University of Lisbon
Faculty of Science
Ecosystem Services and Environmental Economy

Arrábida's Natural Park

Analysis of the Ecosystem Services (terrestrial component)

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Bring together in a structured way, all the major different aspects about the earth component of the Arrábida's Natural Park (ANP)

Map its definitive role on the local human wellbeing

Provide a point of information for the future decision making about the place

Build a shared recognition about its ES its benefits and value

Objectives

We want to understand the ecosystem and the interaction between the elements involved in ANP

Identifying the current conditions and human pressures surrounding it

Have a clear view of the direct and indirect contributions for the human wellbeing and their consequent economic value

Latest studies and raise recent data, to manage the building of a conceptual framework

Methods

Bibliographic research

Data collection

Framework and classification

Study area

Terrestrial and marine

Mountain area near littoral

3 main floristic elements:
Euro-Atlantic;
Mediterranean;
Macaronesian

Study area

Main habitats

Forests;

Rocky habitats and caves;

Herbaceous formations;

Sclerophilic weeds.

Study area

Biodiversity

1450 plant *taxa*;

650 invertebrates species;

12 amphibians;

17 reptiles;

197 birds;

34 mammals
(some of them endangered)

Structure	Functioning
Forests	Water fonts
Rocky habitats and caves	Primary production
Natural / semi-natural herbaceous formations	O2 production
Mediterranean arborescent scrubs	Nutrient cycling
Sea cliffs	Maintenance of genetic diversity
Trophic web	Soil formation
Faunal communities	Natural habitat provision
	Pollinate (plant reproduction)

Structure

Forests

Rocky habitats and caves

Natural / semi-natural herbaceous formations

Mediterranean arborescent scrubs

Sea cliffs

Trophic web

Faunal communities

Functioning

Water fonts

Primary production

O2 production

Nutrient cycling

Maintenance of genetic diversity

Soil formation

Natural habitat provision

Pollinate (plant reproduction)

Services

Provisioning:
Herbs
Vegetables
Other endemic varieties
Grapes for wine
Medicinal herbs
Ornamental herbs
Genetic material
Dairy products
Endemic orchid
Water for drinking
Water for production

Regulation:
Nutrient cycling
Erosion regulation
Natural pollination services
Habitat provision
Human disease and pest regulation
Soil formation
Water quality regulation
Climate regulation
Air quality regulation

Cultural:
Place for recreation
Ecotourism
Sports practice
Place for destress and nature contemplation
Place for scientific research
Place for educational purpose
Sense of place
Aesthetic values
Local emblem
Spiritual and religious value

