Cedrus libani in the country - mountain pastures and cushion thorny scrubland with numerous endemic plants, which are very important as seasonal grazing areas and areas of high interest for the collection of a high number of edible, aromatic and medicinal plants species as well as honey;

(iii) the eastern slopes and foothill in the Beqaa valley including natural oak forests, pastures, scrubland and lowland agriculture, which are very important for shepherds involved in the hima management system.

Hima means protected area in Arabic: a community-based approach used for the conservation of sites, species, habitats, and people in order to achieve the sustainable use of natural resources. It has a history of more than 1,500 in the region, but in the twentieth century, political and socio-economic changes led to its weakening. Contemporary approaches attempt to merge the traditional Hima approach and contemporary scientific approaches in nature conservation. The Hima approach today concentrates on empowering local communities, upgrading their livelihood, and promoting sustainable use of natural resources. In the SHO area, the main issues that are involved include:

- Species population decline; Habitat loss and degradation;
- Loss of mosaic landscape diversity & connectivity; Degradation of traditional agro-silvo-pasture systems;
- Rural abandonment and population decline; Lack of employment & business development opportunities; Lack of market incentives;
- Loss of traditional knowledge, increase of intensive and extensive agriculture;
- Land tenure conflicts; Abandonment of community resource governance arrangements;
- Inadequate & insufficient rural development policies and economic incentives; Poor legislation and weak law enforcement;
- Knowledge gaps; Lack of awareness;
- Insufficient exposure to, cross-fertilization and support from the Regional fora to enhance the Mount Lebanon eco-cultural values.

The targeted Landscape approach has the following objectives:

- Improved scientific knowledge and ability to monitor the state of biodiversity and ecological functioning of the landscape, and gained public support to wildlife management and conservation;
- Restore landscape multi-functionality;
- Adaptive management practices consolidated and up-scaled through capacity development, partnership building and advocacy;
- Improved Stakeholder capacity for the conservation of the high value traditional agro-silvo-pastoral systems in the Shouf Landscape;
- Best management practices and Community-based platforms on the conservation and enhancement of the high value traditional agro-silvo-pastoral systems are shared and disseminated elsewhere in Lebanon;
- In the West Bekaa Region, shift from Technical/management capacities of land-planning, to a user-friendly interactive spatial framework that summarizes spatially the risks/problems and sets out the vision and goals for each landscape area with the community and for the community through the Hima Participatory Approach;
- Establish Complementary Homat Al Hima training of the West Bekaa Region on environmental, economic and social concerns, and to assure the conservation of the site and its key biodiversity, and the ecological and cultural services it provides.

This is a conservation-based approach. So far, such approaches tended to ignore local practices, productive, social or cultural and therefore the links between them and biodiversity is not fully documented, topically or spatially. The approach taken focuses on restoration of local traditional agro-silvo-pastoral practices and map their links to biodiversity conservation.

The two most important traditional agricultural systems in the area constitute of: (a) agriculture systems on cultivation terraces; (b) livestock and pasture systems. For the
Actions suggested for these plans include:

- Terrace agriculture systems:
  - stone wall terrace restoration
  - effective water harvesting solutions linked to the terrace walls for an efficient water use;
  - production of organic, edible, aromatic and medicinal plants native to the region and/or local fruit tree/grape varieties;
  - restoration of micro-habitats and enhancement of the biodiversity linked to stone terraces (rare rocky plant species and fauna).
- livestock and pasture systems
  - the harvesting and production of high-quality seeds of native grass species;
  - active field restoration interventions;
  - temporary enclosures;
  - pasture rotation measures.
  - Reintroduction of Herd of Nubian Ibex from Jordan
  - Production of a grazing management plan

Also, in order to improve stakeholders' capacities a capacity building plan is designed, including technical measures such as protection (e.g. temporary enclosures), management (e.g. rotational grazing practices; forest thinning and pruning; stone wall terrace restoration), and direct field restoration actions for the improvement of agro-silvo-pasture ecosystems functionality at the landscape-level.

