

ACTUAL CONDITION - year 2020



NEW AGRICULTURE TECHNIQUES - year 2020



SYMBIOTIC LANDSCAPE - year 2100



Country / City Italy, Ferrara

University / School University of Ferrara / Architecture Department / Sealine Research Center

Academic year 2018/2019

Title of the project SYMBIOTIC LANDSCAPE. A dynamic strategy between water management and land aptitudes

Authors Davide Felloni, Beatrice Magagnoli, Lorenzo Tinti

TECHNICAL DOSSIER

Title of the project	SYMBIOTIC LANDSCAPE. A dynamic strategy between water management and land aptitudes
Authors	Davide Felloni, Beatrice Magagnoli, Lorenzo Tinti
Title of the course	Master Thesis Laboratory in Landscape Architecture and Infrastructures
Academic year	2018/2019
Teaching Staff	Luca Emanuelli, Gianni Lobosco (Supervisors), Carmela Vaccaro, Alessandro Bondesan (Co-Supervisors)
Department/Section/Program of belonging	Architecture Department / Sealine Research Centre
University/School	University of Ferrara



Written statement, short description of the project in English, no more than 250 words

According to future projections, climate change will make water increasingly rare threatening agriculture production. The aim of the thesis is to improve landscape resilience in order to face such prolonged drought periods. The strategy focuses on creating territorial devices that can collect water during flood events and release it when necessary underground or to the surface. The research is carried out in the territory of the Reclamation Consortium of Ferrara, one of the most endangered areas of the Po river plain in Italy. By generating alternative scenarios related to IPCC forecasts and agricultural techniques evolution (from traditional to precision one), the project develops an intervention methodology based on the soils' productivity analysis: through satellite imagery, it is possible to accurately discern suitable (low productive) areas to be transformed in water reservoirs, infiltration forests and aquifer recharge spots. Such "soil aptitude" informs potential transformations at various scales. For example, the implementation of ecological corridors parallel to the coast allows to fight saltwater intrusion mitigating desertification effects and saving the productivity of nearby zones. More local interventions, as the ones developed in the three case-studies presented, can also provide security for rural settlements from flooding, reduce the risk of pollution thanks to waste water phytoremediation and, at the same time, generate new landscapes opportunities for leisure and recreation. Such symbiotic vision demonstrates how, if we want to keep farming productivity in the future, a deep re-setting of agricultural land-use is needed and the new corresponding landscape has to be rooted on soil aptitudes.

For further information
Máster d'Arquitectura del Paisatge -DUOT - UPC

T: + 34 93 401 64 11 / +34 93 552 0842
Contact via email at: biennal.paisatge@upc.edu

Máster d'Arquitectura del Paisatge -DUOT - UPC
ETSAB- Escola Tècnica Superior
d'Arquitectura de Barcelona
Avenida Diagonal, 649 piso 5
08028 Barcelona-Spain