Structure

Forests

Rocky habitats and caves

Natural / semi-natural herbaceous formations

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Benefits

Harvest crops

Healthy diets

Support livelyhoods

Rich natural landscape

Cultural activities enabling

Scientific and educational enriching

Relevant personal experiences

Values

More economic activities on site

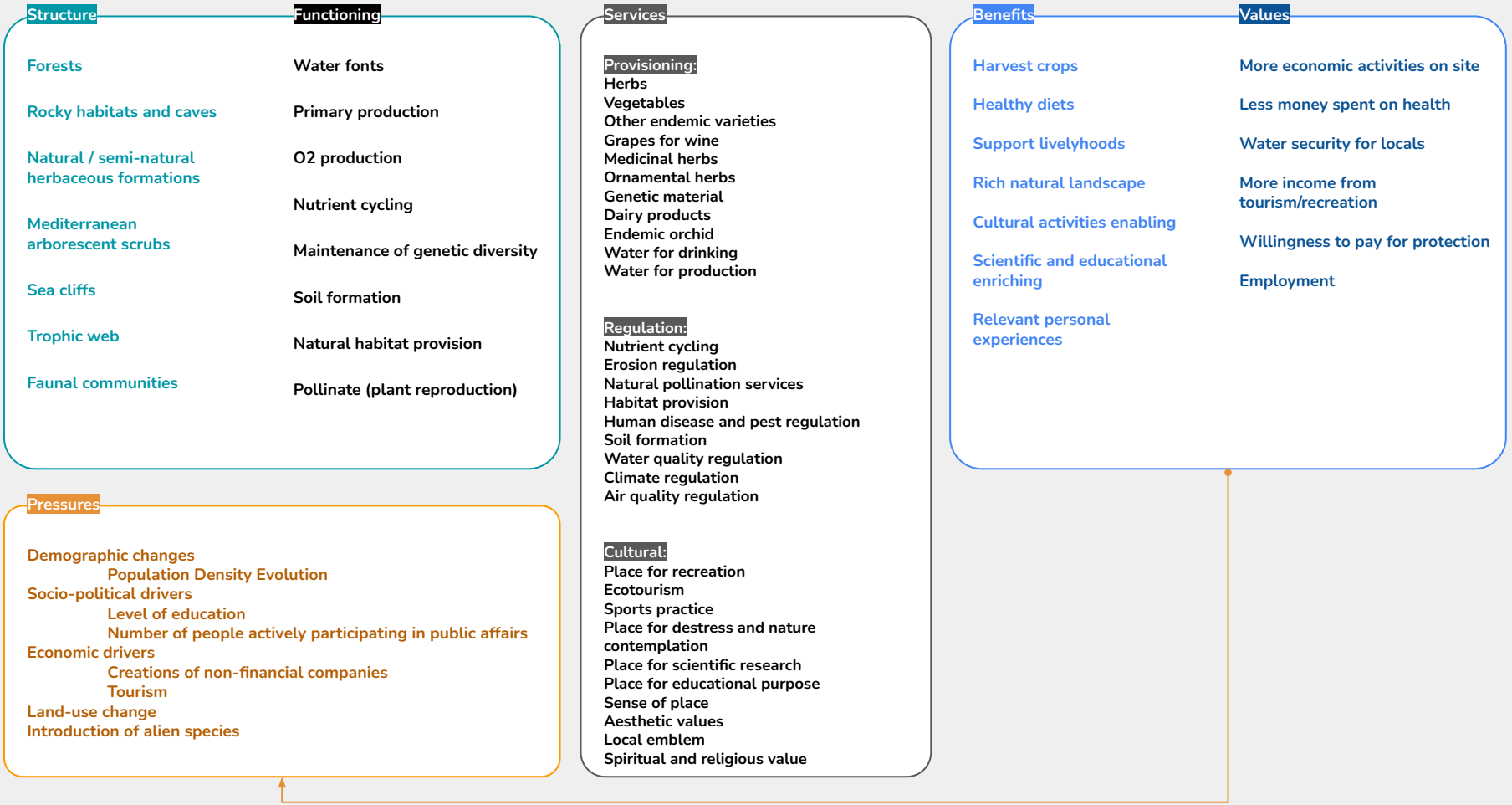
Less money spent on health

Water security for locals

More income from tourism/recreation

Willingness to pay for protection

Employment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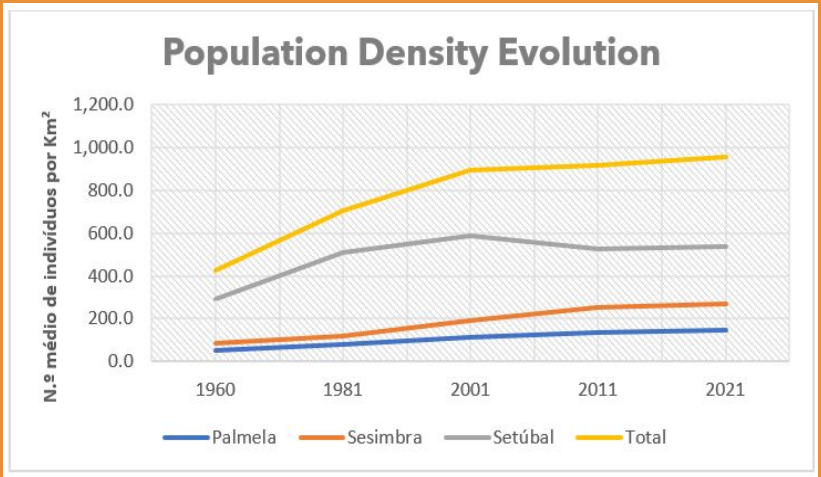
Pressures
Demographic changes
Population Density Evolution
Socio-political drivers
Level of education
Number of people actively participating in public affairs
Economic drivers
Creations of non-financial companies
Tourism
Land-use change
Introduction of alien species

Pressures

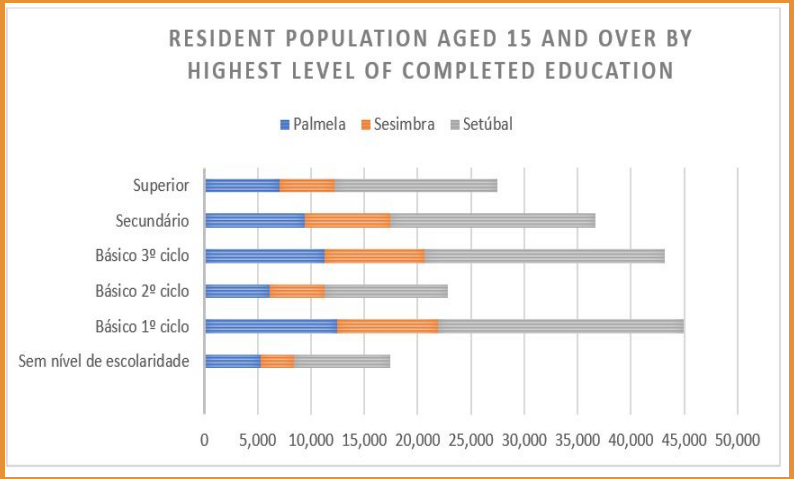
High population density puts high pressure on ecosystems and produces great demand