High Atlas - Morocco

In Morocco, the **High Atlas** (ATL) case study in Morocco is made of two areas IME in El Haouz Province (278 km2, 560 people) and AMH in Azilal Province (560 km2 and 23696 people). Both areas are located in the northern slopes of the High Atlas range. The landscape includes irrigated land (vegetables, fruit trees) and non-irrigated agriculture (cereals) in the valleys, extensive grazing in higher altitude pasturelands. Degraded *Quercus rotundifolia* and Juniperus forest patches can be found in both locations. Agropastoral terraces dominate the steep gorges in Imegdale. In Ait M'hamed, large agdals – vast communally managed pastures used for summer grazing – dominate the highland plateaus. AMH also hosts much larger settlements.

The changes occurring surrounding cultural landscapes are multifaceted with local inhabitants from the communes of Imegdale and Ait M'hamed identifying multiple and variate aspects of rural life as drivers. In general, there is a process of intensification of certain practices (intensive agriculture, husbandry, water use) while others are being abandoned (ethnobotanical uses, traditional agriculture, ceremonies, and collective work).

Drivers of change perceived as most important were linked to environmental issues, especially drought and changing rain patterns, along with sociodemographic transformations, linked with individualization, modernization, and globalization. Seasonal or permanent rural exodus is significant.

The objectives of the approach are:

- To centralize and homogenize all georeferenced data already available, biological and cultural in the same platform that the whole team can use;
- To elaborate a fieldwork plan to collect any necessary data in situ;
- To obtain and interpret different map layers, biological (plant distribution, habitat mapping) and cultural (material culture, ethnoecological classification), for the areas under investigation;
- To analyse spatial and temporal dynamics of biological and cultural parameters and of their interactions;
- To provide and promote "spaces of discussion" between different families and clans to minimize existing conflicts in the management of agdals;
- To provide legal advice that can ameliorate legal conflict concerning land rights and legislation.

Besides GIS mapping, more data on perceptions, functions and values of landscapes through ongoing social research among community members will be collected. Data on the perceptions and values of state and local government actors and research on Morocco's legal and policy framework regarding communally governed territories and resources.

Companhia das Lezírias Montado - Portugal

Companhia das Lezírias in Ribatejo, Portugal, is an estate with over 6 000 ha of cork oak (*Quercus suber*) cover constitituing a model and a case-study of the "montado" silvopastoral system which covers approximately 700 000 ha in Southern Portugal.

Montados (also called Dehesas in Spain) are multifunctional sivopastoral systems with a dominant tree cover of cork and holm (*Quercus rotundifolia*) oak trees, sometime mixed with other tree species such as pines (e.g. maritime pine *Pinus pinaster* and umbrella pine *Pinus pinea*). Tree cover structure is relatively open with number of tree varying between 30 and 60 trees/ha but sometimes reaching higher densities (e.g. 80 to 100 trees/ha), forming a savanah-like habitat structure. The understorey is usually a mosaic of shrublands (e.g. *Cistus* spp) and grassland patches of high heterogeneity and supporting high diversity of plants and vertebrate species (Moreno et al. 2016). The montado system is classified under the pan European network of protected areas Natura2000 (Behrramouni et al 2009).

Main product generated in cork oak montados is cork- the tree bark – a non-timber forest product harvested each 9 to 12 years without felling the trees and used mainly as wine bottle stoppers (over 70% of the production). Other uses include livestock production, namely cattle, which has been replacing shepherd grazing with sheep and goats in the last 20 years. Hunting, either small game hunting (e.g. red-legged partridge *Alectoris rufa* or rabbits *Oryctolagus cunniculus*) or big game hunting (e.g. wild boar *Sus scrofa* or red deer *Cervus elaphus*), is also a common use in cork oak montados. Well managed cork oak montados also generate cultural (Bugalho et al. 2018) and regulating ecosystem services (EA 2005) such as long term carbon storage, or prevention of severe wildfires (Bugalho et al. 2011-a). Recently, the Mediterranean Program of the World Wide Fund for Nature (WWF) as implemented a scheme for payment for ecosystem services in cork oak montados in Portugal (Bugalho and Silva 2014).

