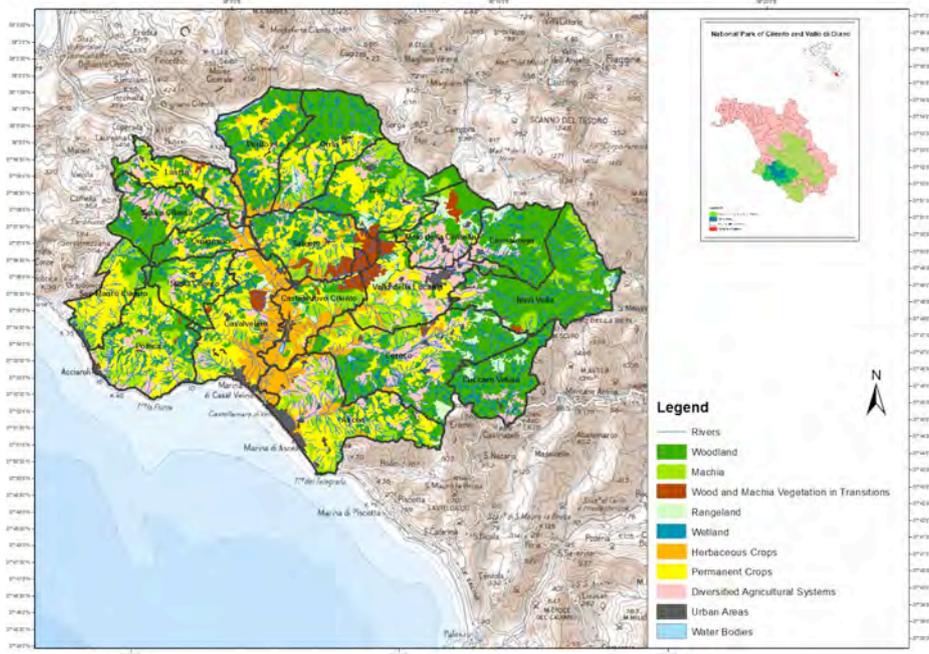


## *Alento River Basin Study Site Description*

### **1. Location**

Alento River Basin represents the core area of the *National Park of Cilento and Vallo di Diano*; it was established in 1991 and belongs to the UNESCO World Heritage List. The Park, covering 181,041 hectares, is located in central-southern Italy, in the Campania region and Salerno Province. Of its total size only the 14% represent the core zones with the rest being in the buffer and transitional zones. The area is characterised by mountains, valleys and coasts. It is bounded on the north and east by the central Appenine, and on the west and south by the coast of Tyrrhenian Sea. In the eastern and northern zones its highest picks are rising, composed of limestone with stratified dolomites. Map 1 shows the location of the study area: the *Alento River Basin* is shown in the main map while in its legend the *Park of Cilento and Vallo di Diano* is shown in green, the Salerno province and its geographical location in Italy is shown in pink.

*Map 1: Alento River Basin within the National Park of Cilento and Vallo di Diano*



