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Participatory mapping: a tool to show natural landscapes richness of Kroumirie-Mogods forest area (Tunisia)

I. KHEMIRI [1], S. KHELIFA [1], O. BOUGHAMOURA [1], C. ABBES [1]

[1] Research Laboratory of Silvo-Pastoral Resources - The Silvo-Pastoral Institute of Tabarka, University of Jendouba - Tunisia.

*Corresponding author: iimen.khemiri@yahoo.fr

Abstract - Kroumirie - Mogods region of represents an important potential in term of landscape diversity that allows the region to highly attractive new forms of territorial development (such as eco-tourism). However, considering its lack of characterization ; this potential remains underestimated and undervalued. Additionally to its original terrain and vegetable coverage, it is strongly influenced by the action of the population that lives there. It also carries the collective memory of its inhabitants. It is a vital factor that must be taken into the consideration, the estimation of these landscapes could not be achieved without the action of its inhabitants' social representations. This work seeks to identify this outstanding scenery through a participatory mapping approach. A typology of forest landscapes in the Kroumirie-Mogods region was identified through 32 different landscapes set by different actors belonging to various cultural backgrounds. These actors have highlighted the components of the most rewarding landscapes of the area. Furthermore, this work presents a preparatory stage for future reflections as part of a participatory and sustainable valorization as well enhancement of this landscape potential.

Keywords: Participatory maps, landscape, actors, Kroumirie-Mogods territory.

1. Introduction

Landscape issues increasingly raised the interest of natural territories development stakeholders. This enthusiasm for the landscape unfortunately has to deal with the multiple meanings of the concept and the lack of conservation strategies relayed by development policies of this type of amenities in Tunisia. If territorial development schemes in developed countries have incorporated the landscape component, emerging countries still mutter between the transposition the development models concerning the coastal zones and those of the European rural areas (especially the French ones). The conclusion is that the landscape of the rural areas in the southern Mediterranean is threatened by irreversible degradation (UNDP, 2014).

In fact, the two fields of action for the preservation and the landscape valorization are amputated by the absence of national inventory of natural landscapes. The mapping of landscapes, the characterization and identification of their specific components in a particular area, are prerequisites for any sustainable territorial development project. This step needs a particular attention especially with the introduction of tourism in the little or not disturbed environments. The World Tourism Organization (UNWTO, 2004) places the landscape as the first element sought by eco-tourists. The growing attractiveness of landscapes in tourism is subjected to the rules of perception of the immateriality of the tourism product it becomes. Two dimensions rule this perception: providing psychological benefits to the tourists and recognizing that this perception is a reality (OMT, 2014).

Illustrating the territory, describing the landscape and the flora and fauna richness of the landscape, immersing the visitor in physical revelations of the invisible and the intangible, consolidating the enhancement of the area in a residential economy. Thinking the landscape as "a constructed characteristic of a specific territory and that, in a development perspective" (Gumuchian and Bernard, 2007) makes the natural attributes of the region a resource for sustainable economic activities. A strong social demand for the landscape is born questioning the involvement of all actors working in a particular area to maintain, improve or modify the landscape (Bedhioufi and Khelifa. 2013).

