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G20 MACS - International Virtual Workshop on Water, Energy, Food Nexus

"Irrigated agro-ecosystem and ecosystem services: the Italian application of Nature Based Solutions"

Session - Nature-based solutions to protect ecosystems and biodiversity services for sustainable food system at a global scale

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WEFE approach and SDGs

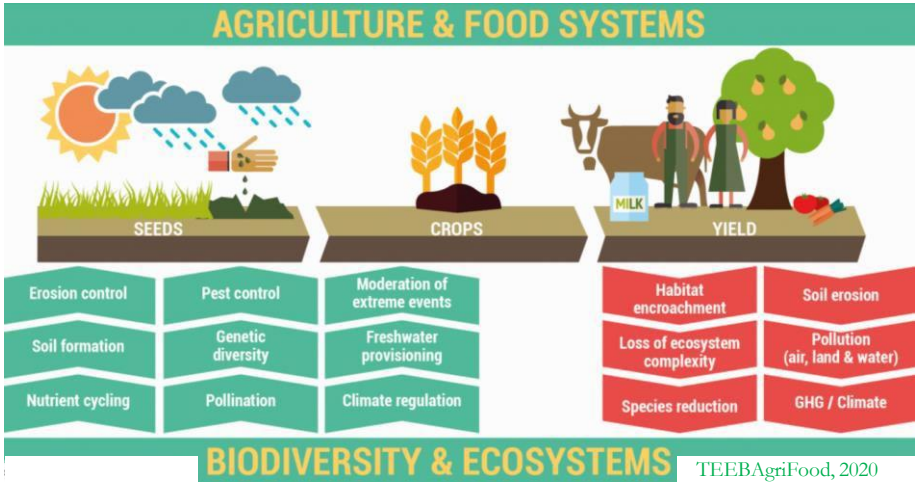
The last decades have been characterized by factors that have affected natural resources, with additional pressures on them and its economies (JRC Technical reports, 2019)

- Identification of appropriate/timely adaptation measures
- Establishment of multi-sectorial interlinkages to achieving SDGs

WEFE Approach

Interlinkages among these elements can increase efficiency, reducing trade-offs, building synergies while improving governance across sectors and ensuring a more integrated and sustainable use of resources

WEFE approach and SDGs



TEEBAgriFood, 2020

Our food and agricultural systems depend on plants, animals and micro-organisms

Guaranteeing biodiversity and ecosystem services is necessary to:

- ✓ support the capacity of farmers, livestock keepers, fishers, etc. to produce food and other goods and services in different biophysical/socio-economic environments
- ✓ increases resilience to shocks and stresses
- ✓ provides opportunities to adapt production systems to emerging challenges

The achievement of these goals is ensured also through the implementation of food security and nutrition policies that include and address the **sustainable use and conservation of biodiversity for food and agriculture** (FAO, 2019).

Ecosystems services.

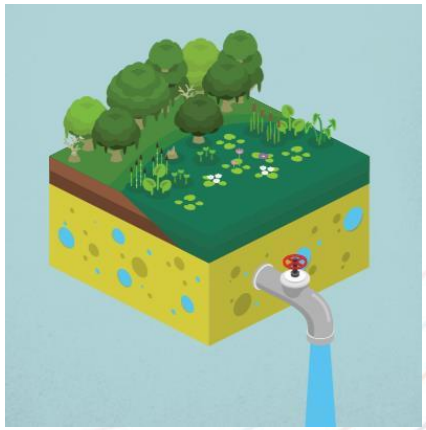
Even more importance has been given at international and national level to the **protection of environment, biodiversity and ecosystems**. The same **Water, Energy, Food security** relies on resources and services provided by healthy ecosystems.

Among the ecosystems, one of the most important is represented by **water-related ecosystems** and its centrality on supporting the natural provision of water for all human and economic activities, mitigating the destructive effects of water-related disasters (floods and droughts) and providing other critical services for sustaining human wellbeing.