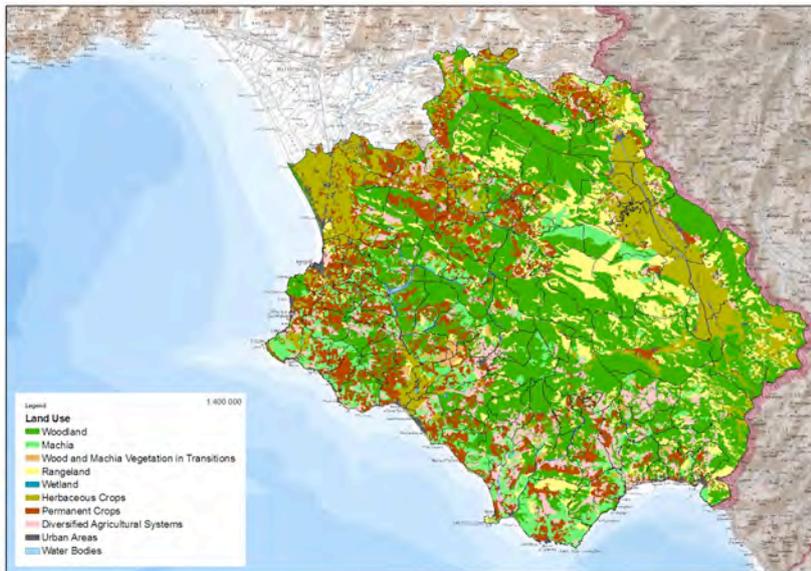
### **Land use and its dynamics**

The Park of Cilento and Vallo di Diano's area is characterised by a substantial diffusion of macchia, forests and pasturelands. As for the lands devoted to agriculture, moving from the top of the hill down to the plane, a significant change in land use can be seen, from an extensive use to specialised crop areas.

Map 2 depicts the land use distribution distinguishing among ten macro land use categories. The maximum expansion zones of herbaceous crops, respectively to north-west and to north-east of the area delimited by the Park, correspond to territories where farming activities are supported by water for irrigation. In fact, the introduction of irrigation in the 1950's has strongly conditioned the productive dynamics, consequently shifting the area to more intensive use of resources. The areas specialising in permanent crops production are mainly represented by olive trees and less by vineyards. The olive tree crop is strongly located in the Park area as well as the olive oil production. Fragmented areas are found all over the park characterised by complex crop systems, which refer to traditional local knowledge where herbaceous and perennial crops coexist, mainly used as self-consumption crops.

Urban areas are concentrated -as it is observed across around the Mediterranean Sea- along the coastline that have been generating high competition for the use of resources caused by strong human pressure phenomena.

**Map 2:** Current land use of the National Park of Cilento and Vallo di Diano



As in many internal areas, this territory has been also characterised by major modifications during the last 50 years. The objective of the increasing production and efficiency, which has inspired the agricultural and rural policies in these areas (achieved by mechanization and chemistry and followed by agricultural exodus phenomena) reshaped the land character. Adopting a five classes grid of land transitions during the last forty years (Table 1), the park's territory can be

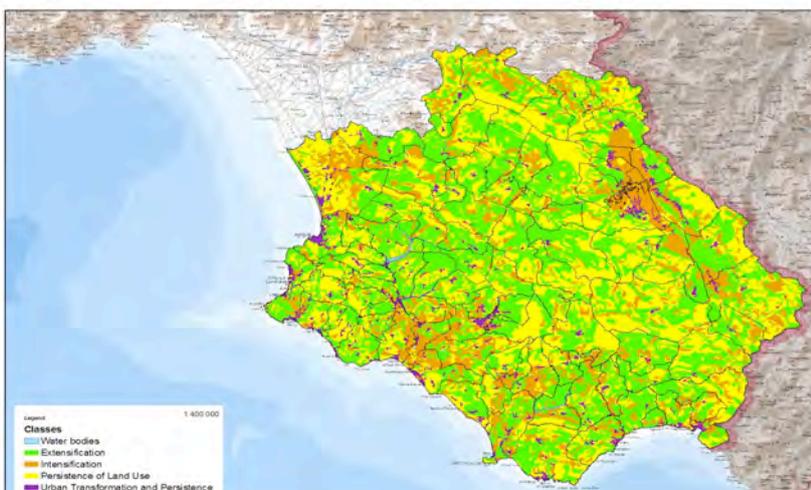
mapped by the shift from one land use to another. It is possible to remark the extensification, intensification and persistence processes in the land use, which have occurred by different forces, mainly economic and social. There have also been reported the urban areas and water bodies dynamics.

**Table 1:** Detailed land use transitions scheme

<b>Extensification</b>	<i>Land passed from an intensive to a less intensive use. For instance, from arable land to pasture.</i>
<b>Intensification</b>	<i>Land passed from an extensive to a less extensive use. For instance, from a arable land to orchard.</i>
<b>Persistence (No Change)</b>	<i>Land that remained unchanged in its use.</i>
<b>Urban trasformations and persistence (no change)</b>	<i>Urban areas that both remained unchanged and increased their size.</i>
<b>Water bodies</b>	<i>Rivers and lakes extension.</i>

Map 3 reveals the spatial distribution of land use transitions. As it can be observed, the persistences in land use have been diffused on the whole area and they became substantial while approaching forestlands. The intensification, instead, can be explained mainly by either a new water distribution system available or by more powerful machinery able to work on steep slopes.

