

INTERNATIONAL CONGRESS OF
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Environmental, economic and social implication of introduction of strip cropping in organically managed farming systems of Marche Region (Central Italy)



Unione Europea / Regione Marche
PROGRAMMA DI SVILUPPO RURALE 2014-2022
FONDO EUROPEO AGRICOLO PER LO SVILUPPO RURALE: L'EUROPA INVESTE NELLE ZONE RURALI



1st International Congress of Mediterranean Agroecology

4th National AIDA Congress

2nd Italian Agroforestry Forum AIAF

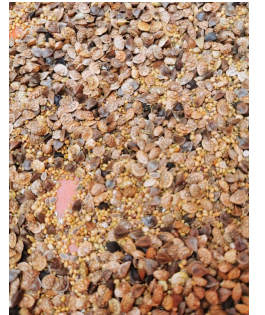
Agrigento, June 9-12, 2025

Agroecological and Agroforestry approaches for a Sustainable future

Diversification of agri-food systems

(field, farm, landscape scale)

- i) temporal diversification (combination of annual and perennial crops/species, rotation, multicropping),
- ii) horizontal and vertical spatial diversification (combination of tree crops, bushes, vegetables, cereals and other arable crops, use of alley- inter- and strip-cropping),
- iii) genetic diversification (use of minor crops, local cultivars and landraces, heterogenous genetic plant materials as evolutionary and cross-composite populations);
- iv) diversification of practices/techniques (no/reduced tillage; use of local/on-farm produced compost, fertilisers, PPPs,)