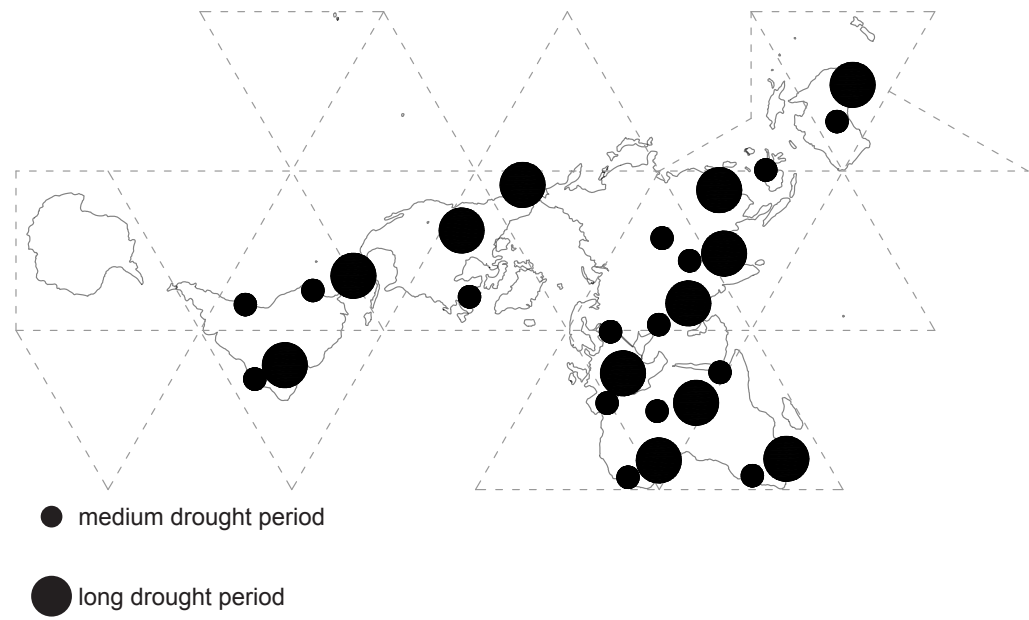


CLIMATE CHANGE AGAIN

11th International Biennial Landscape Barcelona

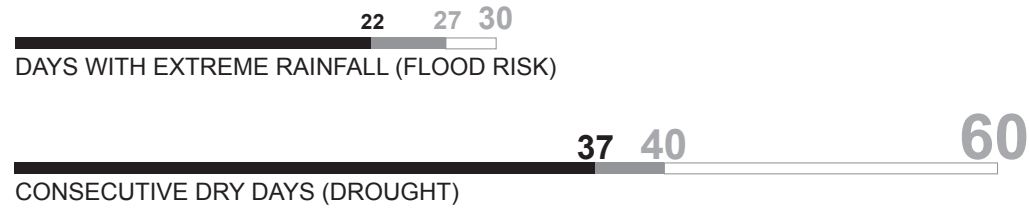
Barcelona September 2020
SCHOOL PRIZE

CLIMATE CHANGE / DROUGHT



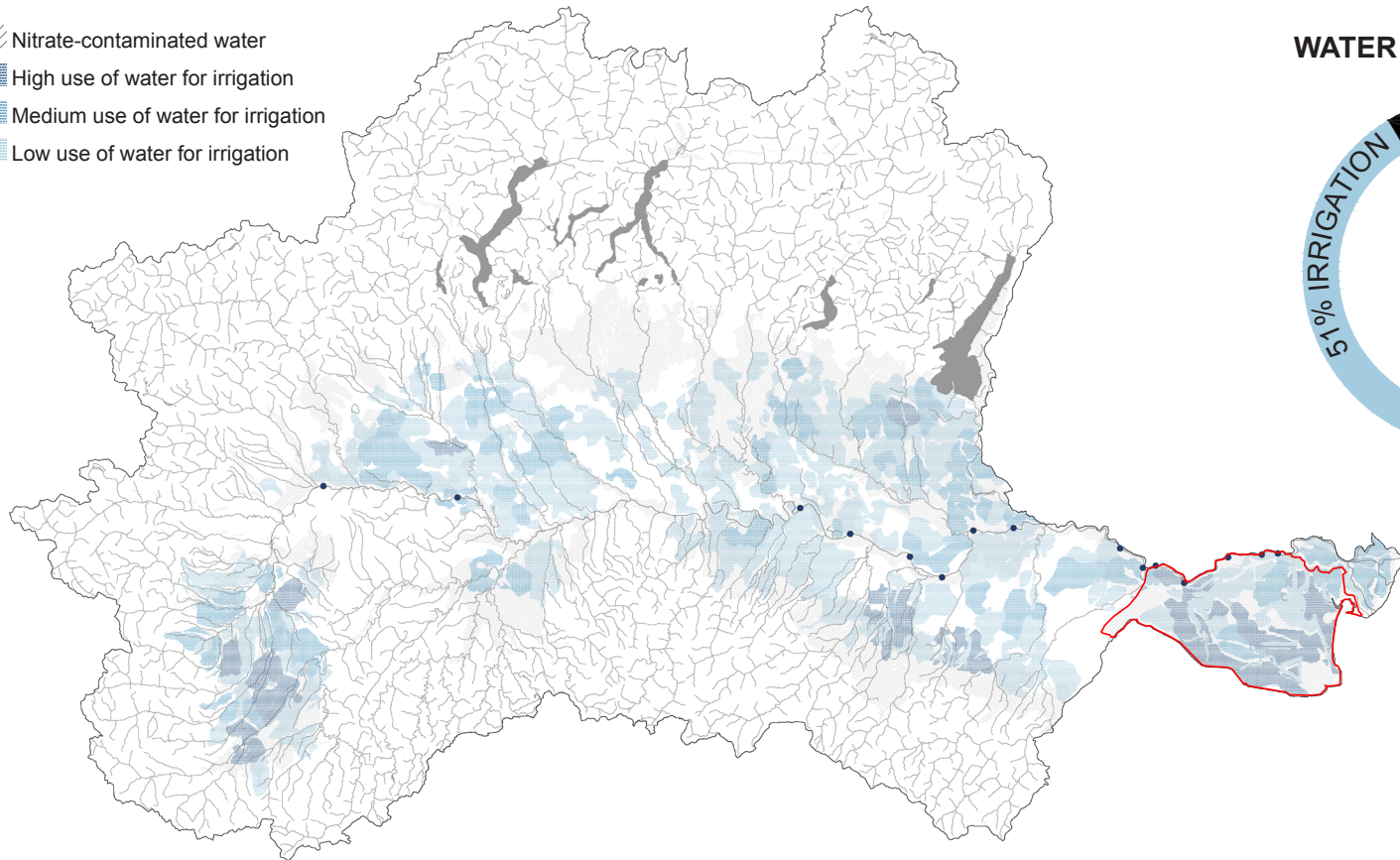
CLIMATE CHANGE PROJECTIONS

IPCC SCENARIO: ■ TODAY at 2020, ■ IPCC RCP2.6 at 2100, ■ IPCC RCP8.5 at 2100



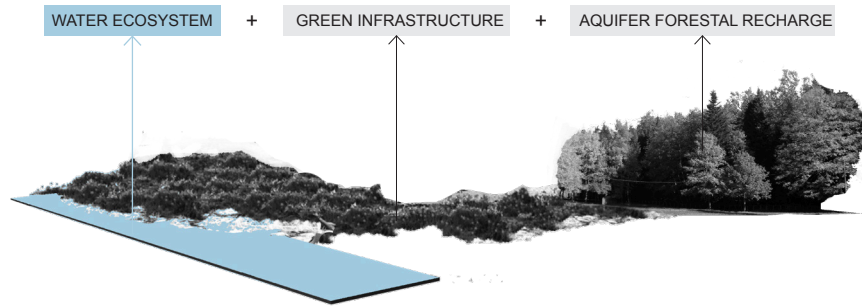
PO BASIN / IRRIGATION MAP

- //// Nitrate-contaminated water
- High use of water for irrigation
- Medium use of water for irrigation
- Low use of water for irrigation

