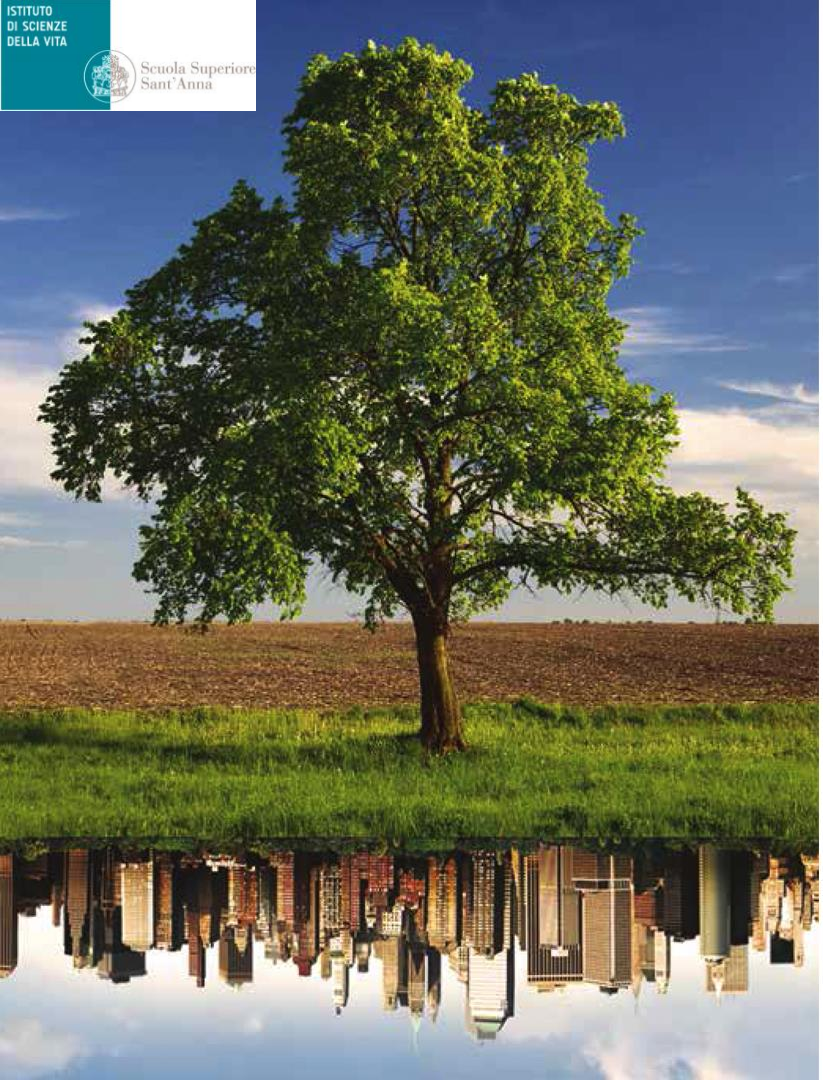

ISTITUTO DI SCIENZE DELLA VITA
Scuola Superiore Sant'Anna

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METROPOLI AGRICOLE

Il contributo dell'agroecologia alla sostenibilità dei sistemi alimentari nelle aree metropolitane

Agroecology: the most sustainable approach to urban and periurban agriculture (and not only)

Paolo Bàrberi
Istituto di Scienze della Vita
Scuola Superiore Sant'Anna, Pisa
paolo.barberi@santannapisa.it

Talk overview

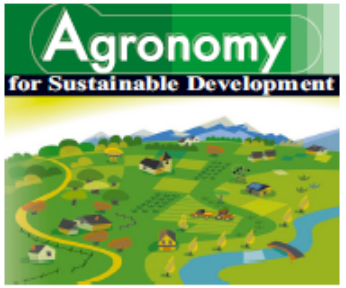
- The three pillars of Agroecology
- The context of UA and PUA and its relationship with Agroecology
- Case studies
  - PUA in the Pisa area
  - Linking research, practices and movements: the role of University
  - Agroecology and local food chains: a thrust for climate change mitigation
- Conclusions

The three pillars of Agroecology

Agron. Sustain. Dev. (2009)