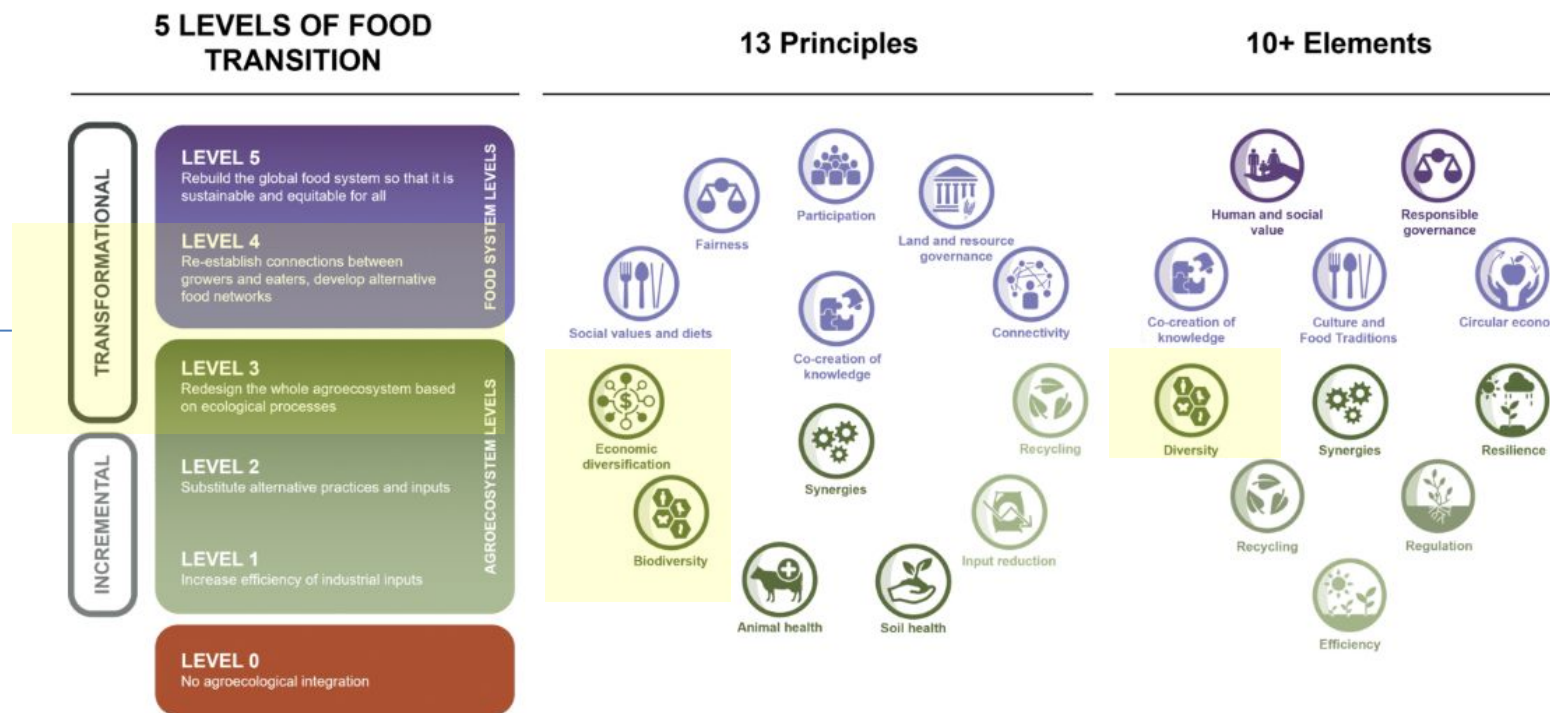
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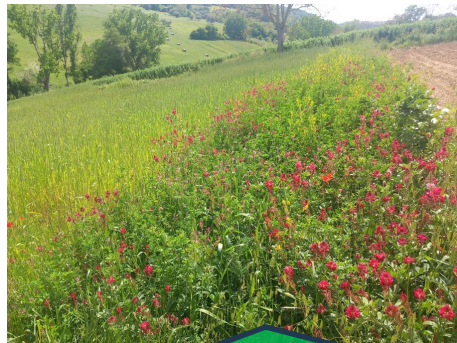
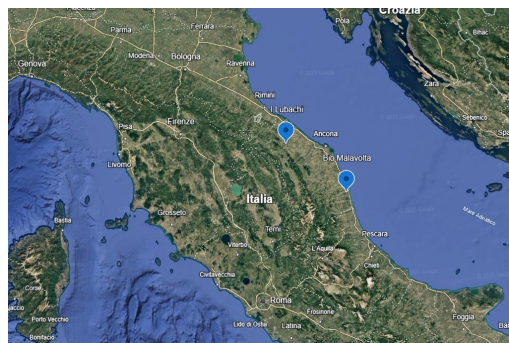