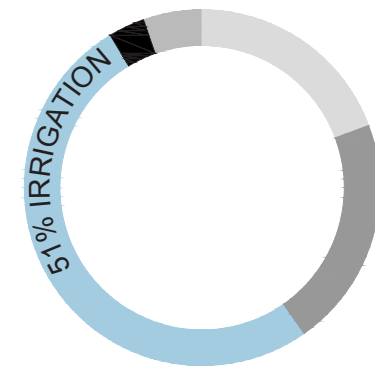


SCENARIO'S APPROACH 2 VARIABLES MATRIX GENERATION

		VARIABLE 02: AGRICULTURE TECHNIQUES	
VARIABLE 01: DRY DAYS SCENARIO	TRADITIONAL AGRICULTURE (100% water consumption) + RCP 8.5 IPCC SCENARIO (60 consecutive dry days)	PRECISION AGRICULTURE (70% water consumption) + RCP 8.5 IPCC SCENARIO (60 consecutive dry days)	
	TRADITIONAL AGRICULTURE (100% water consumption) + RCP 2.6 IPCC SCENARIO (37 consecutive dry days)	PRECISION AGRICULTURE (70% water consumption) + RCP 2.6 IPCC SCENARIO (37 consecutive dry days)	

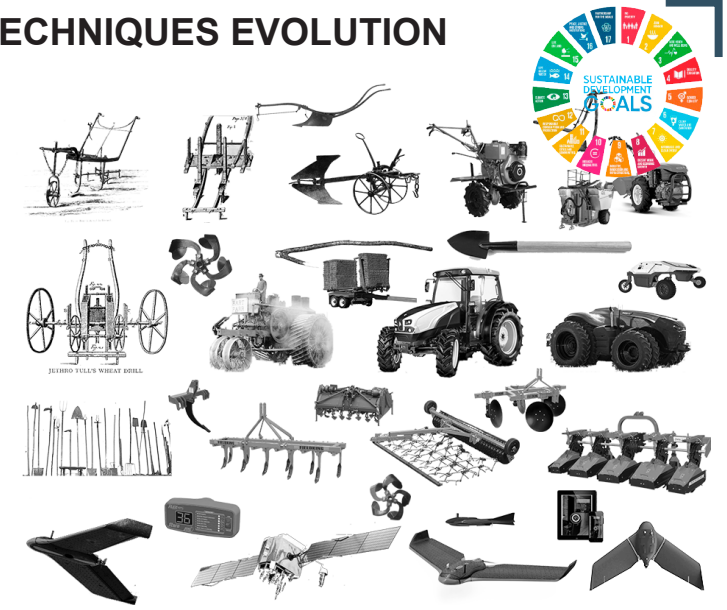


WATER USE / ITALY



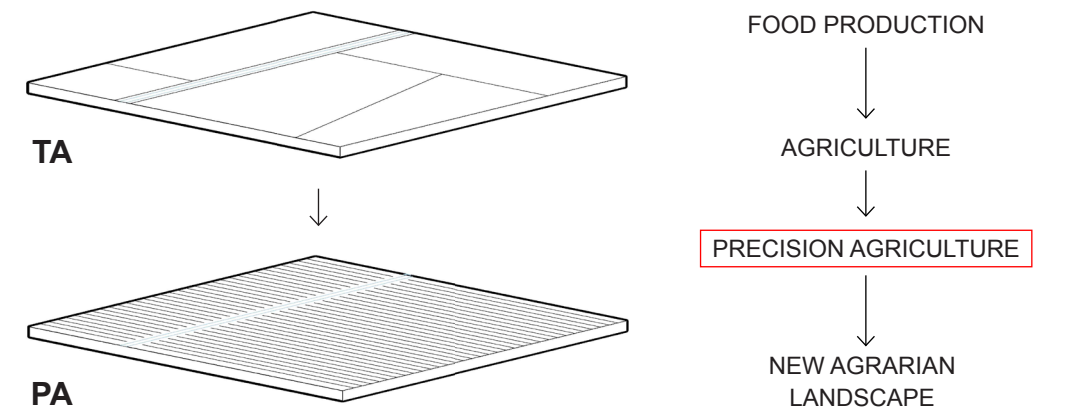
AGRICULTURE / TECHNIQUES EVOLUTION

HUMAN NECESSITY
↓
INVENTING METHOD
↓
CREATE TOOLS
↓
LANDSCAPE TRANSFORMATION



FROM TRADITIONAL (TA) TO PRECISION AGRICULTURE (PA)