Birds, Water, Floods Directive

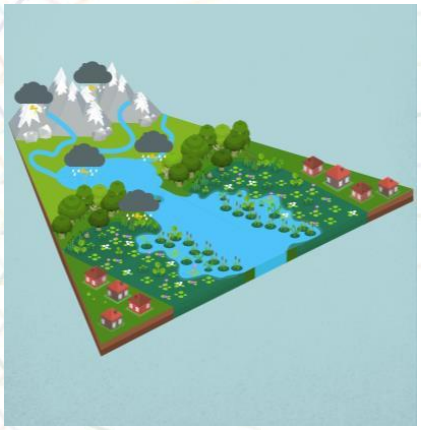
Nature-based solutions and Integrated Water Resources Management

NBS and **NWRM** to improve the management of water resources, achieve water security and contribute to core aspects of sustainable development (Ecobenefits)



Improve water availability

Improve water quality



Reduce risks to water related extreme events

Source:
World Water Assessment Programme, UN.

The Italian experience on NBS

The NBS are widely applied in Italy, specifically in the agro-ecosystem, where NBS are implemented thanks to the Common Agricultural Policy (CAP) and its financeable measures (construction of buffer strips, wetlands, ecological corridors, etc).

The **Reclamation and irrigation Consortia** play a fundamental role in the **implementation of these measures**, since they are entities in charge for water management for agriculture and the territory.

They can adopt NBS for the **management of natural resources**, such as water and energy, which are also inputs for the food production process, while protecting aquatic ecosystems, operating in line with the WEFE approach.

The Consortia can finance the implementation of these measures through the CAP funds (in particular through the EAFRD funds) but also through other European and national funds for environmental purposes or through their own budget.

The Italian experience on NBS: best practices

Ensuring policies addressing biodiversity aligned across sectors (cross-sectoral approaches) and coordination between Ministries responsible for agriculture, fisheries, forestry, environment, education, economy, health, trade and social affairs is needed, together with inclusive policies that involve producer organizations, civil society and the private sector (FAO, 2019).

CREIAMO PA Project

C.A. RNDP 2014-2020

MINISTERO DELL'AMBIENTE E DELLA TUTELA DEL TERRITORIO E DEL MARE

SOGESID SPA
INGEGNERIA TERRITORIO AMBIENTE

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mipaaf
ministero delle politiche agricole alimentari e forestali

River Basin District Management Plans

Reclamation and irrigation Consortia

Strategic National Plan

NWRM implemented by Italian Irrigation and Reclamation Consortia

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Agriculture

A01	Meadows and pastures
A02	Buffer strips and hedges
A03	Crop rotation
A04	Strip cropping along contours
A05	Intercropping
A06	No till agriculture
A07	Low till agriculture
A08	Green cover
A09	Early sowing
A10	Traditional terracing
A11	Controlled traffic farm
A12	Reduced stocking den
A13	Mulching

Urban

N01	Basins and ponds
N02	Wetland restoration and management
N03	Floodplain restoration and management
N04	Re-meandering
N05	Stream bed re-naturalization
N06	Restoration and reconnection of seasonal streams
N07	Reconnection of oxbow lakes and similar features
N08	Riverbed material renaturalization
N09	Removal of dams and other longitudinal barriers
N10	Natural bank stabilisation
N11	Elimination of riverbank protection
N12	Lake restoration
N13	Restoration of natural infiltration to groundwater
N14	Re-naturalisation of polder areas

Forest

F01	Forest riparian buffers
F02	Maintenance of forest cover in headwater areas
F03	Afforestation of reservoir catchments
F04	Targeted planting for 'catching' precipitation
F05	Land use conversion
F06	Continuous cover forestry
F07	'Water sensitive' driving
F08	Appropriate design of roads and stream crossings
F09	Sediment capture ponds
	dy debris
	parks
	an areas
	ntrol structures
	w areas in peatland forests

Hydro

U01	Green Roofs
U02	Rainwater Harvesting
U03	Permeable surfaces
U04	Swales
U05	Channels and rills
U06	Filter Strips
U07	Soakaways
U08	Infiltration Trenches
U09	Rain Gardens
U10	Detention Basins
U11	Retention Ponds
U12	Infiltration basins