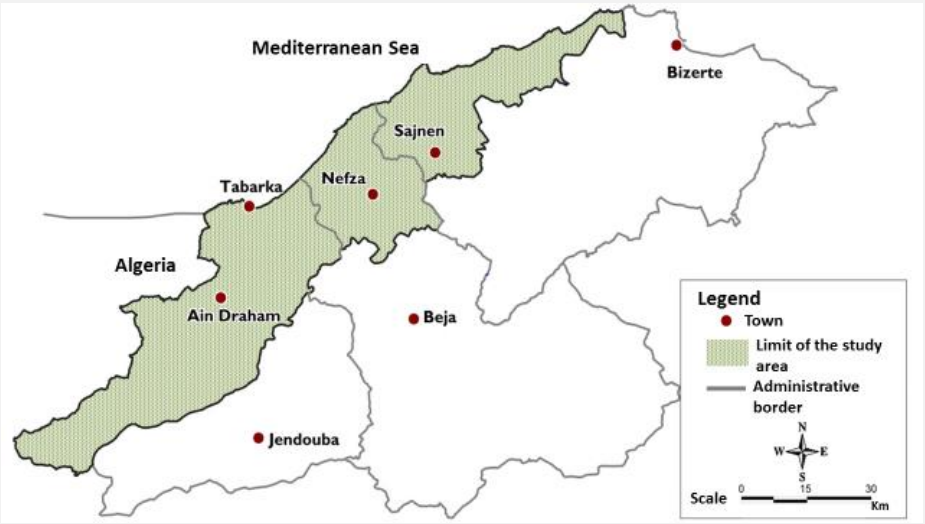
Because of that, we started tracking them in an emotional relationship, a value judgment, symbols, representations, aesthetic value in addition to the semantic message. The economy is based on political choices, "the status that takes the landscape in the economic discipline then calls a specific management mode" (Lifran and Oueslati, 2007). It becomes a "possible territorial resource revealed from a process specification through a projective approach" (Peyrache-Gadeau and Perron, 2010). In order to provide the stakeholders (planners, managers, policy makers,...) a tool for considering a forest area as a landscape to preserve, valorize and integrate in an environmental development, is necessary to give to the forest additive value and recognize its unknown amenities. The characterization and enhancement landscape resources of Tunisian forests have the ambition to bring out new territories projects, not necessarily corresponding to the current production systems. A multi-functionality of the space generating income and employment is expected. The forest landscape in Kroumirie – Mogods, today, offers a range of residential economy amenities, with tourism and leisure economy.

The development of the people living in Tunisian forest, estimated at 1 million people, with a national average of users per Km2 forest of about 87 users (DGF, 2012) in addition to the fact that the 62.3% of the population in the governorate Jendouba, Bizerte and Beja are forest users, which clashes with environmental degradation and endangers the landscape resource: determining factor of the ecological functioning of the natural ecosystem. The North West, shaped by the mountain range Kroumirie – Mogods, enjoys significant potential in unique forest and mountainous landscapes sheltering Mediterranean ecosystems. Identifying the remarkable landscapes of this region will serve in an advanced stage in their recovery and protection in the context of "conservation plans and enhancing landscapes". This supporting tool, replace the landscape at the center of territorial projects.

2. Materials and methods

2.1. The Kroumirie territory – Mogods

The Kroumirie - Mogods territory covers 2900 km^2 of the coast with coastal forests, estuaries and mountains of the northern part of Tunisia (Map 1). It extends from El Feija (at the edge of the Tunisian-Algerian border) to Ras Al Koran (west of Bizerte), bounded to the north by the Mediterranean (with a coastline that extends on about 140 km) to the south and the Majerda valley. From a geological perspective, the concerning area is the domain of the Numidian flysch clay and sandstone of Oligocene age forming a powerful series from the extreme north-west of Tunisia to Bizerte (Khorchani and al, 2013;. Stambouli -Essassi & al., 2007). The relief of the territory is rugged and strong, commonly exceeding 800 m in western Kroumirie (1203 m at Jebel Ghorra to Ghardimaou), it falls to the east (400 m in the mountains of Cape Negro, 300 m in the hills Mogods). Altitude and exposure are eligible for this region of abundant rainfall of over 800 mm as annual average for the region and leaving a very varied vegetation: Forest formations of 70203 hectares of cork oak (*Quercus suber*) evergreen and 10,000 ha of zeen oak (*Quercus canariensis*) (Khorchani and al, 2013;. Stambouli-Essassi and al., 2007). Administratively, the Kroumirie - Mogods territory spans six delegations (Ain Draham, Fernana, Ghardimaou, Nefza Tabarka, and Sajnen).



Map 1. Limit the territory Kroumirie- Mogods

2.2. Participatory mapping

Participatory mapping is a tool of information co-construction which forms part of a collaborative and participatory approach to the development and the enhancement of territories. Agricultural maps of Jendouba, Beja and Bizerte (issued by the General Direction of Forests : DGF) were used as the basis for this work and we are uploaded landscapes cited by the different actors and users interviewed. Participatory mapping is the production of corporate cards by communities that displays the relevant and important information to their needs and uses (IFAD, 2009). In fact, in a same area, several actors act, live, sell, value, enjoy it. Given their relationship with the territory (the administration and exploitation ...), these actors do not have the same mental conception of this territory, which leads to in several visions to describe it, enjoy it, exploit it and enhance it. The superposition of the representations of the different readings of the actors on a cartographic support is the identification, clear and understandable of the most important landscape units.