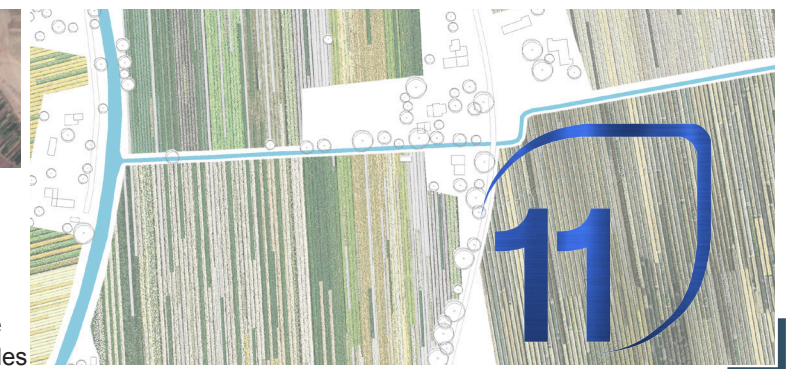
WATER CONSUMPTION - PRECISION AGRICULTURE
100% → **70%**



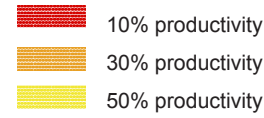
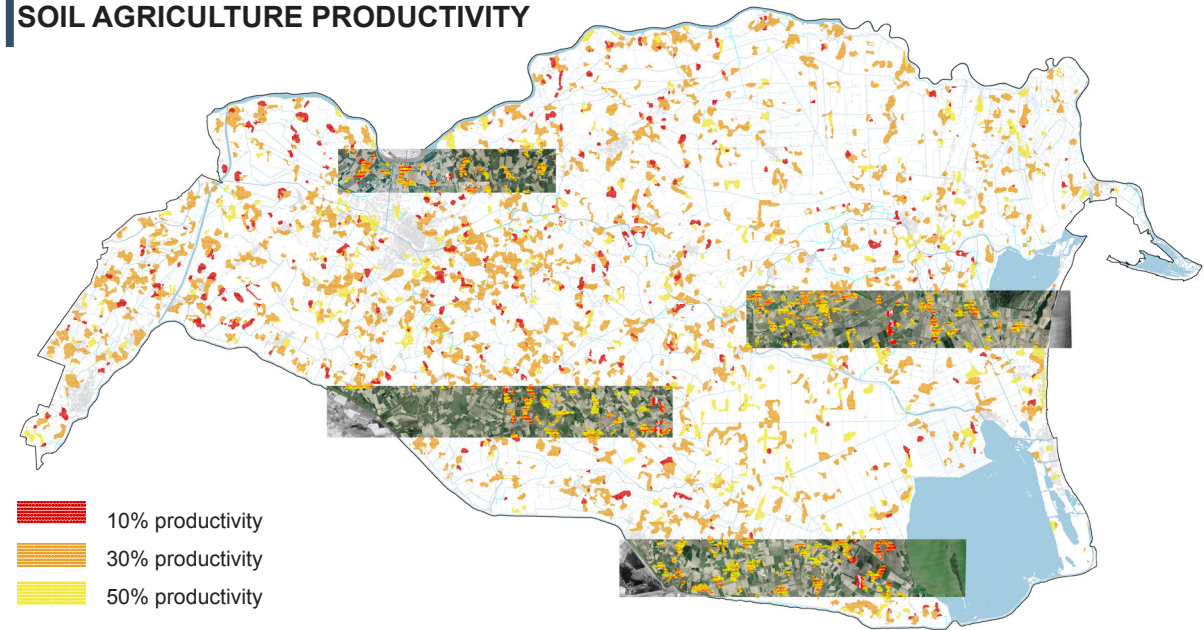
TRADITIONAL AGRICULTURE
Geometry: area
Perception: diffuse
Term of use: solitary
Generating: field property