DOI: 10.1051/agro/2009004

Available online at:
www.agronomy-journal.org



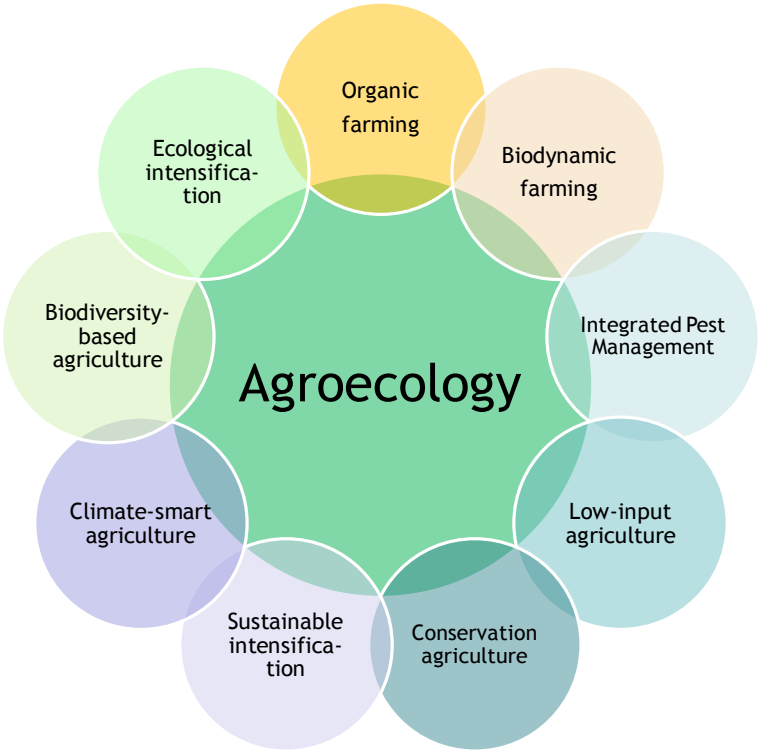
Review article

Agroecology as a science, a movement and a practice. A review

A. WEZEL[1]*, S. BELLON[2], T. DORÉ[3], C. FRANCIS[4], D. VALLOD[1], C. DAVID[1]

[1] ISARA, Department of Agroecosystems, Environment and Production, 23 rue Jean Baldassini, 69364 Lyon Cedex 07, France
[2] INRA-SAD, UR 767 Écodéveloppement, Site Agroparc, 84914 Avignon Cedex 9, France
[3] AgroParisTech, UMR 211 INRA/AgroParisTech, BP 01, 78850 Thiverval-Grignon, France
[4] University of Nebraska-Lincoln, Department of Agronomy and Horticulture, 279 Plant Science Hall, Lincoln, Nebraska 68583-0915, USA

Agroecology and …



UA/PUA and Agroecology

- 2/3 of world population expected to live in cities by 2050 (UN, 2012 – World Urbanization Prospects)
- Food (i) security, (ii) safety, (iii) quality, (iv) sovereignty
- Environmental degradation
- Typologies of UA
  - Community gardens, allotments, rooftop gardening, vertical farming, …

Regione Toscana

Speciali | Centomila orti in Toscana

Centomila orti in Toscana

Regione Toscana GIOVANISÌ

100MILA ORTI in Toscana

In Primo Piano

Convegno: 100mila orti in Toscana

Martedì 12 Luglio 2016. Sala Pegaso, Palazzo Strozzi Sacrati n.10, Firenze

Toscana Notizie

Agricoltura e foreste
14/11/16 14.28
Enogastronomia, oggi e domani la

Project 100,000 urban gardens in Tuscany

Priority to:

(i) Gardeners < 40 years

(ii) Organic farming methods

Gli **elementi essenziali del modello Toscano** sono:

- **cambiamento radicale del concetto di "orto urbano"** che viene inteso come un insieme di appezzamenti di terreno inseriti in strutture (denominate "Complessi di orti") che si presentano come luoghi moderni, destinati a persone di tutte le età (soprattutto giovani), centri di aggregazione e di scambio culturale fra i coltivatori, visitatori occasionali, studenti, ecc...;

- nel "Complesso di orti" **sono inseriti servizi, spazi comuni, punti di aggregazione**. La presenza delle persone non si limita allo svolgimento delle cure colturali nel "proprio"appezzamento, quanto a condurre una vita sociale volta anche allo **scambio di informazioni, all'aggiornamento delle conoscenze, al confronto con le altre persone e le altre generazioni**. Tali orti possono diventare anche punti di riferimento importanti per la coltivazione di germoplasma di antiche varietà locali;