**Map 3:** Spatial distribution of land use transitions



The percentage of land surface, affected by transitions and persistences, are summarized in Table 2. The extensification is the transition that has been most verified on the study area, followed by the persistence. The intensification, although it concerns a little less than 20% of the territory, has

been however, mainly recorded in the agricultural areas.

*Table 2: Tercentage of land transitions*

<i>Land use transition classes</i>	<i>%</i>
<i>Extensivization</i>	<i>43.10</i>
<i>Intensification</i>	<i>18.60</i>
<i>Persistence</i>	<i>35.30</i>
<i>Urban trasformations and persistances</i>	<i>2.90</i>
<i>Water bodies</i>	<i>0.20</i>
<i>Total</i>	<i>100.00</i>

The statistical analysis led on the dynamics that have noticed on the agricultural area of the municipalities residing within park's area, have been tracing cases of extreme variability among them, signifying a complex and a non-uniform reality such as the one of the area delimited by the Park. The

extensivization processes, for example, goes approximately between 72% and 19%. The peak of intensification reaches a value of 57%, while the minimum value it's about 2%. The persistence in the land use is included in a range between 60% to 5%. Furthermore the urban transformations and persistances show the maximum value of 14% and the minimum of 0,22%.

## **2. Environmental profile**

Presently, Cilento National Park is the result of the combination of natural and humankind activities. It falls into the category of evolved landscape, the result of historical, social, economic, artistic, and spiritual imperatives and assumed its present form in association with and in response to its natural environment. It is a living and dynamic landscape showing both very degrading sites and examples of stable and balanced ecosystems, experiencing several degradation threats, from land abandonment to soil erosion and land slides, as well as an unsustainable pressure on the coastlines. This highly degrading process involves more than 10% of the total land, turning this area in a very interesting study site.

The diffusion of human activities in the Cilento Park strongly influences the management of the resources. This makes environmental characters shaped by human activities, leading the vulnerability of the land ecosystems which has been stongly connected with alteration, disturb and anthropic impact actions. One of the most interesting feature of the study area is, undoubtedly, the wide environmental heterogeneity which is showed in these areas thanks to the overlapping of physical, cultural, social and economical stratifications. These features are based on a peculiar litologic, geomorphologic and climatic variability, elements that make this territory a complex of environmental realities hardly findable in other peninsula areas.

By the climatic point of view, the contact between the Temperate region and the Mediterranean clearly explains the complexity and the bio-geographic value of the Park. The landscape of the study site is strongly influenced by the four litological complexes, determining an equivalent number of countrysides. The links among the diversified territorial systems is granted by a rich and complex hydrographic network, which finds source in the water bodyes of the carbonatic systems. Along the main water streams it is noted an interesting mosaic of igrophila herbaceous, shrub and woody vegetation of high naturalistic interest. The river ecosystems are known as the most significant and interesting natural sites both in the Park territory and in the neighbouring regions.

## **3. Demographic & socio-economic profile**

The 95 municipalities consisting the greater area of the National Park, fit to the 60% of the whole set of the Salerno province municipalities. However, they repret only one forth of the population living the province. The so-defined Park area shows a steady trend of the living population in the last forty years, stating to values of about 270,000 inhabitants. In spite of the constancy of such

value, there have been in the same period strong internal dynamics. In the costal municipalities a report of total increase of over 20,000 inhabitants is noticed, while in some of the internal municipalities the population decreases more than the half of the same period, bringing them to less than 1,000 inhabitants per village. Using four socio-demographic basic indicators (density, elderly rate, activity rate, weight of agricultural employees) the human capital territorial performances can be observed.