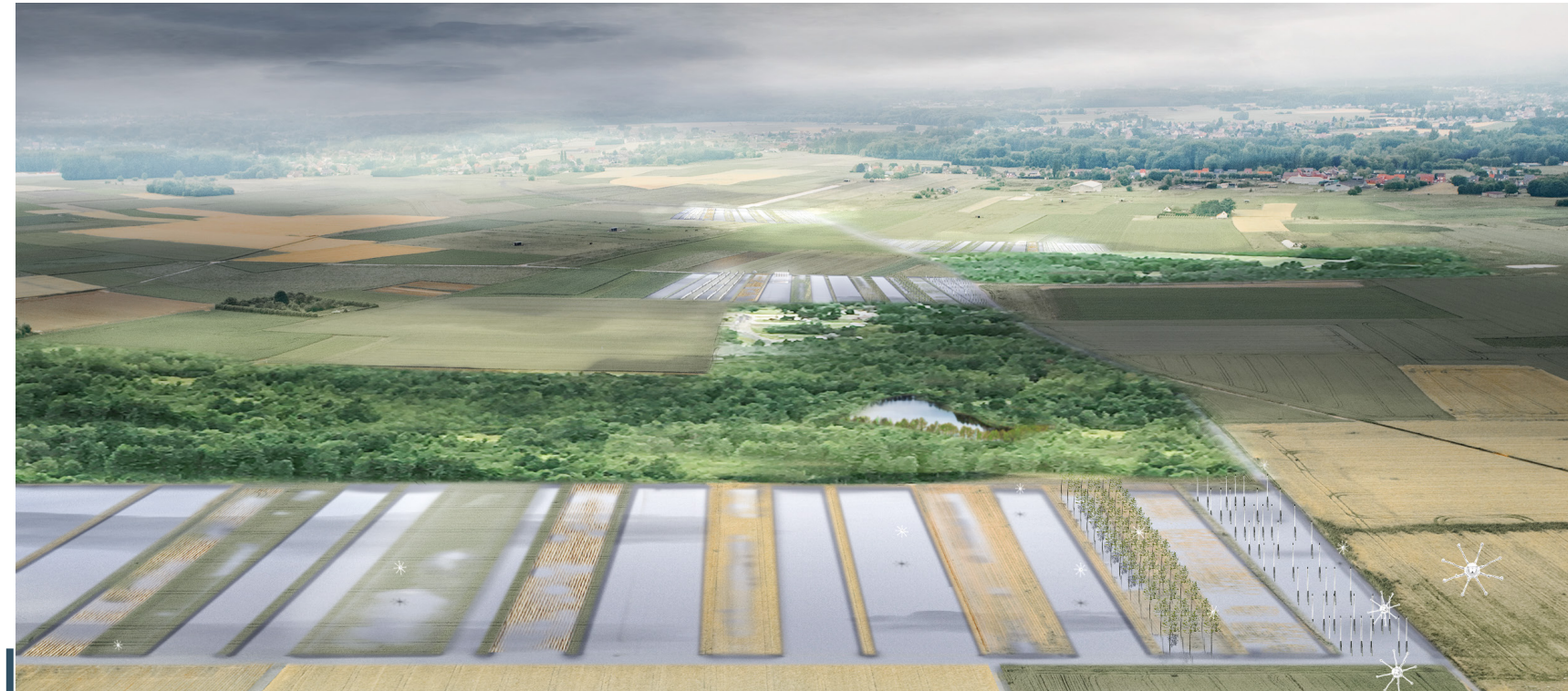
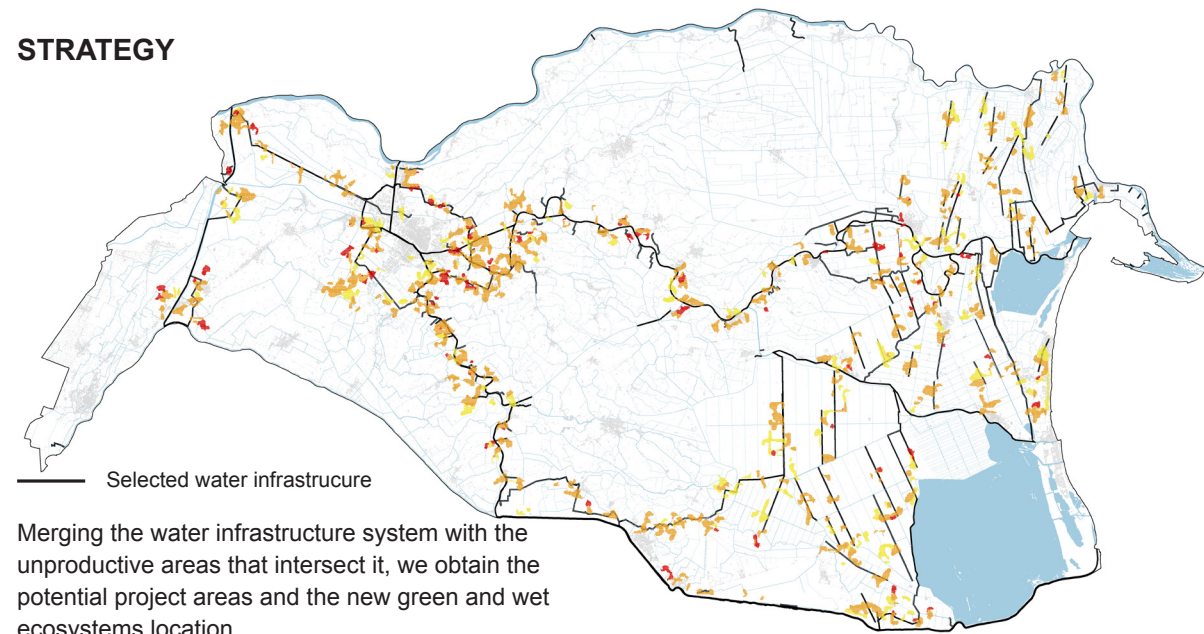
PRECISION AGRICULTURE
Geometry: linear
Perception: punctual
Term of use: cooperative
Generating: land aptitudes