2.3. Interviewed actors

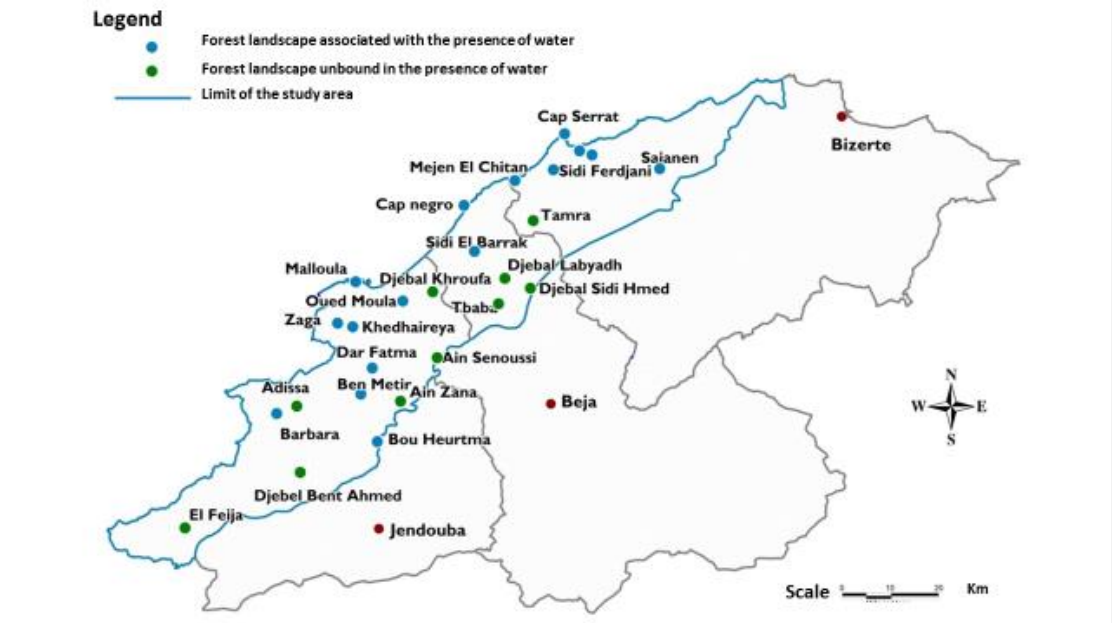
In order to reach the widest range of stakeholders on the same territory, and with a view to better identify the actors' representations of the landscape, 10 actors were interviewed for every 100 km^2. A total of 255 players were interviewed over the three governorates of Beja, Jendouba and Bizerte, and deriving from the six delegations of Ghardimaou, Fernana, Ain Draham, Tabarka, and Nefza Sajnen. These actors were classified into 3 categories of resource persons: (i) local population (85 persons), (ii) decision makers and territorial managers (85 persons), and (iii) visitors (85 persons). Maintains the chosen method is at the center of the scale proposed by double entry Grawtiz (2001) and considers two criteria: freedom and depth. The semi-directive maintains evokes a degree of freedom that is reflected in the type and form of the questions asked when the depth is reflected in the richness and complexity of the responses of the interviewee.

3. Results and discussion

3.1. The landscape diversity Kroumirie - Mogods

Participatory mapping conducted in this study has highlighted 24 identity landscapes in Kroumirie -Mogods, according to 255 actors audited. Far from being a comprehensive mapping, this empirical work, informson some learning elements about the relationship of local actors in their "surrounding world", which expresses the relationship between "objective reality" and "subjective intent" (Hoyaux, 2009). The perception of the landscape is "much more than an impression of the sense organs: it is the representation, by means of this impression of an external object in a place of space" (Hoyaux, 2013; Berque 1996).

The result was that on the whole regional territory, mountains and valleys had succeeded. Their contrasting alternation is part of the large landscapes dynamic features. Often difficult terrain and the presence of the water component, contribute to delineate landscape units in the territory. The nature of the soil and the vegetation coverage shape the landscape, showing different textures and structures that differentiate the area. The combination of this complex matrix made by texture, structure and the presence or absence of water, shows some landscapes given by the view of their observers. Two major categories of natural landscapes are perceived by local actors: non forested landscapes associated to the presence of water, and forest landscapes associated to the presence of water (Map 2 and Figure 1).