Over the past 40-50 years, as shown in Table 3, although a substantially unvarying population density has occurred, the elderly rate registers have increased four times in its value. The relatively stable level of activity rate contrasts with the drastic reduction of agricultural employees. This data, in line with the transformation that has affected agricultural and rural areas, in this area turns in an higher share of the weight of the agricultural sector compared to its role in the Italian economy.

Concerning the educational level of the Cilento area, an change has been registered, i.e. the number of residents who have a higher educational degree (High School and University) have increased its value of more than 10 times in the last 50 years, due to the improvement of economic conditions and the communication infrastructures. This aspect turned in many social impacts. Due to the absence of job opportunities for highly educated people, many of them had to migrate either in the closest city or in the richer north part of Italy; contributing to the impoverishment of the local social capital.

As protected area, the Cilento national Park, presents a dualistic pattern of development. Along the coastline we may find almost the 90% of touristic infrastructures (more than 12,000 beds), usually used 50 days per year, while in the internal areas prevails a less intensive form of accommodation. It is noted that approximately 20% of the area's municipalities offer some kind of touristic accommodation.

In terms of social services the study area of Cilento shows a quite diffused presence of non primary services (post offices and banks, and a more concentrated availability of personal services (hospitals and medical services).

The total added value of the study area indicates a typical internal economic fragile situation. The average per capita income is less than 15,000 euros per year (from 32,000 to less than 10,000 euros per year). The agriculture share of that added value roughly represents the 7%, while the services represent over the 75% of the total economy of the area.

**Table 3:** Trend of socio-demographic indicators in the National Park of Cilento and Vallo di Diano

<b>SOCIO-DEMOGRAPHIC INDICATORS</b>	<b>1961</b>	<b>1971</b>	<b>1981</b>	<b>1991</b>	<b>2001</b>
<i>population density (people per Km<sup>2</sup>)</i>	28,50	27,08	27,23	28,05	27,17
<i>elderly rate %</i>	31,45	44,25	63,18	86,54	131,97
<i>weight of agricultural employees %</i>	64,64	50,41	38,12	26,9	16,95
<i>activity rate %</i>	59,36	51,79	48,43	47,94	41,94
<i>Total population (1961 =100)</i>	100	95.0	95.54	98.42	95.34
<i>Total population with a degree / Tot pop (1961=100)</i>	100	201	377	649	1149

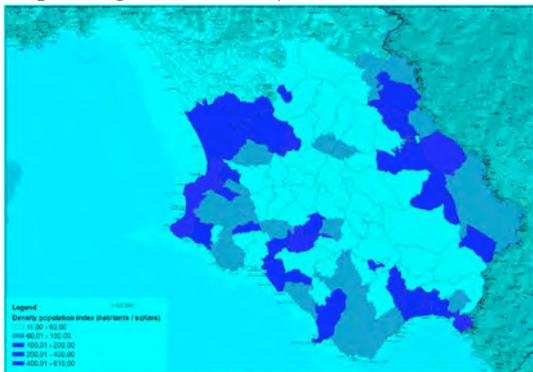
The extensivization processes on the internal territory and the intensification processes along the coastlines, as it was easy to foresee, are followed by consistent socio-demographic phenomena. The population, in fact, moves from the internal areas to coastlines and to the ones better infrastructured with social services. The demographic impoverishment of the internal areas is followed by elderness phenomena. As far as the population moves from the internal to the costal

areas, the number of agricultural employees decreases. The activity rate is apparently anomalous but for this indicator, the reasons have to be searched in the macro socio-economic dynamics rather than to this territorial scale.

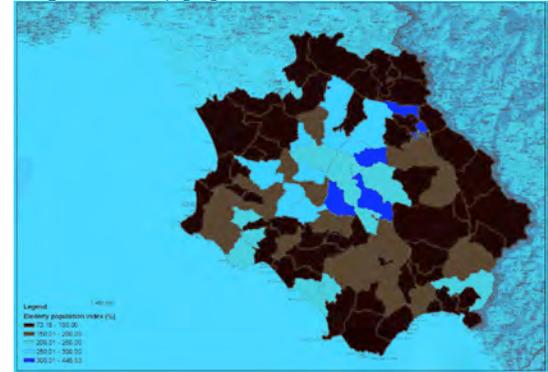
All the socio-demographic indicators considered, show a high variability in values they assume, pointing out, once again, a deep territorial differentiation.