SOIL AGRICULTURE PRODUCTIVITY

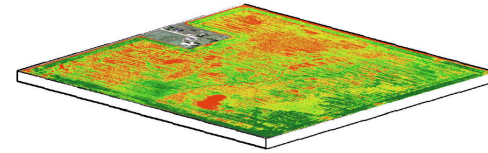


STRATEGY

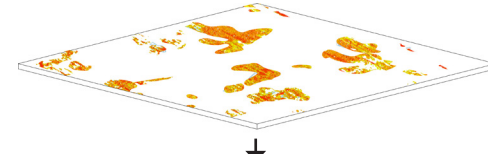


METHODOLOGY

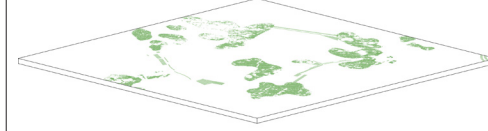
SOIL PRODUCTIVITY ANALYSIS



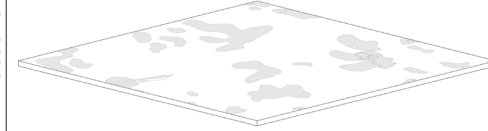
UNPRODUCTIVE AREAS SELECTION



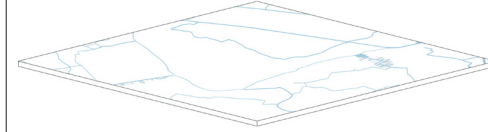
NEW FORESTS



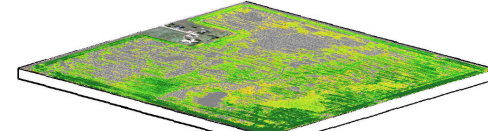
AQUIFER RECHARGE CONNECTION



HYDROGRAPHY IMPLEMENTATION

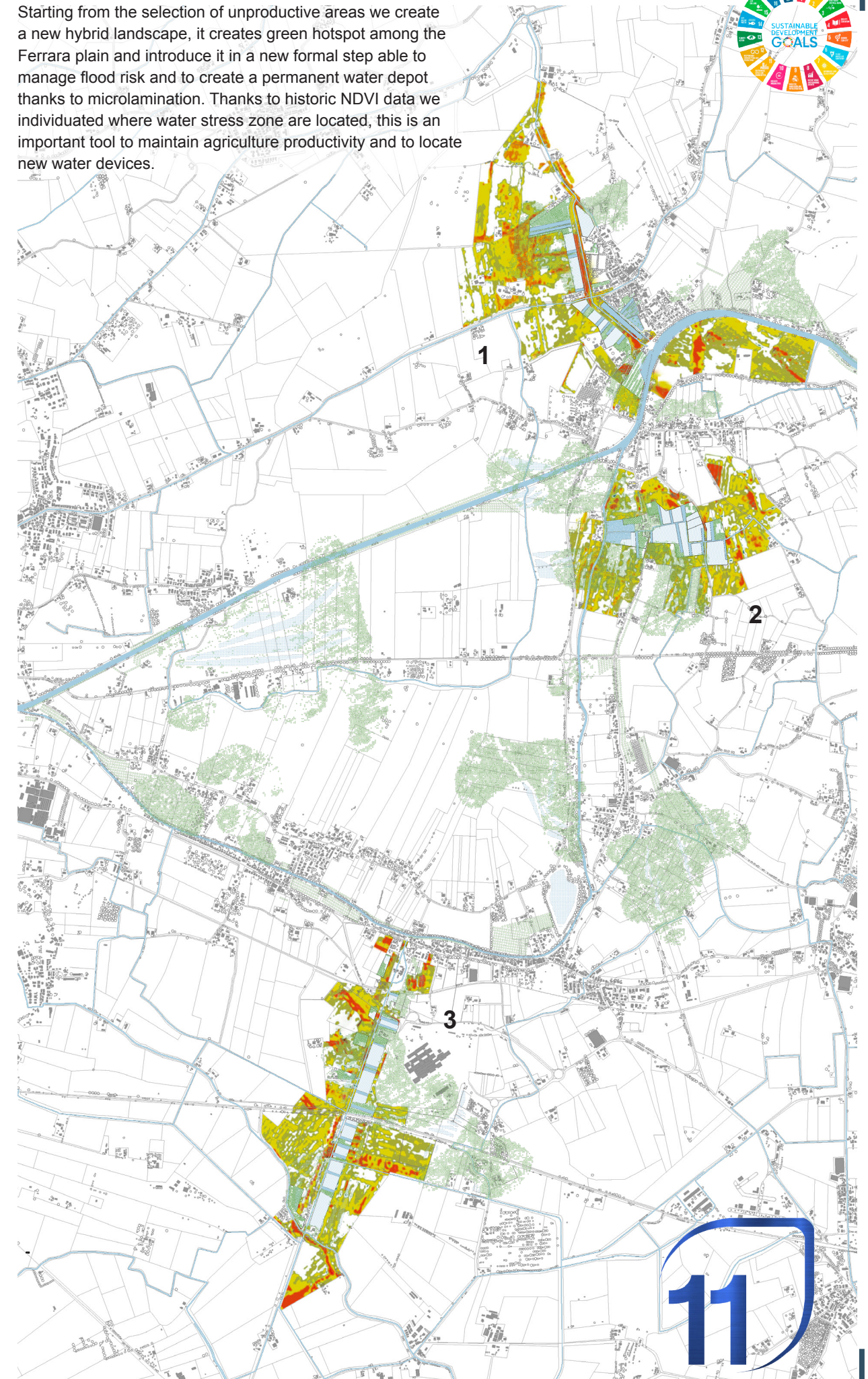


PRODUCTIVE LAND SAVED