OSCAR GREEN, I FINALISTI SONO UNA COMUNITÀ DI INNOVATORI

giovedì 17 novembre 2016

PUA: the case of Pisa

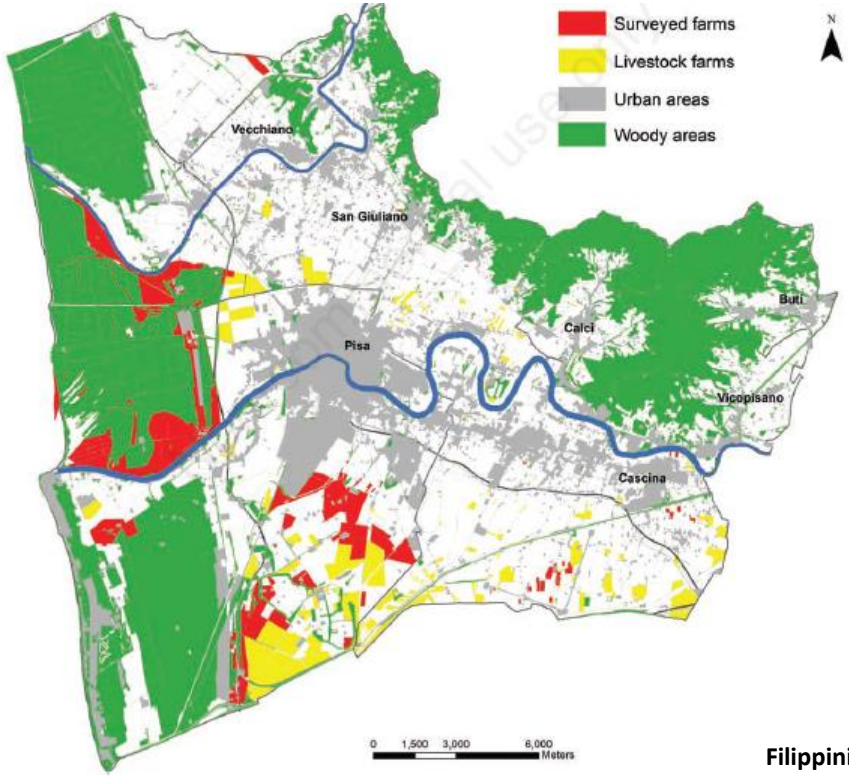
Italian Journal of Agronomy 2014; volume 9:569

Assessing food production capacity of farms in periurban areas

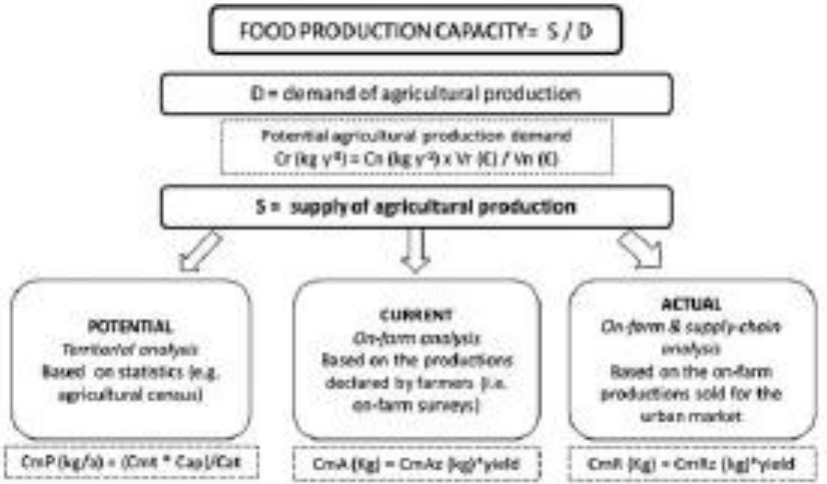
Rosalia Filippini,[1,2] Elisa Marraccini,[1,2] Sylvie Lardon,[2,3] Enrico Bonari[1]

[1]Institute of Life Sciences, Scuola Superiore Sant'Anna, Pisa, Italy; [2]AgroParisTech, UMR 1273 Métafort, Aubière, France; [3]INRA, UMR 1273 Métafort, Aubière, France

PUA: the case of Pisa



Beef and lamb meat



Filippini et al. (2014). Italian J. Agron. 9, 63-70

PUA: the case of Pisa

Local demand

26.0 kg/yr/capita (beef)

1.6 kg/yr/capita (lamb)

Local supply

POTENTIAL

16% (beef)

62% (lamb)

CURRENT

17% (beef)

37% (lamb)

ACTUAL

14% (beef)

0.6% (lamb)