The population density rate reports growing values up to 610 inhabitants/km<sup>3</sup> and decreasing down to 11 inhabitants/km<sup>3</sup>.

**Map 4: Population density**



**Map 5: Elderly population index**



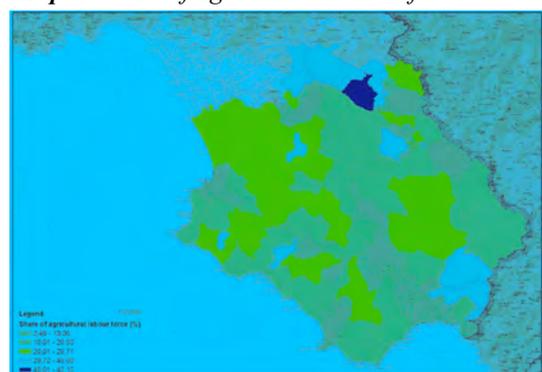
The elderly rate analysis traces growing values moving from bordering zones to the internal ones. This index ranges between 73 and 448%, showing alarming demomagaphic and social phenomena (e.g. some villages record only 2 babies per 1,000 over 65 years old persons).

The trend of the population activity rate, as you can see on map 6, is as heterogenous as the previous ones: the periferial area of the Park zones shows higher levels of such index, up to more than 50%. As the previous indicators also the agricultural employees rate shows a non-homogeneous distribution on the territory. The peak of this index goes up to 42%, while it is possible to record municipalities where the same un dex reaches values low as 2%.

**Map 6: Active population ratio**



**Map 7: Share of agricultural labour force**



#### 4. Principal LEDD Problems

The study area shows several LEDD problems, both deriving from a non-suitable territorial management and from an intrinsic territorial fragility, aggravated by a diffused land abandonment. A first group of LEDD issues, such as Landslides, Coastal Erosion and Flooding originate mainly from the local geomorphology, exacerbated by a deep modification of waterways by human activities.

A second group of LEDD issues, such as forest degradation, soil erosion, bush fires, reduction of soil organic matter, decrease of land productivity, loss of agricultural biodiversity, land abandonment, urban sprawl, Urban Land Ceiling, mainly derive from the trend of the agricultural activities during the last 50 years. In fact, the agricultural sector, has been strongly influenced by

social and economical forces which have been pushing it towards crop intensification and specialization. The internal areas, characterized by structural and economic marginality, have been excluded from these processes experiencing significant phenomena of land abandonment.

The third group includes all the socio-demographic issues such as depopulation and eldersness, leading to a local demographic impoverishment. As it can be noticed from table 3, a preliminary set of LEDD problems as they can be observed in the study area, as well as the scale to which those phenomena should be better addressed.

Table 3: LEDD problems in the Cilento study area

<i>LEDD problems</i>	<i>Scale</i>
<i>Landslides</i>	Local
<i>Coastal erosion</i>	Regional
<i>Flooding</i>	Regional
<i>Water table quality and quantity detriment</i>	Regional
<i>Water shortage</i>	Regional
<i>Springs quantity and quality deterioration</i>	Local
<i>Surface water pollution</i>	Regional
<i>Forest degradation</i>	Local
<i>Soil erosion</i>	Local
<i>Bush fires</i>	Local
<i>Reduction of soil organic matter</i>	Local
<i>Decrease of land productivity</i>	Local
<i>Loss of agricultural biodiversity (Shift from traditional/local crops to brand products; monoculture; no crop rotation; abandonment of traditional agricultural practices)</i>	Local
<i>Urban sprawl</i>	Local
<i>Urban Land Ceiling</i>	Local
<i>Land abandonment (agriculture/pasture)</i>	Local
<i>Depopulation</i>	Regional
<i>Ageing population</i>	Regional

Map 8 reports the geographical location of the landslides and flooding areas recorded in the study area, while photo 1, illustrates a typical phenomenon of soil erosion causing off-site effects invading the roads, with potential severe consequences also on the safety.