The Italian experience on NBS: best practices

Collection

Analysis

Categorization

Identification

- **Examples of NWRM** implemented by italian Irrigation and Reclamation Consortia and **selection of NBS** as national best practices implemented in the national territory (with a focus on those connected on WEFE approach)
- **Tools for mapping NBS/NWRM** in Italy

Irrigation and Reclamation Consortia of Burana

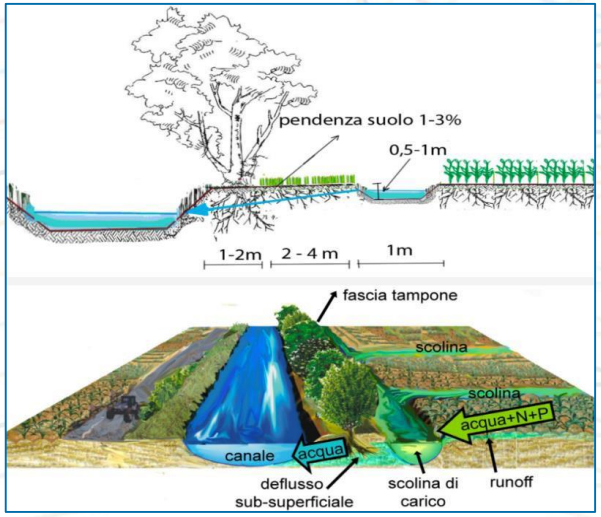
NWRM code F01 Forest riparian buffer- Forestry interventions

Wooded Buffer Strips- planting of native and / or arboreal essences in areas close to canals or other consortium infrastructures. Annual maintenance of these vegetated structures

Every year

70.000 €/year

Own budget



WBS scheme (Cirf, 2013)

Irrigation and Reclamation Consortia Delta del Po

NWRM Code N02 - Wetland restoration and management - Restoration of the Ca 'Mello Canal and the Ca' Mello Oasis for the purpose of renovation wetlands functional

Technical features: the canal has a length of 2 km and feeds a wetland area of 40 hectares

1990, 1993, 1995

2.250.000 €

Veneto Region

Ca' Mello Oasis
(source www.watermuseumofvenice.com)

NWRM cod. F01 Forest riparian buffer strip - F03 Afforestation of reservoir catchments Collective Project: Environmental Intervention Network for the rural development of the Po Delta

Technical features: 60 km of hedges and buffer strips; 2.4 ha of thickets; 2.7 ha of herbaceous belt adjacent to a farmer ditch; protection of 5.5 km of farmer hydraulic network

2018

174.116 €

EFRD (European Fund for Rural Development)

Irrigation and Reclamation Consortia Consortium Chiese

NWRM code N02 Wetland Restoration and management - N10 Natural bank stabilization

Renovation of a «fontanile» (special springs in Italy)

Thecnical features: Removal of accumulations of fine substrates at the bottom of the "fontanile" head. Shore consolidation by laying wooden palisades. Maintenance of the ecological and landscape function through the planting of new typical essences along the banks.

90.000 €

Example of bank stabilization with wood weaving

(www.nwrm.com)

Irrigation and Reclamation Consortia Est Sesia (Piedmont)

NWRM code: N02 Wetland Restoration and management - F05 Land Use conversion

Aretè – Acque in rete" project for the virtuous management of water resources and agro-ecosystems for the increase of natural capital

Technical features: Optimization of the water circulation, which will allow a widespread increase in biodiversity and a better supply by the agricultural sector.

Particular attention will be paid to the hydraulic interventions that will combine complete ecological functionality with better insertion in the traditional landscape.