400 inhabitants/km2 in 1960 to almost 1000 inhabitants/ km2 in 2021

"Population Density Evolution" Data Sources: INE - X, XII, XIV, XV and XVI General Population Censuses

People with a higher degree of education in the area are more than 25 thousand

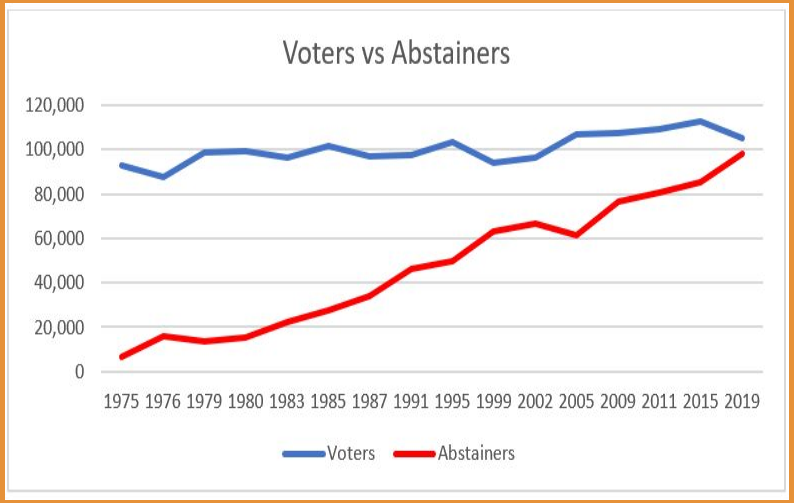


Most of the adult population is well educated and has reached at least the level “Básico 3° ciclo”.

"Resident population aged 15 and over according to the Census: total and by highest level of completed education". Data Sources: INE - X, XII, XIV and XV General Population Censuses, last update 2015

Pressures

Low rates of public involvement on decisions can be a big concern

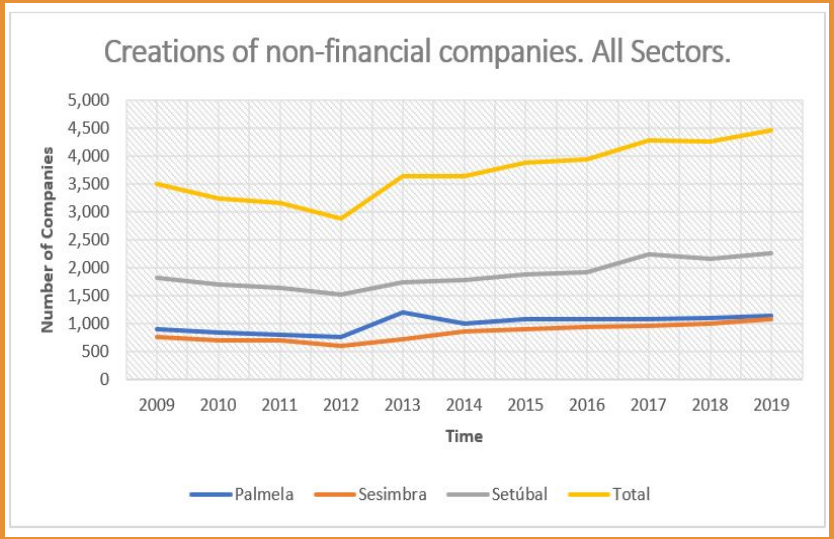


On the other hand, the number of abstainers has risen up along the same time span

"Voters in the elections for the National Assembly: voters and abstention" Data Sources: SGMAI - Voter Registration Database (Voters) | Provisional scrutiny (voting)

