

STRATEGIES FOR THE ENHANCEMENT OF BIODIVERSITY AND SUSTAINABILITY OF THE VINEYARD LANDSCAPE: THE LANDSCAPE PATTERN AND THE BIOLOGICAL BALANCE AND THE ECOLOGICAL STRUCTURE

ESTRATEGIAS PARA EL AUMENTO DE LA BIODIVERSIDAD Y SOSTENIBILIDAD DE LOS PAISAJES VITÍCOLAS: UNA MATRIZ DE PAISAJE Y EL EQUILIBRIO BIOLÓGICO Y LA ESTRUCTURA ECOLÓGICA



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The vineyard(s) landscape(s) respond fundamentally to the technical requirements of consumption and markets, and therefore to productive factors. This income requirement, which responds to the productive function of the landscape, has to be reconciled with the other functions associated with the landscape, in particular with the functions of conservation of resources, but also with recreational functions, where aesthetic specificities and tourist dynamics are involved.

This integrated vision associated with the notion of landscape leads to strategies developed in order to promote a landscape pattern that values the biological balance, ecological structure and cultural aspects that can be achieved through landscape design and management:

- A first strategy based on the notions of soil suitability and valuation of the main biophysical structures of the landscape to determine the agricultural areas and the definition of plots;
- A second strategy centered in the design of a landscape structure that guarantees the biophysical requirements of higher hierarchy (above mentioned) and that enhance those of lower hierarchy, which include the small spaces and structures (hedges, wetlands/drainage areas, and / or compensation bands, routes/paths, among others), fundamental to establish a biological, physical and cultural continuity.

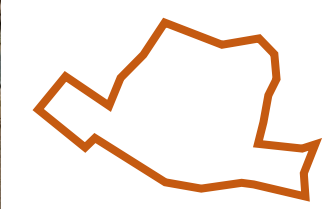
OBJECTIVE: to reflect on the principles of design associated to the construction of the productive system connected with the landscape of the vineyard, taking into account a strategy to increase the biodiversity and the sustainability of the landscape, thus contributing to a greater environmental sustainability and valuation of the landscape, where the economic, social, environmental and aesthetic dimensions are integrated.

The main characteristics associated to the practice of organic viticulture are explored, and a landscape pattern that best suits this agricultural practice and the more accurate plant species are proposed.



SCALE 1: 30 000

CASE-STUDY



VINEYARD PLANTATION
(Mata Cães property, Borba, PORTUGAL)



STRATEGY

DRY SYSTEM: dry and stony areas/soils with some spontaneous vegetation

WET SYSTEM: stream structure



Mata Cães (North view)



Mata Cães (West view)

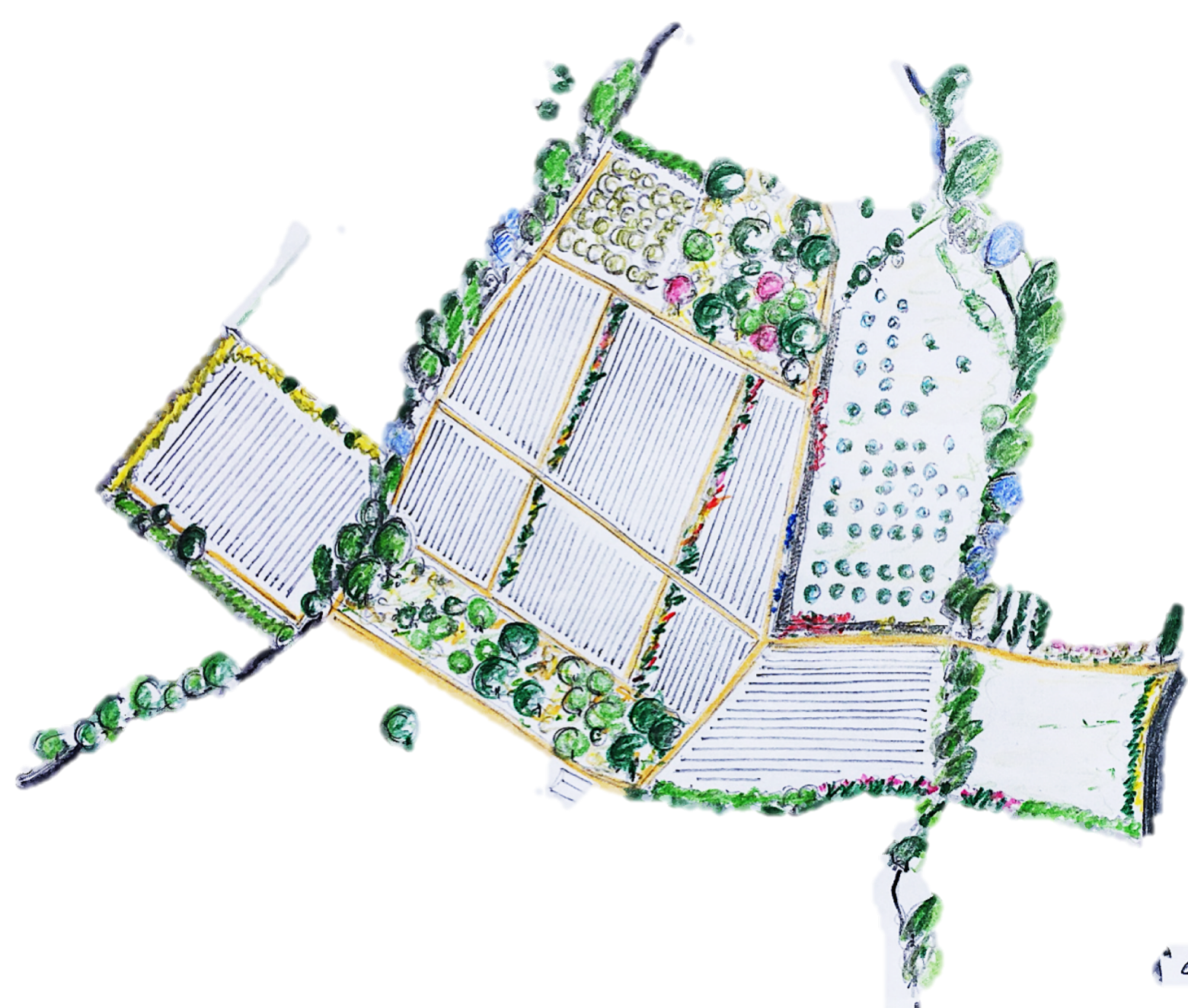
BRIEF CHARACTERIZATION OF THE CASE-STUDY LANDSCAPE: Mediterranean landscape, monotonous, with smooth slopes; good agricultural land, extensive agricultural use but large and uninterrupted areas of cereals and vines, only very rarely with areas of forest and some isolated trees.