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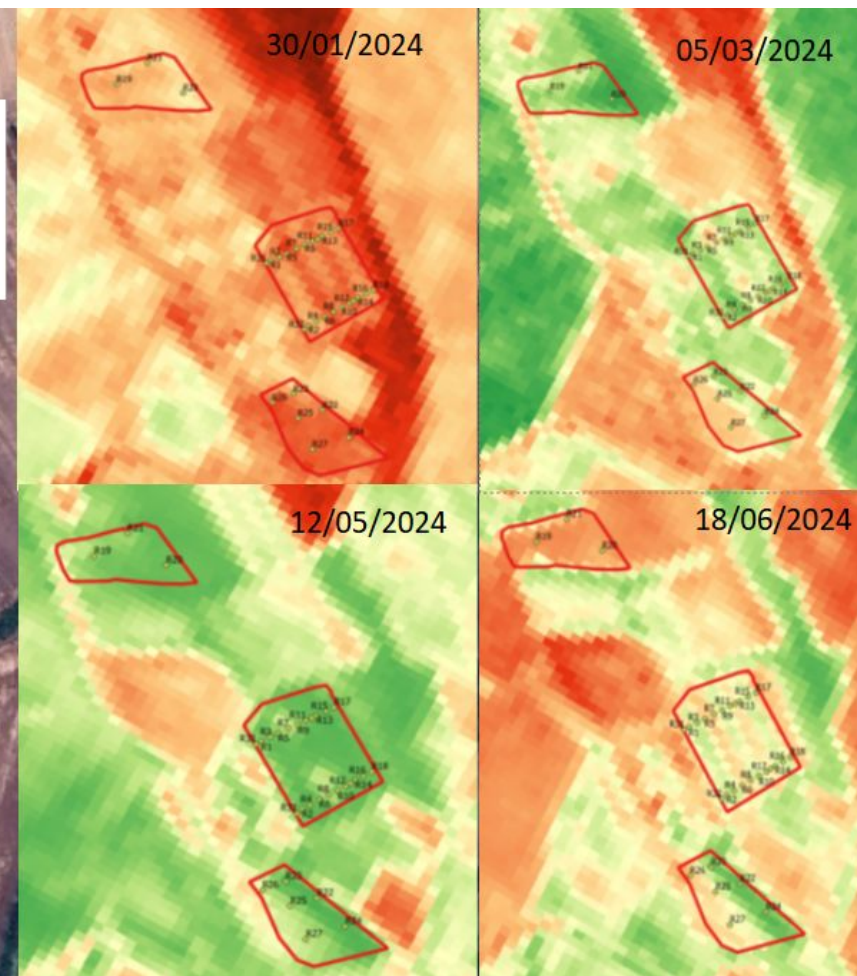
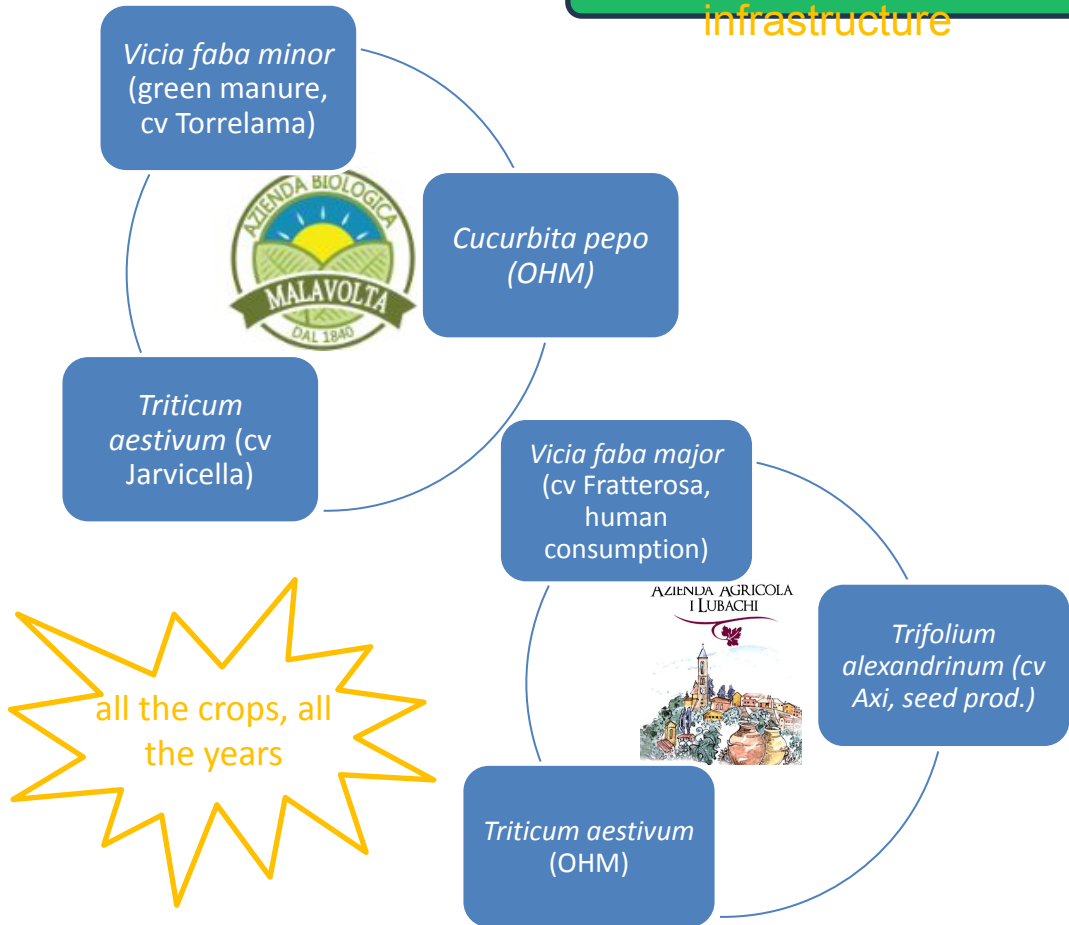
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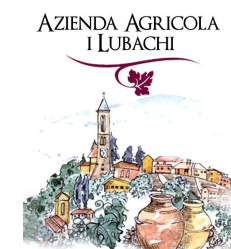