BEEF

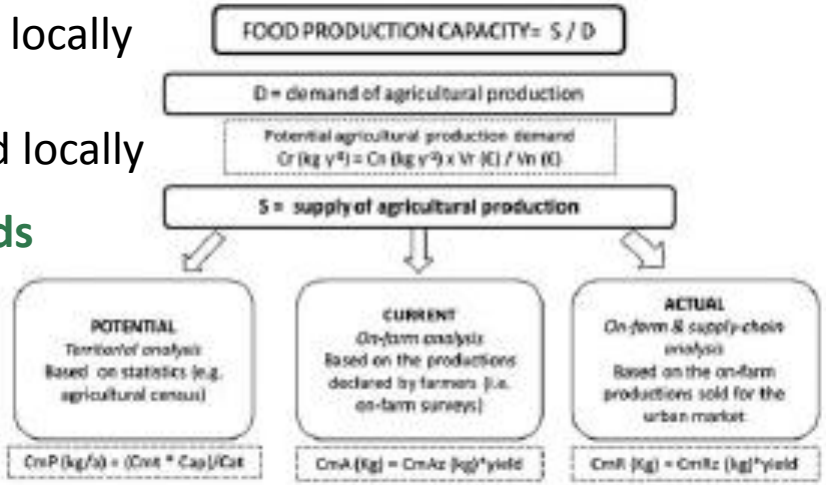
70% of local production sold locally

LAMB

1.6% of local production sold locally

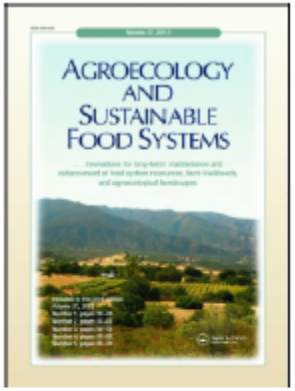
Organic beef and local breeds

Beef and lamb meat



Filippini et al. (2014). Italian J. Agron. 9, 63-70

PUA: the case of Pisa



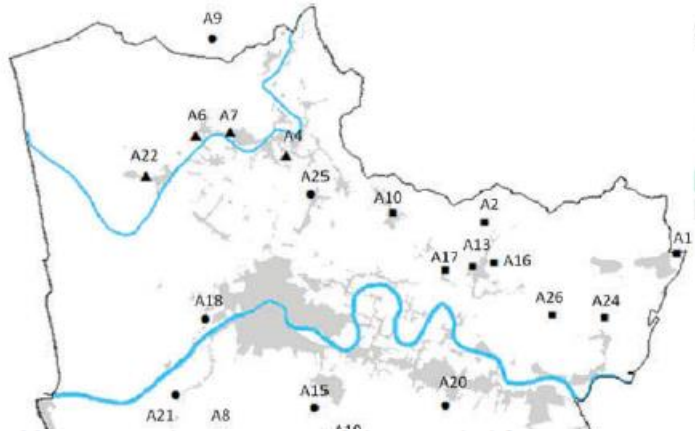
Agroecology and Sustainable Food Systems

ISSN: 2168-3565 (Print) 2168-3573 (Online) Journal homepage: http://www.tandfonline.com/loi/wjsa21

Food production for the city: hybridization of farmers' strategies between alternative and conventional food chains

R. Filippini, E. Marraccini, M. Houdart, E. Bonari & S. Lardon

PUA: the case of Pisa



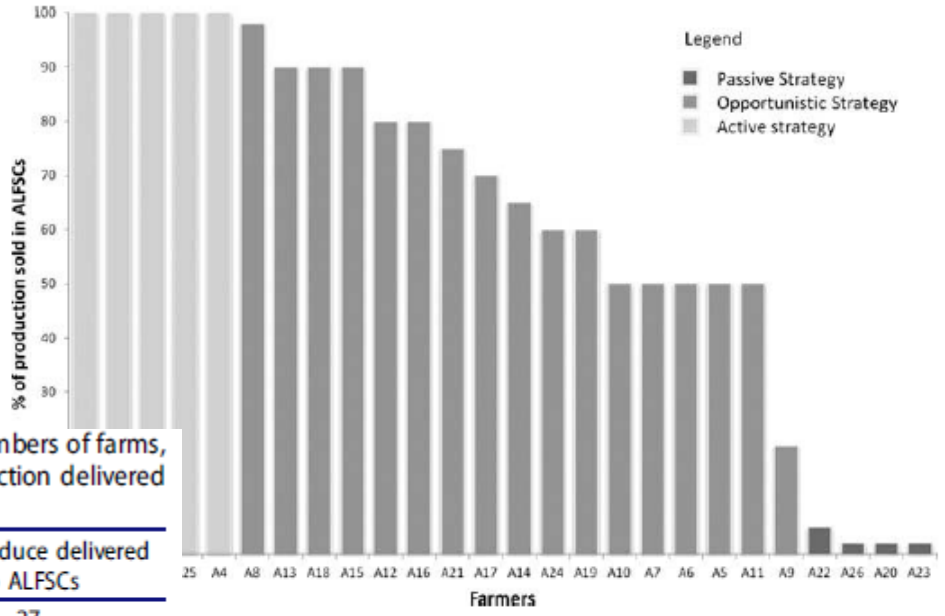


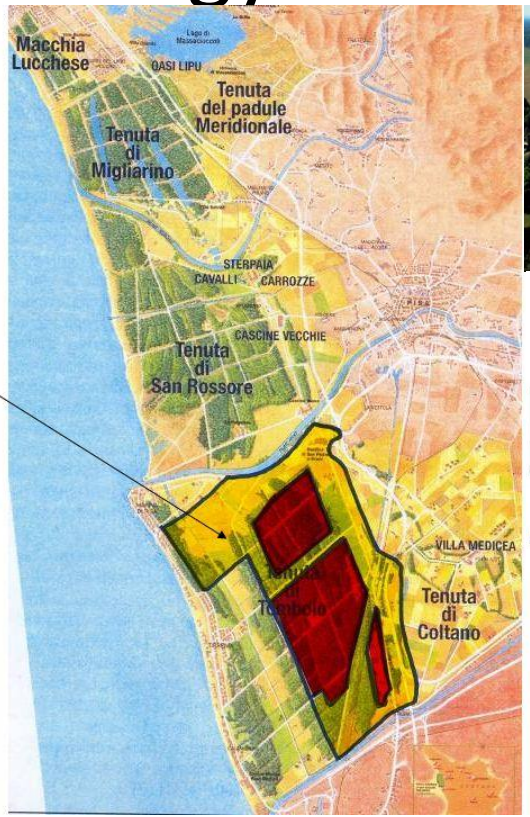
Table 7. Main characteristics of the sampled farming systems, considering the numbers of farms, the corresponding percentage, the average of hectares, the percentage of production delivered to ALFSCs.