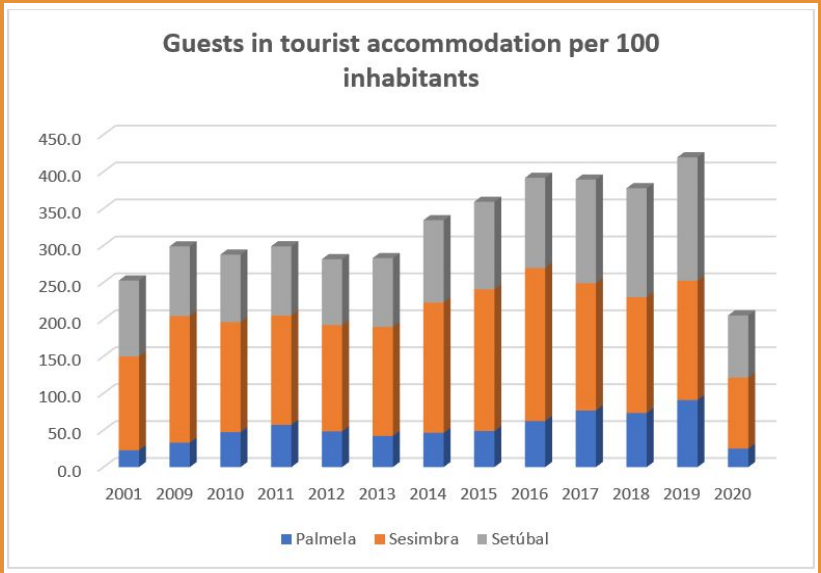
Pressures

The number of companies founded in the three municipalities increased from 2009 until 2019 in INE's registers.



"Creations of non-financial companies. All sectors." Source: INE -Demographics of the Companies

The number of tourists has almost doubled from 2001 until 2019 (pre pandemic era)



"Guests in tourist accommodations per 100 inhabitants" Data Sources: INE - Annual Resident Population Estimates

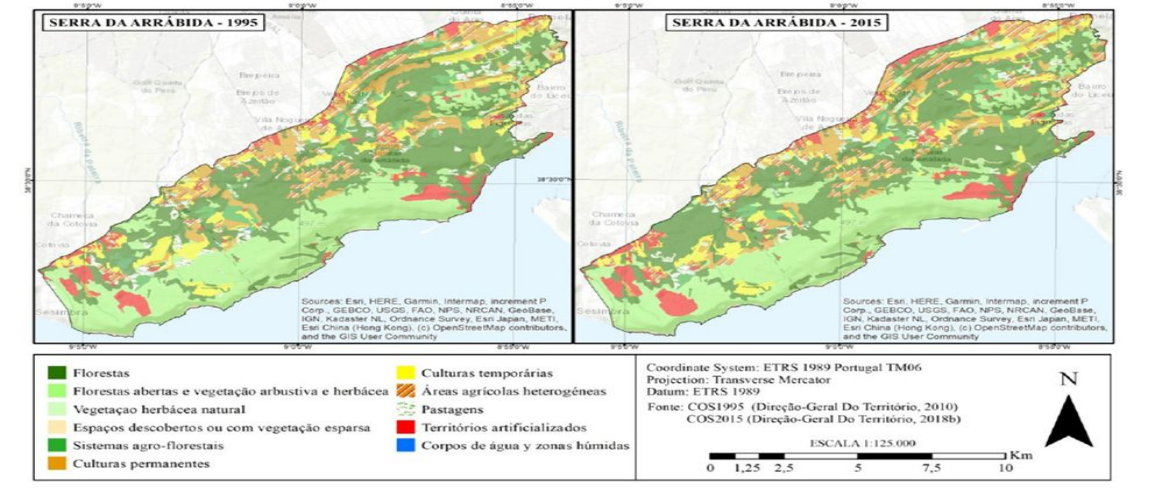
Land use change

Agricultural abandonment accounts for **27.48%**;

Increase in artificial areas (less than 10%);

Agricultural area increased by **9.07%**.

Forest areas have increased.



" Maps of uses and coverage for the years 1995 and 2015. Own elaboration based on Directorate-General for the Territory (2010, 2018b)"

Invasive species as factor of unbalance

Ipomoea indica

Carpobrotus edulis

Senecio angulatus (senecio)

Discussion

Protected areas are perceived as a shield not only for the conservation of biodiversity but also from wild economic growth and constructive pressure

Land usage and its effects on the functioning of the ecosystem is a key factor to discuss

Study area are in direct relation with the pressures exerted from Lisbon

The more economic activities are present in those municipalities, the more people living there

Discussion

Similar services identification on other papers, but different methodology and more focus on human pressures.

Data collected to analyse pressures refers to all the municipality's territory

Help decision makers to easily visualize ES, structures, pressures and their relations

Build a public dashboard monitorize data about the main pressures and its evolution over time


Thank you :)
André Jorge
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Pietro Ruffo