Map 2. Dispersion of landscapes Kroumirie - Mogods

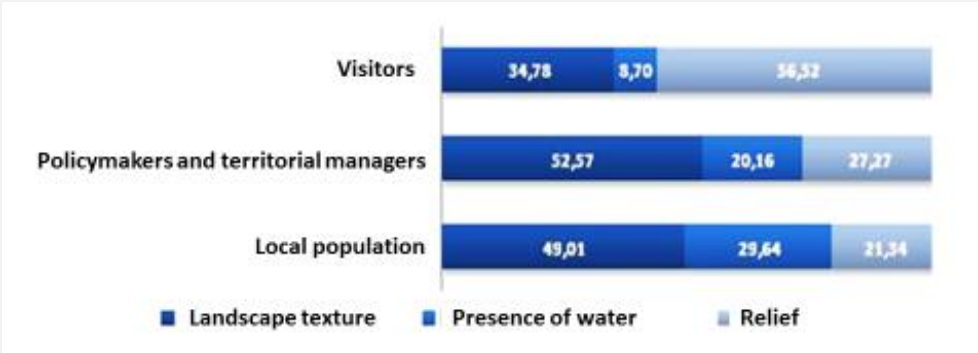


Figure 1: Illustration of landscape components by his actors and users

3.1.1. Forest landscapes unrelated to the presence of water

Tunisian forest stands in the Mediterranean by its high density of inhabitants, up to 87 inhabitants / km2 (DGF, 2012). Reality be inhabited, raises the reality of high human being impact with an additional factor of production landscape. It becomes a result of an interaction between the natural environment and the past and present action of man. Agro-forestry-pastoral practices, development operations and management of the forest area, agriculture, water projects, roads, affect and shape the landscape. According to the actors, the forest management operations are actions that do not

change the "natural appearance" forest landscape because they are localized interventions. Only in population activities that we can influence the landscape as a whole. Thus, identity landscapes Kroumirie - Mogods not related to the presence of water, listed within this participatory mapping are classified as cultural landscapes and not manmade.

- The forest anthropoized landscapes: Many people have settled in the mid-slopes. It is created around this location several agro-forestry-pastoral activities. The tops of slopes (mountains) are occupied by the forest around the population one notices the presence of the underwood with forestry-pastoral and forest clearings units (Figure 2). This landscape unit created by the forest edge and scrub are the interface between wooded areas and other types of land use. Downstream settled farms of large area. This type of forest landscape is very common in Kroumirie - Mogods and is often seen on watershed areas Ghardimaou, Fernana, Sajnen, Nefza ...

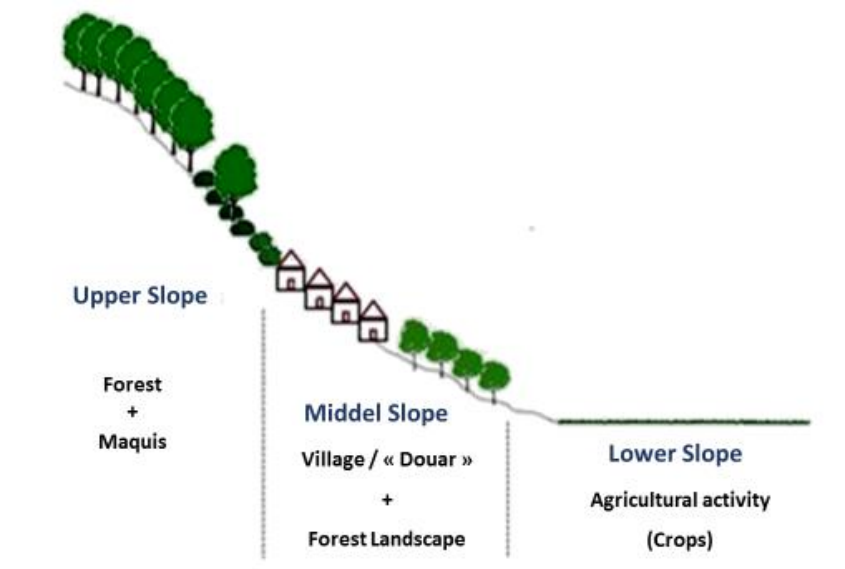


Figure 2: Profile of the typical forest landscape unrelated to the presence of water and anthropogenic area Kroumirie - Mogods

- Forest landscapes with little or no anthropoized: These are forests where the slopes are not manned. The forest extends from the top of the relief until mid-slope. The direct action of man is reflected in the forest management (including exploitation of cork, sliced firewall ...). These are landscapes that can be observed in protected areas such as Feija and Ain Zana. The actors interviewed for this type of landscape, highlighted the importance of the relief component seen as "a resource constraint, risk or as an approval" (Portal, 2012). This is a relationship between landscape's actors the and the landscape itself.