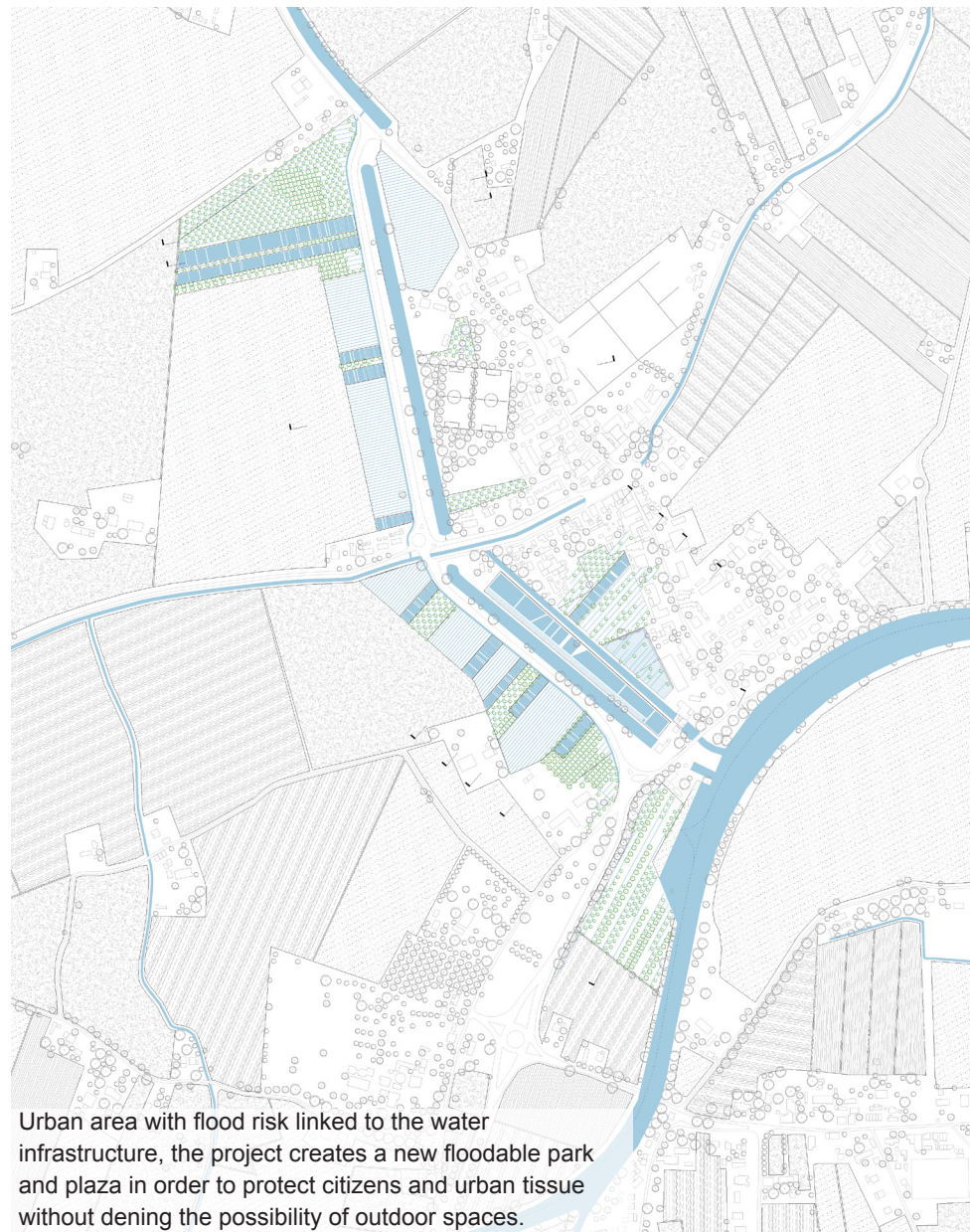
NEW LANDSCAPE ECOSYSTEMS

Starting from the selection of unproductive areas we create a new hybrid landscape, it creates green hotspot among the Ferrara plain and introduce it in a new formal step able to manage flood risk and to create a permanent water depot thanks to microlamination. Thanks to historic NDVI data we individuated where water stress zone are located, this is an important tool to maintain agriculture productivity and to locate new water devices.