Map 8: Landslides Susceptibility and Flooding areas

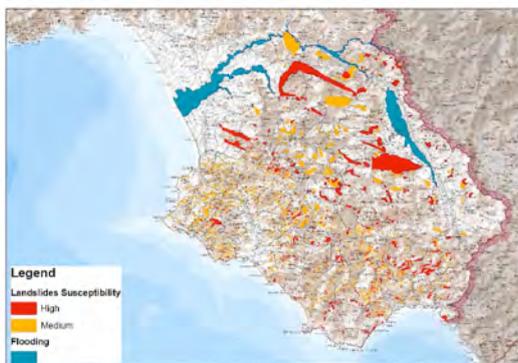


Photo 1: Soil erosion in Cilento study area



## 5. Current observed RESPONSES to LEDD

As the environmental sensitiveness increased, most of the LEDD problems in the study area have been acknowledged and described. On the mean while some planned responses have been

implemented. However due to many other public or private goals and their implementation, negative effects on the LEDD have been registered. The latter can be considered as indirect negative responses. What can be now observed along the study area is either the result of no action undertaken or the outcome of the interaction between the positive planned human actions with the negative ones.

Subsequently there is a list of the main responses to LEDD observed in the Cilento study area, according to seven main categories like Land Management Practices, Physical Measures, Plans, Policies, Fiscal Measures, Economic Measures and Social Measures, and their classification as positive or negative ones.

*Photo 2: landslide control in Cilento study area*



*Photo 3: erosion control in Cilento study area*



	<b>POSITIVE</b>	<b>NEGATIVE</b>
<b>LAND MANAGEMENT PRACTICES</b>	<ul style="list-style-type: none"> <li>- Organic farming</li> <li>- Integrated Farming System</li> <li>- Cover crops (Olive grow and Vineyards)</li> <li>- Crop rotation</li> <li>- Recover of traditional crops</li> <li>- Forestation</li> <li>- Afforestation</li> <li>- Integrated grazing management</li> <li>- Transhumance</li> </ul>	<ul style="list-style-type: none"> <li>- Increase of fertilizers</li> <li>- Increase of mechanical equipments</li> <li>- Irrigated crops</li> <li>- Crop specialization</li> <li>- Livestock intensification</li> </ul>
<b>PHYSICAL MEASURES</b>	<ul style="list-style-type: none"> <li>- Terraces maintenance</li> <li>- Stone roads maintenance</li> </ul>	<ul style="list-style-type: none"> <li>- Concrete walls</li> <li>- Road ceiling</li> </ul>
<b>PLANS</b>	<ul style="list-style-type: none"> <li>- NAP</li> <li>- National Park Management Plan</li> <li>- Watershed management plan</li> <li>- Water management plan</li> <li>- Forest management plan</li> </ul>	
<b>POLICIES</b>	<ul style="list-style-type: none"> <li>- Rural Development Program</li> <li>- Natura 2000 Network</li> <li>- Cross-compliance</li> <li>- EU Protected Designation</li> </ul>	<ul style="list-style-type: none"> <li>- Euromed Agreement</li> <li>- Regional Agreements</li> </ul>
<b>FISCAL MEASURES</b>	<ul style="list-style-type: none"> <li>- Special agriculture regime</li> <li>- Special agriturismo regime</li> </ul>	<ul style="list-style-type: none"> <li>- Low fiscal pressure on secondary houses on the coast</li> </ul>

<b>ECONOMIC MEASURES</b>	<ul style="list-style-type: none"> <li>- Single farm payment (SFP)</li> <li>- Support to agriculture diversification (agriturism, social farming, etc.)</li> </ul>	<ul style="list-style-type: none"> <li>- Support of touristic activities on the coast</li> </ul>
<b>SOCIAL MEASURES</b>	<ul style="list-style-type: none"> <li>- environmental scholarships</li> <li>- wide band communication support</li> </ul>	<ul style="list-style-type: none"> <li>- reduction of medical centres in the rural areas</li> </ul>