3.1.2. Forest landscapes related to the presence of water (Figure 3)

Putting in evidencethe intuitive and spontaneous results obtained by the Kroumirie – Mogods actors, the water is considered as landscapes differentiation component which draws from a social tool to a responsible and symbolic one. The perception is strongly influenced by social and individual representations (Jodelet, 1993). It is very interesting that the local population is the most sensitive to the presence of water in cities landscapes (the third of the landscapes they consider identity, figure 1). "The waters, undifferentiated masses represent the infinity of possible, they contain all the virtual, informal, germs germs, all development promises, but also all the resorption of threats."

The water, the terrain and the forest are elements constantly present in the region of Kroumirie - Mogods. Water is found in several forms: rivers, dams, hill lakes, sea ... To this frequent presence is born an association between the forest, the terrain and the water element creating a complex

relationship that enriches landscapes on the level of structure and texture. In addition, the presence of water can play a fundamental role in the implementation of villages and "*douars*". In the presence of water downstream of the mountains, the land use change and new forms of landscapes appear. The striking feature of the landscape lies in their diversity and uniqueness. In Kroumirie - Mogods, there are mainly two types of forest landscapes associated with the presence of water:

- The coastal forest landscapes: these unique landscapes are characterized by a high slope and a mid-slope occupied by forest and scrub. These forests are defined by Favennec (1999) as "a forest near the ocean or sea, the characters and the dynamics are conditioned by this proximity." These landscape units and by the same author are places of high economic value, social and property, to which a significant landscape value added. This type of landscape forges the identity of the territory on this study. The soil and terrain influence vegetation. Depending on occupancy of the lower side can be distinguished:
    - Forest landscape coastline with sandy substrate: the forests in this case occupy the heights and continue until mid-slope. Sand dunes are held by forestry plantations or semi-forest which may have a different plant association and promoting the creation of a new wooded landscape unit occupying the dunes and serves mainly to fix coastal dunes and reduce erosion from wind. This type of landscape can be observed in the regions of Barkoukech (Ouechteta). The diversity of vegetation (trees and shrubs) creates a remarkable textural heterogeneity creates the uniqueness of the landscape.
    - Forest landscape coastline bedrock: we observe the landscape in the region Melloula (Tabarka), Cap Serrat and Cape Negro (Nefza region) where the forest extends from the top of the mountain down to the sea. Near the sea, the underwood moved in association with the presence of rock formations. This unusual combination, by its ecology texture, and its structure is depending on the actors one of the factors that shape the landscape identity of the coastal regions of the Tunisian Northwest.
- The patchy forest landscapes: These forest landscapes of "artificial nature" were born following the combination of a forest and a lake created by the retention of water by installing dams in the catchment. The forest in this case occupies the tops of the relief and extends to the banks of the dam. These are landscapes characterized by the presence of a limited body of water by forested hills, as if the landscape identified by stakeholders in the Ben Metir region. These intra-forest lakes create identity lake landscape units in these regions. The patchy landscapes created by dams changing and constantly changing depending on whether one is in the dry season or wet season. Variations in water levels create different atmospheres. The forests surrounding lakes and retained water are always maintained and restored through reforestation actions and are intended to protect these structures (dams) and avoided their clogging. They also play a role ecological and landscape. The wooded banks provide a visual screen and give the Lake dam plant row appearance.