Farming system	Number of farms	% of the farms sampled	Average UAA (ha) and (standard deviation)	% of produce delivered to ALFSCs
Cereal	3	12	134 (103)	27
Livestock	10	38	6 (4)	73
Olive oil	8	31	12 (6)	68
Vegetables	5	19	273 (280)	51

ALFSCs = local and alternative food chains; UAA = usable agricultural area.

Filippini et al. (2016). Agroecol. Sustain. Food Syst. 40, 1058-1084

Agroecology for PUA: the role of Universities



CIRAA
Università di Pisa
centro interdipartimentale di ricerche agro-ambientali Enrico Avanzi

MaB UNESCO
Man and the Biosphere Programme
Programme sur l'homme et la biosphère

'Selva Pisana'

Ca. 1,400 ha
50% agriculture
50% forestry
380 ha arable land
50% forage crops
40% cereals, pulses, industrial crops
5% bioenergy crops
1% vegetable crops
4% other crops
133 Friesian dairy cows
115 Mucco Pisano cows
1,200 sheep
Mixed woodland
Poplar (e.g. SRF)
Nut pine

P. Bàrberi

Agroecology for PUA: the role of Universities

CIRAA

UNIVERSITÀ DI PISA
centro interdipartimentale di ricerche agro-ambientali
C.I.R.A.A. Enrico Avanzi

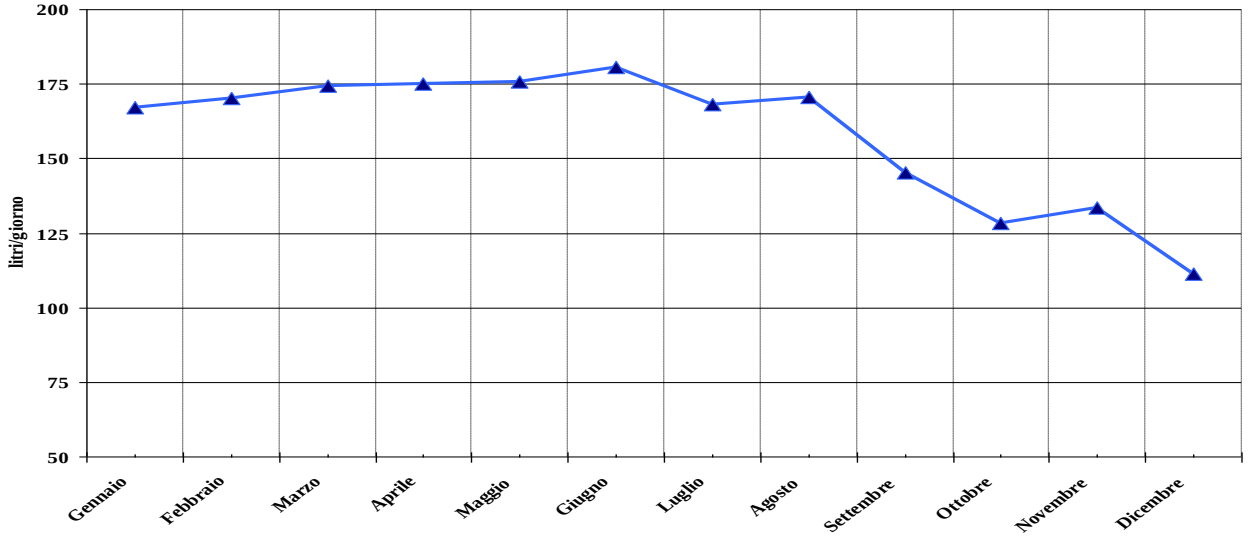
ACTIVITIES

-Agriculture, livestock and forestry
-Research
-Education & Training
-Didactic farm
-A point of reference for peri-urban multifunctional agriculture in the Pisa area and beyond