Flower strips as ecological infrastructure



Multicriteria assessment of strip cropping (system level)

Dimension	Criteria	KPIs (examples)
Environmental	Soil C metabolism	C input
	Soil Biodiversity	QBS-e (earthworms) QBS-ar (micro-arthropods)
	Nutrient balance	Surface N balance Surface P balance
	Erosion	Soil cover index FVI
	Climate change mitigation	CO ₂ emission
Economic	Yield and biomass	Field measurements, NDVI, SAVI, LAI, CCC
	Gross margin	Revenue – cost difference
	Economic efficiency	Revenue – cost ratio
Social	Work efforts and distribution	Workload
	Actor's involvement	Commitment and open event participation
	Landscape quality	Citizens' Landscape perception



	I anno		II anno	
KPIs	Pure	Strip	Pure	Strip
Normalized Difference Vegetation Index - NDVI (da satellite), -1 a +1	0.29	0.28	0.44	0.55
Soil Adjusted Vegetation Index - SAVI (da satellite), -1 a +1	0.25	0.24	0.30	0.39
Fraction Vegetation Cover - FVC (da satellite), 0-1	0.27	0.26	0.30	0.41
Leaf Area Index - LAI (da satellite)	0.48	0.35	0.75	1.65
Canopy Chlorophyll Content - CCC (da satellite), $\mu\text{g cm}^{-2}$	16.04	8.05	35.74	109.41
Normalized Difference Moisture Index – NDMI (da satellite), -1 a +1	0.09	0.07	0.10	0.19
Copertura del suolo, %	45.7	38.0	28.62	58.93
Bilancio azoto, kg N/ha	17.6	53.85	-21.75	53.35
Bilancio Fósforo, kg P ₂ O ₅ /ha	31.4	31.9	-11.59	-17.88
Carbon input, t C/ha s.s.	0.35	0.48	0.48	0.78
Consumi energetici (diretti + indiretti), GJ/ha	6.74	10.76	10.32	13.81
Reimpiego degli input energetici, 0-1	0.41	0.37	0.47	0.49
Emissioni in CO ₂ equivalente, CO ₂ equiv./ha	350.9	513.5	263.56	350.0
Efficienza economica	-	-	2.58	3.03
Contributo all'occupazione, n. ore/ha	-	-	156.00	170.20
Densità artropodi (ind/m ²)	25480	29000	47925	44925
QBS-ar	157,5	207	201,5	217

	I anno		II anno	
KPIs	Pure	Strip	Pure	Strip
Normalized Difference Vegetation Index - NDVI (da satellite), -1 a +1	0.28	0.31	0.56	0.57
Soil Adjusted Vegetation Index - SAVI (da satellite), -1 a +1	0.22	0.26	0.35	0.37
Fraction Vegetation Cover - FVC (da satellite), 0-1	0.26	0.31	0.39	0.41
Leaf Area Index - LAI (da satellite)	0.47	0.56	1.36	1.37
Canopy Chlorophyll Content - CCC (da satellite), $\mu\text{g cm}^{-2}$	28.31	21.67	156.62	163.10
Normalized Difference Moisture Index – NDMI (da satellite), -1 a +1	0.08	0.11	0.17	0.20
Copertura del suolo, %	58.5	66.6	75.57	83.49
Bilancio azoto, kg N/ha	19.14	23.60	13.99	18.77
Bilancio Fósforo, kg P ₂ O ₅ /ha	-8.53	-5.57	-15.17	-16.14
Carbon input, t C/ha s.s.	0.295	0.271	0.51	0.55
Consumi energetici (diretti + indiretti), GJ/ha	6.81	6.59	6.24	6.13
Reimpiego degli input energetici, 0-1	0.45	0.41	0.68	0.69
Emissioni in CO ₂ equivalente, CO ₂ equiv./ha	267.3	251.51	213.51	210.89
Efficienza economica	-	-	11.64	11.84
Contributo all'occupazione, n. ore/ha	-	-	38.33	37.81
Densità lombrichi (ind/m ²)	92.56	40.71	136	146
QBS-e	232.06	110.82	355	561

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Lessons learned

- Greater complexity in management
- Positive environmental and social effects
- Economic performances to be further investigated
- Flower strips as a promising ecological infrastructure approach (soil erosion mitigation and soil C input contribution, farmers' acceptance)