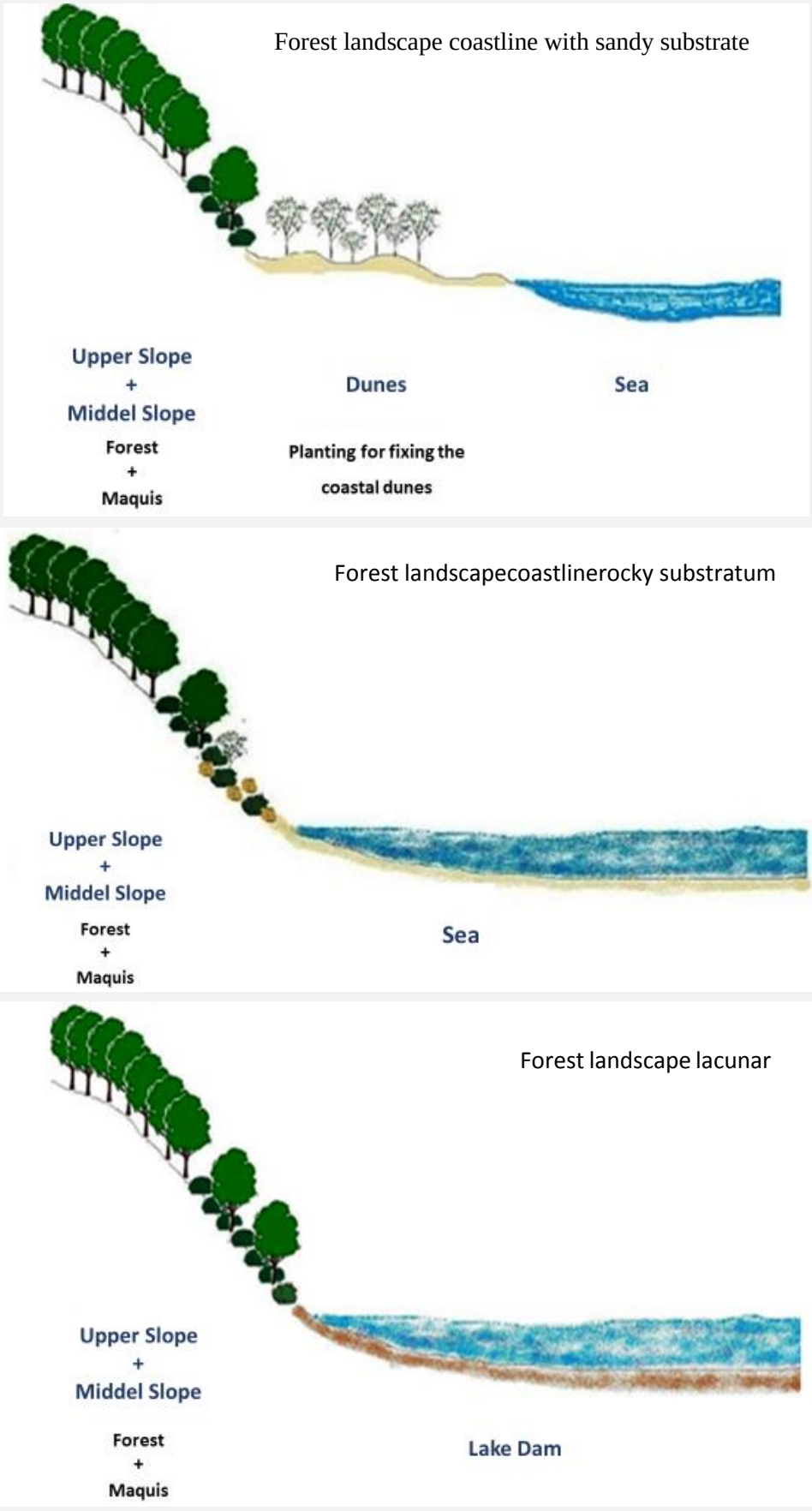


Figure 3: Profile Type of forest landscapes associated with the presence of water in the region Kroumirie – Mogods

4. Conclusion

The value of Tunisian forestswas estimated, for a long time, fortheir simple timber potential. The consideration of other amenities such as non-timber forest products unfortunately is not integratedto the landscape. A large part of the intangible heritage forest is obscured and reducing one hand the value of forests while exposing obsolescence. The identification of this potential seeks to raise awareness of landscape riches of the region of Kroumirie - Mogods, identify and locate the building on a participatory mapping process. Its purpose is to draw the attention of development stakeholders in this region of Tunisia that these amenities are considered in decision making, in project development and in regional planning.

Analysis of the results of this participatory mapping of forest landscapes of the Kroumirie – Mogods region, showed a great diversity of landscapes studied level. Revealing a specific component for each observation point (relief, texture, water ...), a rich landscape of components characterized marking and great diversity. The actors interviewed paint a revealing sample representations of identity landscape components of this territory.

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