Depending on region, property size and age of landholders, both land abandonment and over-use, namely overgrazing, may occur in different regions of the montado silvopastoral system in Portugal (Bugalho et al. 2009). Once the system stops being managed (e.g. grazing, rotational clearing of shrubs) shrub encroachment frequently occurs, leading to loss of habitat heterogeneity and increased risk of severe wildfires. It has been shown that moderate grazing favours plant and invertebrate diversity in

corak aok montados (Bugalho et al 2011-b). However, in overgrazed areas, oak seedlings and saplings may not establish and survive, which may endanger the ecological sustainability of the system.

Forest certification, a third-party audited voluntary mechanism under which landholders and managers commit with environmental and socio-economic standards of forest management, has been applied to the cork oak montado system. In Portugal approximately 100 000 ha of cork oak montados are now under forest certification. Among forest certified practices, it can be mentioned the commitment to enhance oak regeneration, maintenance of uneven aged stands of oak trees, rotational clearing of shrubs (e.g. between 5 to 7 year rotations), reduction of grazing in some areas. Once an oak montado is certified, cork originated in that estate receives a label, recognized by consumers, and has added value, being the main motivation for certification among the cork oak producers. Forest certification also includes a strong component of stakeholder participation: International forest management standards are interpreted and adapted to each country or region, through public participation processes to establish criteria and indicators of management. Participatory processes include Public Administration representatives, environmental NGOs, Academic representatives, Forest Landowner Associations or Hunting Associations.

One of the main requests of forest certification is setting aside “conservation areas” of approximately 10% of the area of the estate (Dias et al 2016) where management, namely grazing, is strongly reduced or even halted.

Companhia das Lezírias, a forest certified estate, will be used as a model of the system, namely to assess how recent trends in certification namely the establishment of conservation zones and grazing exclusion areas (which also simulate land abandonment) affect oak regeneration and establishment as well as the biodiversity (plants and birds) of the system. Insights gained in this study area will be used to discuss and develop management guidelines to the cork oak montado silvopastoral system in Portugal.

The objectives of the approach are:

- To compare grassland, shrub and bird diversity among conservation areas (grazing exclusion) established in study areas as part of forest certification;
- To compare oak regeneration between conservation areas and “business as usual” management in remaining areas;
- To use different ages of grazing exclusion (10, 14 and 20 years) to assess oak stand and habitat structure. In particular, the aim is to know:
    - Does grazing exclusion enhances seedling and sapling establishment?
    - If yes, which is the ideal grazing exclusion period?
    - Does shrub encroachment in conservation areas facilitates or competes with successful oak regeneration?

These results will be interpreted and be use as a model for the cork oak montado silvopastoral system in Portugal.

Similarities and Differences of the Implementing Sites

These descriptions provide a rough outline of the similarities and the differences. The most important similarity is the fact that all implementing sites represent different approaches to grazing management in Mediterranean climatic conditions. Two more uphill areas (High Atlas and Shouf) and two less uphill

(Lemnos and Companhia das Lezírias), with widely varying climatic and land cover situations, but basically areas where grazing of small ruminants (sheep and goat, but also hogs and cows in a smaller degree in some areas) is the dominant activity. At the same time, although the management regimes are different in terms of ownership patterns (private vs community land), who has access to the land, when (in the grazing period) this access is granted and for how long, what are the products and how these activities are linked with agriculture, forestry or other economic activities in the area differ, some of the underlying principles appear similar in the Agdal, Mandra, Hima and Montado systems.