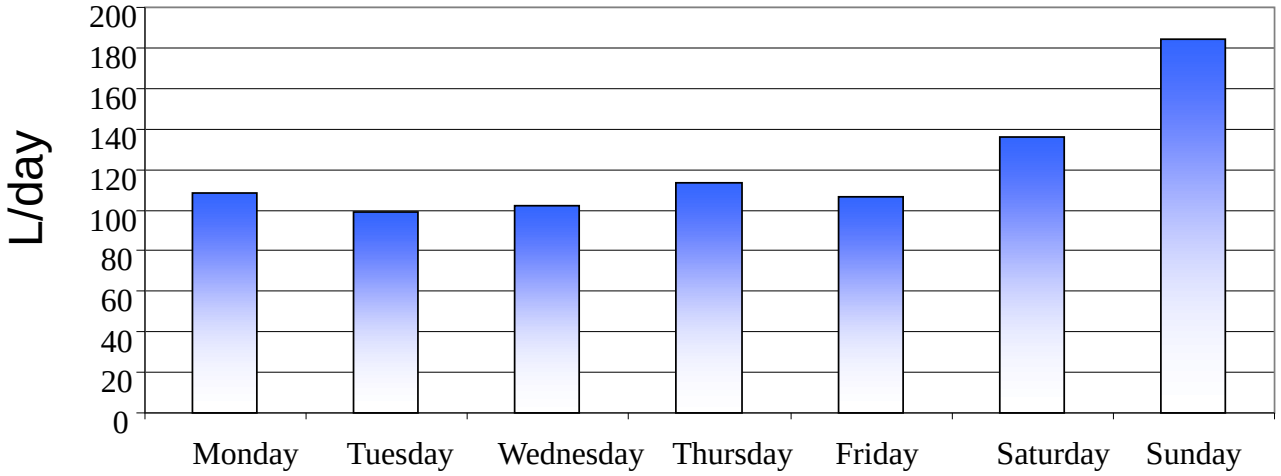
CIRAA
0-m raw milk distributor ('Bancolat')

1 €/L (Bancolat) *vs* 0.35 €/L (producer) *vs* 1.40 €/L (consumer):