BRIEF EXPLANATION OF THE STRATEGIES USED: recovery of the dry system (most dry and stony areas where some spontaneous vegetation remains - forest) and of the wet system (watercourses and wetter lowlands) with high repercussions in the increase in biodiversity and the enhancement of the ecological structure.

BRIEF DESCRIPTION OF THE PROPOSAL: dense and diverse landscape pattern, with respect for the ecological system where economic, but also cultural and aesthetic requirements were met.

It includes the design with diverse vegetal material that aims to improve the natural habitat and to avoid the predators of the biological vineyard:

- Autochthonous vegetation suitable for each system: dry (forest) and wet systems (riparian gallery, orchard);
- Well-adapted vegetation which, being not autochthonous, helps to prevent pests and diseases supporting organic viticulture.



PROPOSAL | LANDSCAPE PATTERN

- DRY SYSTEM: AREAS OF ECOLOGICAL COMPENSATION**
 - A(1) TREES: *Quercus rotundifolia*, *Pyrus bourgaeana*, *Cercis siliquastrum* | SHRUBS: *Ulex minor*, *Cytisus scoparius*, *Phillyrea angustifolia*, *Crataegus monogyna*, *Quercus coccifera*
 - A(2) TREES: *Quercus rotundifolia*, *Pyrus bourgaeana*, *Celtis australis* | SHRUBS: *Retama sphaeroscarpa*, *Cytisus multiflorus*, *Quercus coccifera*, *Crataegus monogyna*, *Rhamnus lycioides*, *Phillyrea angustifolia*, *Teucrium fruticans*
- DRY SYSTEM: HEDGES OF ECOLOGICAL COMPENSATION**
 - B(1) SHRUBS: *Cytisus multiflorus*, *Retama sphaeroscarpa*, *Crataegus monogyna*
 - B(2) SHRUBS: *Crataegus monogyna*, *Nerium oleander*, *Cytisus scoparius*
 - B(3) SHRUBS: *Lavandula stoechas*, *Lonicera caprina*, *Rosa sempervirens*
 - B(4) SHRUBS: *Crataegus monogyna*
 - B(5) TREES: *Cupressus sempervirens* | SHRUBS: *Laurus nobilis*, *Rosa sempervirens*
- DRY SYSTEM: ECOLOGICAL CORRIDOR**
 - C(1) SHRUBS: *Teucrium fruticans*, *Lavandula stoechas*, *Thymus citriodorus*, *Ruscus aculeatus*, *Myrthus communis*, *Lonicera caprina*, *Rosmarinus officinalis*, *Rosmarinus officinalis prostratus*
 - C(2) SHRUBS: *Retama sphaeroscarpa*, *Cytisus multiflorus*, *Cytisus scoparius*, *Lavandula stoechas*, *Thymus citriodorus*
 - C(3) SHRUBS: *Genista tracantos*, *Cistus salviifolius*, *Cistus ladanifer*, *Myrthus communis*, *Rhamnus lycioides*, *Cistus crispus*; *Thymus mastichina*
- WET SYSTEM: RIPTICAL GALLERY**
 - D(1) TREES: *Fraxinus angustifolia*, *Salix salviifolia*, *Sambucus nigra*, *Tamarix africana* | SHRUBS: *Rosa sempervirens*
 - D(2) TREES: *Celtis australis*, *Salix salviifolia*, *Fraxinus angustifolia* | SHRUBS: *Rosa sempervirens*, *Viburnum tinus*, *Lonicera caprina*, *Nerium oleander*
- (E) ORCHARDS**
 - TREES: *Prunus dulcis*, *Citrus sinensis*, *Citrus limon*, *Juglans regia* | SHRUBS: *Punica granatum*, *Cydonia oblonga*, *Arbutus unedo*, *Rubus idaeus*
- ACCESS /PATHWAYS**



Mata Cães (South view)



Mata Cães (East view)