One of these underlying principles is the consideration of soil fertility in traditional practices and the realization that some of the grazing areas are marginal and cannot support all year round intensive grazing. Different solutions have been offered in this in the Mediterranean and the implementing sites can be considered as typical in this. The abandonment of these practices and systems has undermined this basic principle and resulted in over exploitation of many grazing lands and loss of fertility and diversity. All approaches suggested in the implementing sites attempt to deal with this in way or another, mostly by realizing that in many cases the underlying causes deal with stakeholder knowledge and cooperation and that this gap has to be addressed. Another similarity is the realization in all sites that the economic viability of farms and livelihoods is vital in planning and implementing approaches and/or policies that will preserve and restore biodiversity. This view of bio-cultural diversity is in line with current research and recognizes the role that stewardship plays in landscape management.

The differences refer to the approach followed in each implementing site. While in Companhia das Lezírias the focus is on ecosystem succession and biodiversity dynamics after controlling grazing pressures with the use of voluntary certification schemes in an archetypal multifunctional system such as the montado, in Lemnos the focus is more actor-oriented and attempts to bring together the practices of very different actors and users of the landscape (herders, farmers, beekeepers, etc.) that aim at using the same resources, but in the end also goes back to voluntary cooperative actions that can bring forward an integrated management and labelling scheme. In the Shouf, the focus is more on governance mechanisms and how these can be reconciled with the revival of the hima system along very different zones of the area with varying degrees of integration between agriculture and animal husbandry. This is similar to the focus in the High Atlas, which is more about stakeholder empowerment and ways to improve the governance of the landscape and its resources, while also bringing forward traditional uses of the plants of the area in a modern economic light. The differences of the approaches refer also to land management approaches and land tenure, which correspond to the different responses, from labelling schemes to enhancement of community governance systems.

In this sense, all implementing sites share many of the aspects of the “landscape approach”, from capturing and managing the dynamics of landscape and of the practices that change landscapes, to the recognition of the inherent multifunctionality of the landscape of the sites and of its uses/users, landscape perceptions as a tool for acknowledging and recording different uses and values of the landscape to build common languages and finally in landscape governance – stewardship approaches that seek to influence decision-making processes of public, private and civic sector actors. This Landscape Approach is in our view best understood in all sites as a multi-level, multi-sector and multi-actor approach, demonstrating that there are more than one approaches to capture and manage landscape dynamics. In the next section, we discuss some tools that can be used to implement these approaches in practice.

Suggested Tools for the realization of a Landscape Approach

Some of the available tools that could be used in the implementing sites to realize their Landscape Approach include:

Tool 1: Public Participation Geographic Information System PPGIS

PPGIS is an interdisciplinary research tool linked to applied participatory qualitative research and quantitative geo-spatial information management tools and mapping approaches. It developed from participatory approaches to planning and spatial information and communication management and is currently used in a wide variety of approaches. In landscape approaches it can play a central role to:

(a) enable public access to cultural, economic and biophysical data generated by governments, private sector organizations and academic institutions;
(b) promote interactive participation of stakeholders in generating and managing spatial information about specific landscapes;
(c) facilitate decision making processes that support effective communication between different stakeholder groups and especially between planning – governance authorities and local groups – producers – NGOs, etc.;
(d) record and map values and practices of different groups of actors in landscape stewardship and/or governance approaches;
(e) provide a clear and concrete spatial (and temporal) context of biodiversity and landscape preservation friendly practices, as specific practices can be mapped with detail and conservation plans planned with a clear spatial context in mind.

Tool 2: Landscape Stewardship policy approaches at the local level – landscape labelling schemes

Landscape stewardship has emerged as one of the most important approaches towards involving local actors in management practices, projects or processes that include a wide range of functions and values that foster positive linkages between people and their landscapes. As the examples from the Hercules project (http://labs.kh.hercules-landscapes.eu/) have demonstrated, landscape stewardship approaches comprise many different types of groups and initiatives, often united by an interest in maintaining and developing the cultural ecosystem services of a particular landscape. These initiatives frequently cross borders between fields such as nature conservation, agriculture, or cultural heritage. As a result, they have difficulties in linking to established policy fields, but there are examples where such initiatives were assigned formal responsibility in land management.