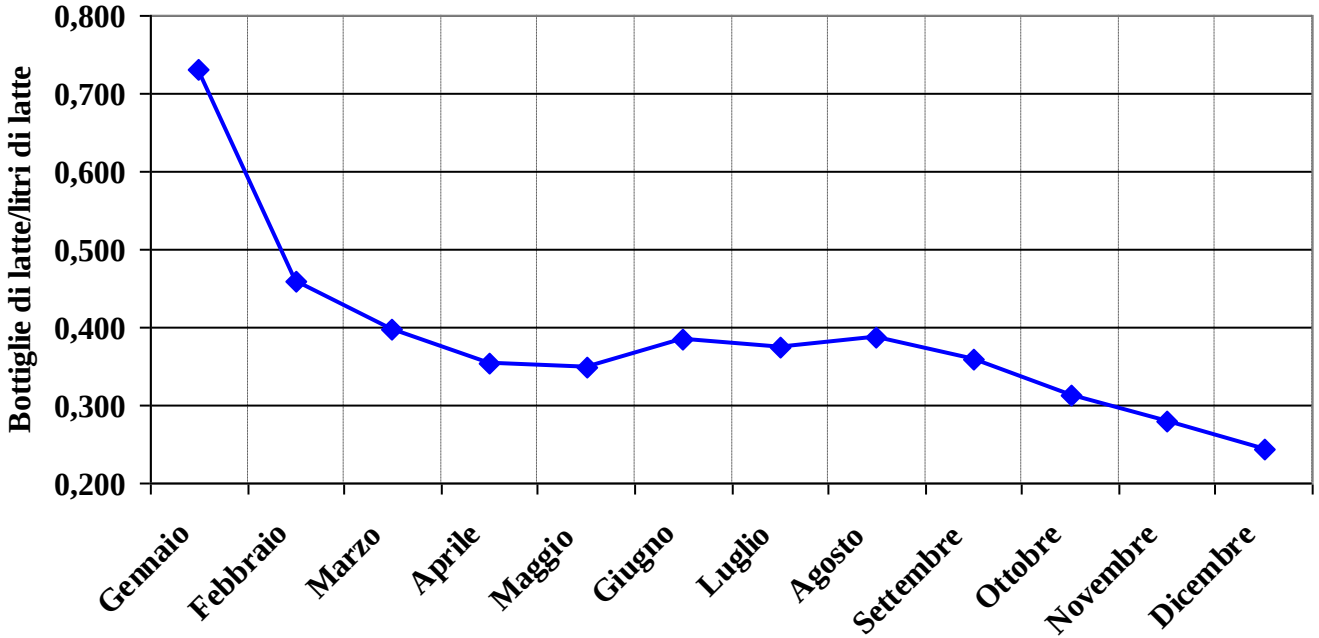
A WIN-WIN SITUATION



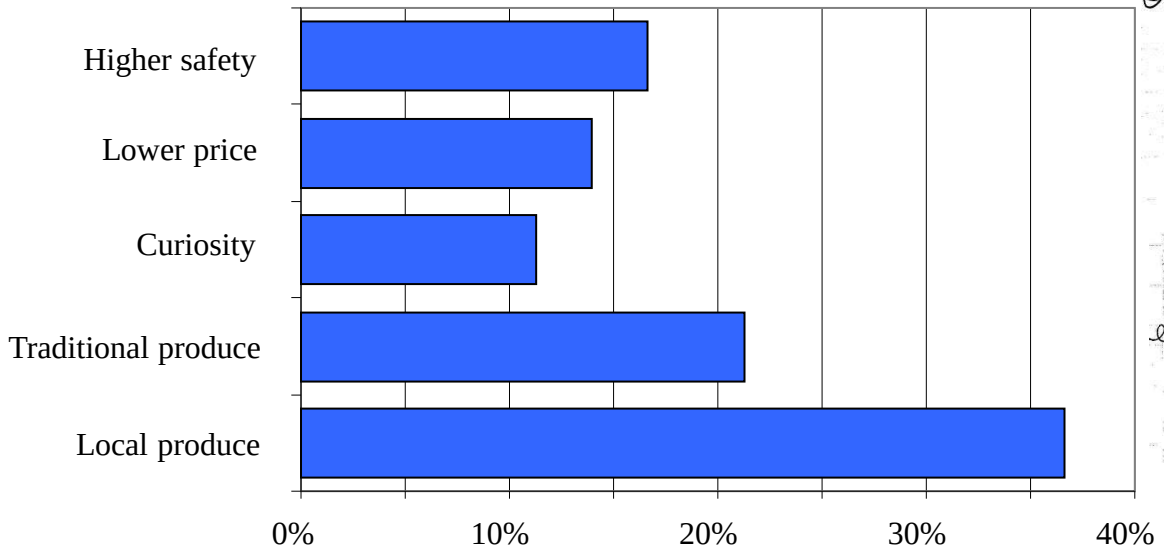
Average sales of raw milk at CIRAA's Bancolat (L/day) in 2009-11



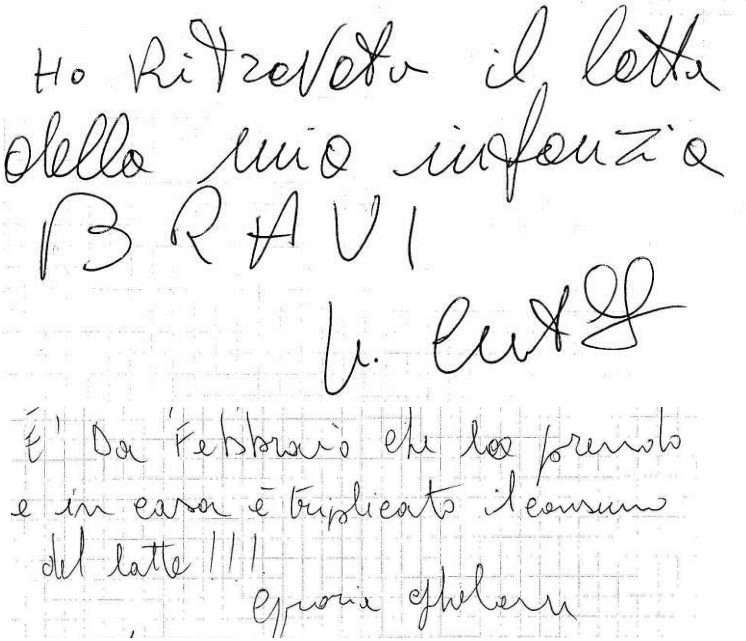
Average sales of raw milk at CIRAA's Bancolat by week day (2011)



Ratio plastic bottles sold/raw milk sold in the first year of Bancolat activity (2008)



Main motivations driving consumers' purchase of raw cow milk at CIRAA's Bancolat



CIRAA's ethical gardens

Partners (since 2008):

-Cooperativa Sociale Ponteverde Onlus
-Cooperativa Sociale Arnera
-BioColombini organic farm
-University of Pisa and CIRAA

AN INNOVATIVE FOOD SYSTEM ENTANGLING:

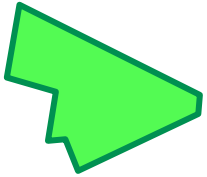
(i) Agroecological (organic) production

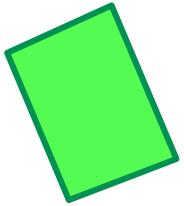
(ii) Social inclusion of marginalized people (e.g. people with physical/mental disabilities, formerly jailed or drug addicts)

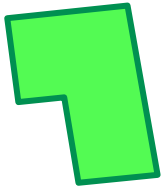
(iii) Valorization of agricultural land

(iv) Consumers engagement through short-supply chains

Vegetable production is located in three areas formerly abandoned or underutilized (property of the University of Pisa)







These areas were brought back to production upon CIRAA's self-funding, saving them from sale/rental

From 2009 9 ha have been progressively converted to organic vegetable farming

PRODUCTION

> 20 t/year of vegetables sold
> 60 crops

Until 2014 = 100% of produce sold to local bulk market
2015 = 25% of produce sold to local bulk market
2016 = 90 % of produce sold through short-supply chain
(UNIORTO: box scheme + direct sale, presently limited to employees of the University of Pisa, activated in July 2015)

Box: mixed seasonal vegetables (5 to 7 €)
On average, 40 boxes/week sold
Possibility to integrate it with direct sale of these and other products at the time of purchase (income = 2x that of boxes)
Direct sale only is also possible

Present limitations:
(i) Limited winter production (1 glasshouse of 400 m^2 + 6 tunnels of 100 m^2 each). Sales drop in February/March; (ii) Distance from the city