The interventions will be declined according to the specific characteristics of the territory: wetlands will be created or recovered, areas managed with floods or flooded meadows will be increased, the creation of flowery meadows and agri-environmental tesserae (small grass / shrub scrub) will be promoted and measures were taken to requalify large wooded areas.

https://progettoarete.weebly.com/

Irrigation and Reclamation Consortia Acque Risorgive

NWRM code : N01 Basins and ponds – N02 Wetland restoration and management – N03 Floodplain restoration and management – U010 Detention Basin– U011 Retention Ponds

Environmental Phytodepuration Recreational Landscaping SIC and SPA IT3250008

Technical features: Eutrophic ponds with the setting of floating and rooting hydrophytes. Thickets of white willow and ashy willow with black alder. Area: 18 ha

2009

2.715.000 €

Veneto Region

Ex Cave di Villetta di Salzano - VE "Oasi Lycaena"

Irrigation and Reclamation Consortium Brenta

NWRM code: U12 Infiltration basins

F.I.A. Forested Infiltration Areas

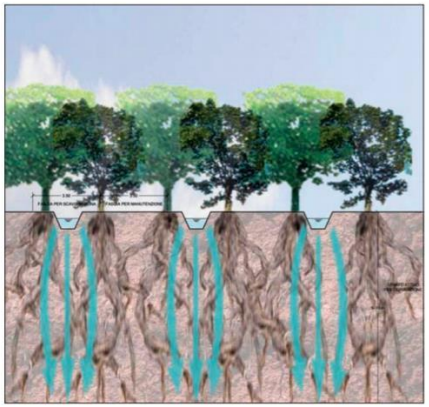
Technical futures: 10.5 ha; volume of infiltrated water 17.003.520 mc / year ; CO2 emissions eliminated equal to 157 t CO2eq / year

2018

15.000 €

Own budget

Scheme of FIA



An operative FIA

Dal Prà, A., Mezzalira, G., & Niceforo, U. (2010). Esperienze di ricarica della falda con aree forestali di infiltrazione. L'acqua, 2, 77-78.

Irrigation and Reclamation Consortium Bacini Meridionali del Cosentino

NWRM code: N02 Wetland Restoration and management

Restoration and maintenance of the wetland in support of the herpetofauna and migratory birdlife in the SIC area for the Natura 2000 network, under the Habitats Directive 92/43 / EEC, falling in the Municipality of Tarsia (CS) (Regional natural reserve lake Tarsia)

54.200 €

ERDF (European regional development fund) – ESF (European Social Fund) 2014-2020

Regional nature reserve lake Tarsia (source www.riservetarsiacrati.it)

Environmental Report is as useful tool to account the NBS-NWRM

Region of Veneto

LR 12/2009 foresees the redaction of a yearly environmental report by each Irrigation and reclamation consortia.

It is considered the **main instrument for the evaluation of the environmental effects** of all the interventions carried out by the Consortia. Its approval, in connection with the Economic and Financial Statements, **allows to verify the environmental effects of economic interventions**.

Specific "Guidelines for the preparation of the Environmental Report of Consortia" (Annex E Dgr n. 3032 20 Oct 2009) give a methodology to Consortia that consider the following areas:

- **Water:** monitoring of water bodies, water saving and protection/use management
- **Energy:** planning of measures for energy saving and use of energy from alternative sources
- **Waste:** measures for the management of plant residues and waste
- **Biodiversity:** protection of the natural environment, biodiversity and the landscape
- **Soil:** soil/canals protection, hydrogeological risk

Environmental Report: an application

The environmental report of Consortium Brenta, year 2018

Focus on water reporting area, some physical and monetary indicators

	M.U.	Value
Water for irrigation	mc/y	344.800
Water saving due to irrigation technique change	mc/y	101.000
Water withdrawal from aquifer	mc/y	38.600
Water returned to the aquifer through FIA	mc/y	17.000
Area for FIA	ha	10,5
Amount of fish fauna in the canals	kg	4.615

	M.U.	value
Cost for irrigation technique change	€/y	47.500
Cost for contructionof phytodepuration areas and Forested Infiltration Area (FIA)	€/y	159.000
Cost for management of phytodepuration areas and FIA		16.000
Cost for contruction of reservoirs and flood retention	€/y	500.000

Useful tool for accounting NBS/ NWRM

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Thanks for the attention