These approaches can be realized as voluntary partnerships between producers (farmers, foresters, herders, etc.) that promotes the use of specific practices which are beneficial to landscape functions and form and in the end they can result in some form of landscape labelling, i.e. a labelling scheme for products that can label them as “landscape” and/or “biodiversity friendly”. Such schemes can be realized as informal or formal partnerships with inside and outside control and can transform into agri-environmental or other policy measures, but can work also as private actors’ only initiatives that can integrate producers, restaurants, retailers, and other local and extra-local actors.

Tool 3: Enhancing and improving stakeholder capacity for landscape governance – landscape stewardship

The capacity of local stakeholders to get involved in landscape governance has been recognized as a key aspect of successful approaches in landscape conservation around the world. The practice of landscape governance refers to a set of rules (explicit policies, but also implicit sets of rules, behaviors and cultural norms) and the decision-making processes of public, private and civic sector actors with stakes in the landscape. It has a different content across different political systems of national and regional/ local levels which allow varying levels of stakeholder involvement at different stages of the process. But, overall, processes that enhance local social capital and empower groups of stakeholders

to learn more about policies and initiatives and record their opinions can have profound effects to the level of engagement of stakeholders, especially groups that are typically left "out" of planning processes.

Tools for enhancing this capacity can include formal education initiatives in local schools, information campaigns, support of local NGOs with equipment and knowledge, visits to other landscapes and exchange of knowledge with other stakeholders, focus on vulnerable groups, inclusion of PPGIS or other forms of interactive forms of communication and many others.

Tool 4: Landscape Character Assessment

Landscape character assessment is a method for identifying distinct "character" areas, on the basis of "characteristics" which makes each part of the landscape distinct and gives each its sense of place A "characteristic" is "a distinct, recognisable and consistent pattern of elements in the landscape that makes one landscape different from another, rather than better or worse." (The Countryside Agency, 2002, p. 8). Each of these "character areas" has its own identity, even they may share some generic characteristics. A special case of LCA is the so-called "Historic Landscape Characterisation" (HLC) that identifies and interprets varying historic character within an area that go beyond individual heritage assets into an understanding of the whole landscape.

LCA is essentially a very valuable input for decision making and it can be used for the planning of sustainable future landscapes. Since the result is the description of a landscape with reference to the characteristics that combine to make a place distinctive, it can be used to provide spatial reference and evidence via mapped landscape character areas / types and inform understanding of key and/or special characteristics that can inform land use plans, protection and conservation schemes, development and landscape change management and eventually provide a negotiated an agreed spatial framework of landscape character areas, or types, to which different policy options / applications and decisions can be applied.

Tool 5: Mapping landscape change

The mapping of land cover and landscapes change in different points in time has been facilitated significantly with the availability of old maps, aerial pictures and eventually satellite images. Depending on the availability of older data, time series of analysis can be prepared and compared and therefore an inventory of changes can be created that records and maps changes and also calculates landscape metrics of the patches involved in these changes. These mapping approaches can be proved very useful to understand landscape change "hot" and "cold" spots and calculate change rates for landscapes and/or some of their specific features. All this information can inform landscape management and stewardship plans and policies.

Tool 6: Agent-based modelling of landscape change

Modelling has been used in spatial contexts for some decades now, with some very important results in policy evaluation and planning and land use plans. Issues of agents (who make the choices to change their practices and why) and scale have brought forward a specific type of modelling, called agent-based modelling (ABM), that explores management interventions within complex landscape systems. What they propose is to place the agent or actor in the center of landscape transitions, considering therefore all driving forces as distinct components of inputs to the actors that make decisions accordingly. ABM focuses on modeling the diversity of responses and decisions of actors (classifying them in groups) that characterize heterogeneous stakeholder communities in landscapes.