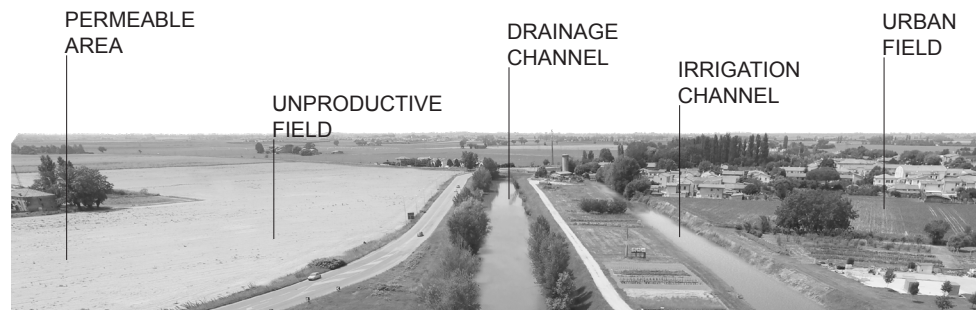


1 / URBAN CASE STUDY

OBJECTIVES: FLOOD RISK MANAGEMENT | GREEN URBAN AREAS | MICROLAMINATION AGRICULTURE

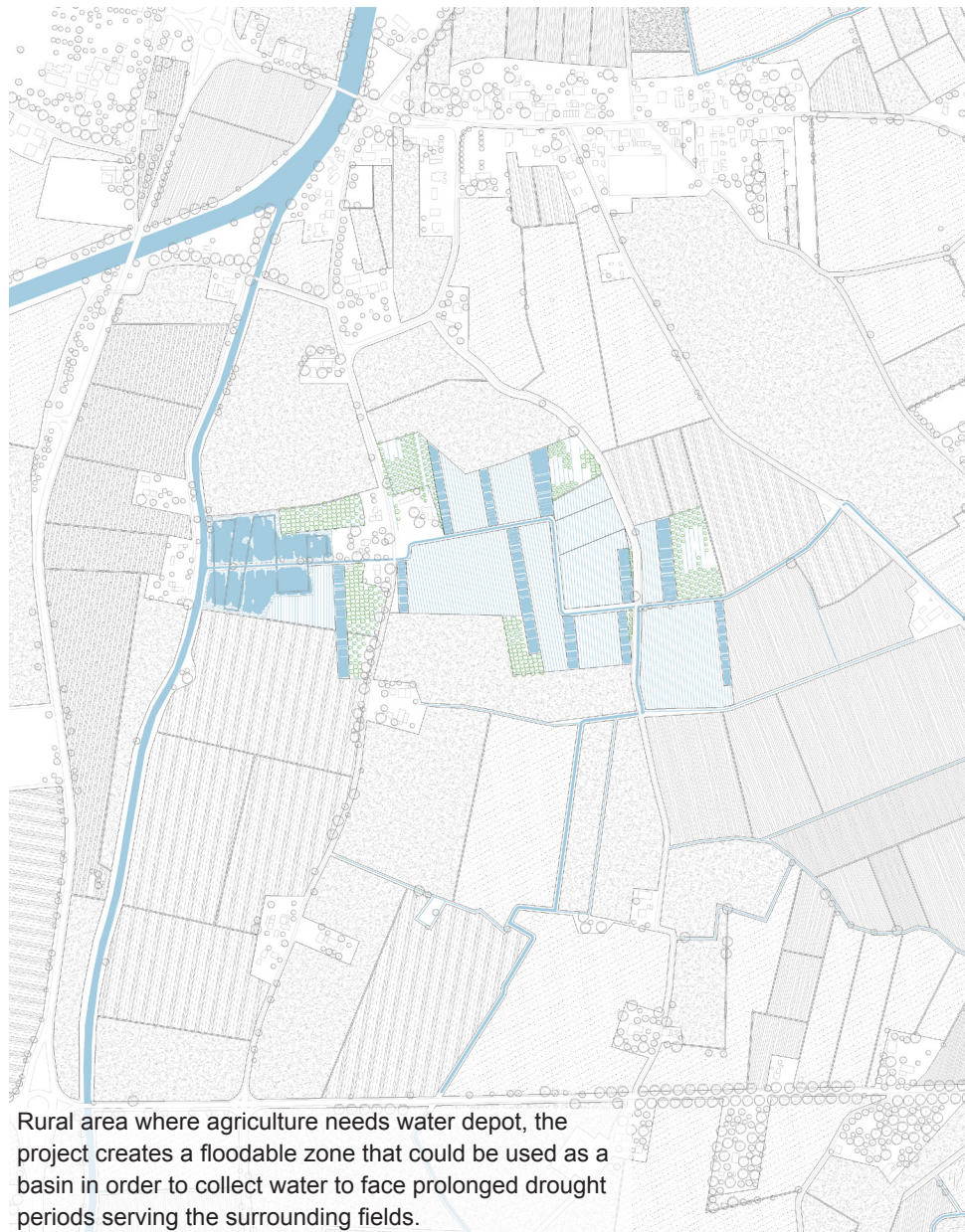


Urban area with flood risk linked to the water infrastructure, the project creates a new floodable park and plaza in order to protect citizens and urban tissue without denying the possibility of outdoor spaces.

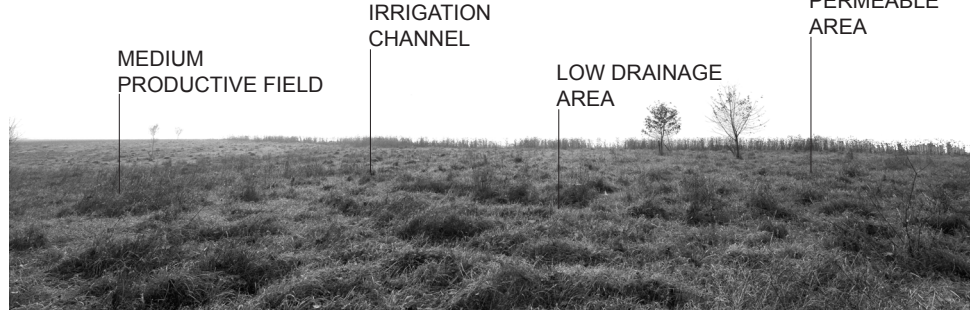


2 / RURAL CASE STUDY

OBJECTIVES: WATER DEPOT | HUMID ECOSYSTEM



Rural area where agriculture needs water depot, the project creates a floodable zone that could be used as a basin in order to collect water to face prolonged drought periods serving the surrounding fields.



3 / PERIURBAN CASE STUDY

OBJECTIVES: FLOOD RISK MANAGEMENT | PHYTOREMEDIATION



Peri urban area characterized by the presence of Ferrara's hospital. The project proposes a floodable linear park able to phytoremediate water and to create an open air space to serve patients.