- ✓ **Non-chemical weed control methods**
- ✓ **Cropping system design and comparison**
- ✓ **Green manure/cover crops**
- ✓ **Novel transplanting techniques**

Agroecology in action

Agroecology and climate change mitigationat the food system level

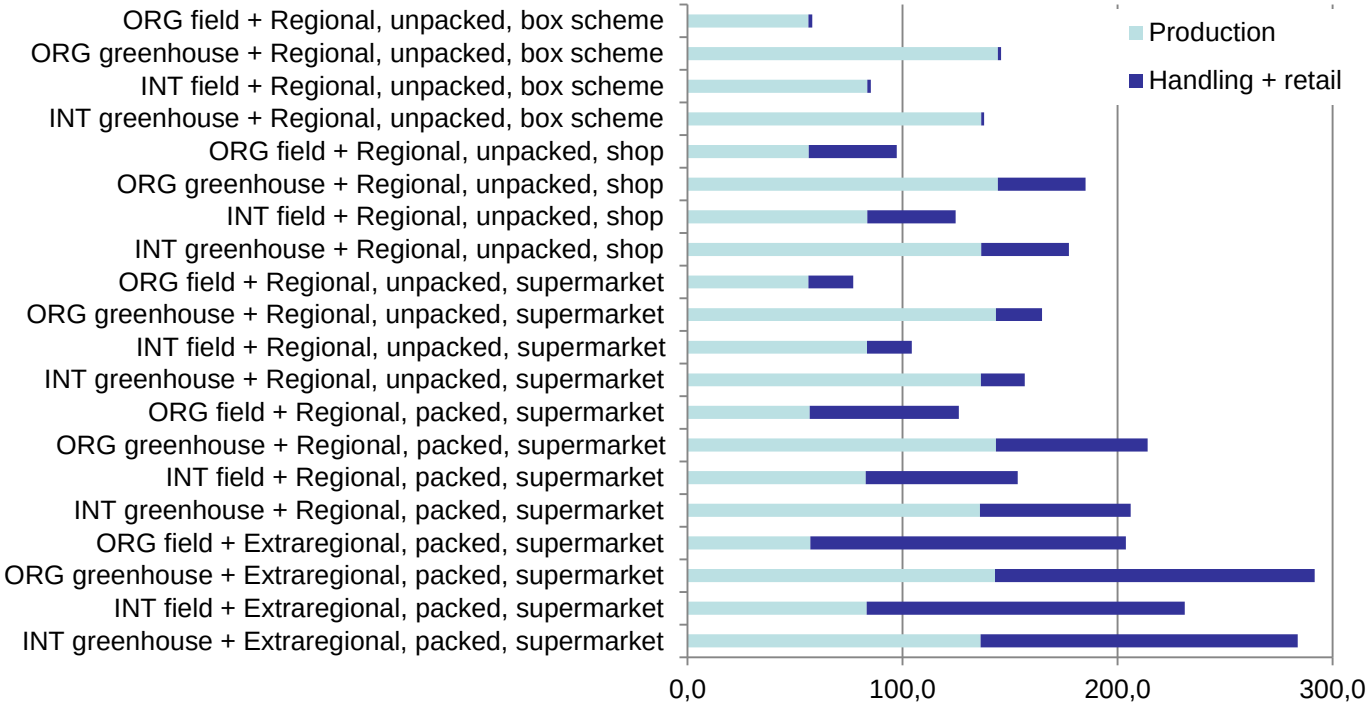
ARIA & SATREGAS projects (Region Tuscany)

- Aim: to analyze the environmental sustainability of **integrated and organic production and retail systems**
- Example (tomato for fresh consumption):
  - Estimated unit emissions (kg CO_2 kg prod.$^{-1}$) as based on LCA analysis for 20 tomato systems
  - 4 production systems x 5 retail systems (including both ‘multifunctional’ and ‘specialized’ systems)

CO_2 emissions (kg/kg produce)

4 production systems x 5 handling & retail systems

TOMATO – FRESH CONSUMPTION



Courtesy of Prof. Marco Mazzoncini (University of Pisa)

Conclusions

- Agroecological techniques rely on knowledge/wise use of agrobiodiversity and can **meet multiple goals**, e.g. better resource use efficiency, reduction of external inputs, buffering climate-change and its effects (mitigation + adaptation)
- Agroecology allows to find **tailor-made solutions** to improve the sustainability of urban and peri-urban food systems
- A basic pillar of the agroecological approach is **local stakeholders engagement** and, as such, Agroecology can fully meet the expectations of farmers, consumers and the civil society on sustainable urban and periurban agriculture and – in a broader sense – on **environmental education of citizens**
- Need to profile Agroecology for better recognition
- www.agroecology-europe.org

Acknowledgements

- Fondazione Cariplo & Prof. Stefano Bocchi
- Prof. Marco Mazzoncini, Dr Daniele Antichi, Dr Marco Ginanni (CIRAA, University of Pisa)
- Prof. Elisa Marraccini (Université LaSalle, Beauvais, Francia)