ABMs can be used to explore alternative landscape futures, where abstract and distant driving forces such as market prices, subsidies and trade regulations can be translated into actual and everyday decision-making and land management represented and quantified. These approaches have gained popularity, although they are typically applied to smaller scales. The main difficulty in its application is the costly and lengthy processes required for the identification and investigation of the behavioral approaches of actors that have to be mapped with detail.

Tool 7: Integration of different spatial and temporal scales in landscape management

The management of prominent landscape features can involve varying spatial and temporal scales. These features can be specific land uses / cultivations or combinations of land use practices. Some examples relevant for the implementing sites of this project include the "altitudinal approach" of land management in the Shouf in Lebanon, which involves differentiation of the suggested good landscape management practices along the altitude and the different temporal scales involved in cork oak management in Portugal and how these can be reconciled at the landscape level. Mapping these scales and their impacts could provide a very valuable blueprint for management plans that can encompass these differences and utilize them for better and more lasting results.

In Table 1, according to the information provided by the implementing partners, an attempt to link the five issues that are considered as important for the "landscape approach" and the goals of the project is presented along with suggested tools.

Table 1: Landscape approach in the implementing sites

Issues	Approaches	Tools	Lemnos (LEM)	Shouf (SHO)	High Atlas (ATL)	Montado - Companhia das Lezírias (MON)
Dynamics of Landscape and of the practices that change landscapes	Identification of different change periods (typically decades, typically DF-C models). Documentation with: (a) land use – land cover data (b) official statistics (c) published and unpublished research and studies.	• Tool 5 landscape change mapping • Tool 6 Modelling (actor based) • Tool 7 Integration of different spatial and temporal scales in landscape management	Tool 5 Tool 6	Tool 5 Tool 7	Tool 5	Tool 5 Tool 7
Socioeconomic and policy drivers of landscape changes	Identification of drivers and actors of landscape change. (a) Expert analysis (b) Ask actors and stakeholders. (c) Compare findings with periods and changes in issue (1) (d) Include Policies	• Tool 4 LCA • Tool 5 landscape change mapping • Tool 6 Modelling (actor based)	Tool 5 Tool 6	Tool 5	Tool 4 Tool 5	Tool 5
Landscape Governance - stewardship	Who participate and how, spatial levels of participation and power over final decisions. Then consider what "landscape stewardship" is in particular socio-ecological context. Relate with some form of policy making.	• Tool 2: Conservation policy approaches at the local level • Tool 3 Enhancing and improving stakeholder capacity for landscape governance – landscape stewardship • Tool 7 Integration of different spatial and temporal scales in landscape management	Tool 2 Tool 3	Tool 2 Tool 3 Tool 7	Tool 2 Tool 3 Tool 7	Tool 2 Tool 7

Issues	Approaches	Tools	Lemnos (LEM)	Shouf (SHO)	High Atlas (ATL)	Montado - Companhia das Lezírias (MON)
Mutlifunctionality of landscape and of its uses/users	Guidelines: (a) Define users – actors – stakeholders: follow guidelines of previous issues. (b) Record lists of different values and uses of each group. (c) Map different values and uses of each group	• Tool 1: Public Participation Geographic Information System PPGIS • Tool 3 Enhancing and improving stakeholder capacity for landscape governance – landscape stewardship • Tool 7 Integration of different spatial and temporal scales in landscape management	Tool 1 Tool 3	Tool 3 Tool 7	Tool 1 Tool 3 Tool 7	Tool 7
Landscape perceptions as a tool for acknowledging and recording different uses and values of the landscape	Selection of groups of importance. Simple and transparent criteria preferable, important to recognize "hidden" groups, whose voice may not be heard through "official" channels. Guidelines: (a) Record (as in issue (4)) values of groups; (b) Assess interaction – spatially and conceptually – of these values; (c) Identify possible critical areas that represent conflict and need to be addressed specifically.	• Tool 1: Public Participation Geographic Information System PPGIS • Tool 6 Modelling (actor based)	Tool 1 Tool 6	Tool 1	Tool 1	Tool 1

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