

Mercoledì 4 giugno 2015 - ore 18.00
Sala Gandhi - Centro Studi Sereno Regis
Via Garibaldi n. 13, Torino

Luci e ombre degli indicatori Life Cycle per la sostenibilità ambientale del cibo

Alessandro Cerutti



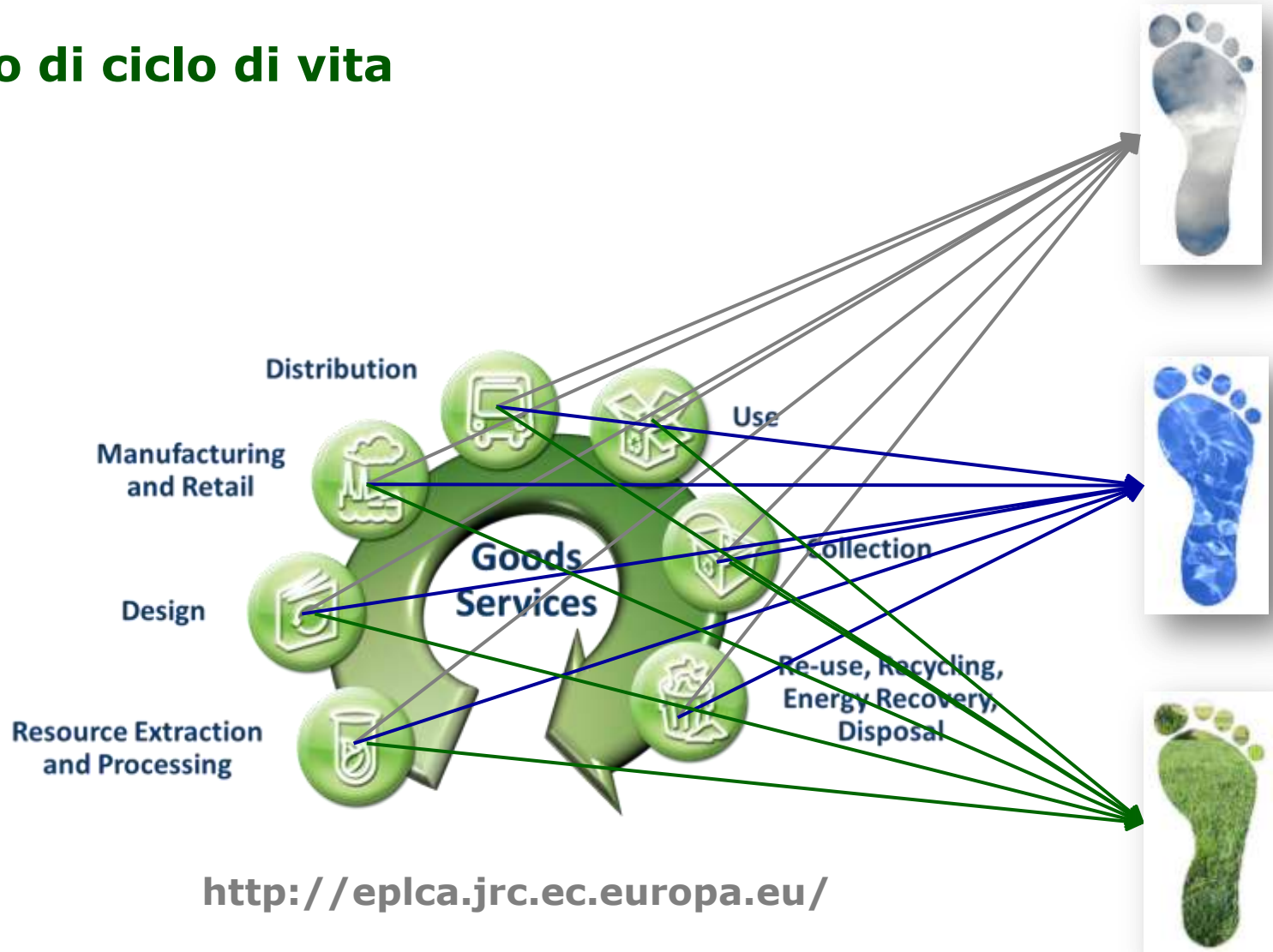
Dipartimento di Scienze Agrarie, Forestali e Alimentari
Università degli Studi di Torino



Istituto di Ricerche Interdisciplinari sulla Sostenibilità (IRIS)
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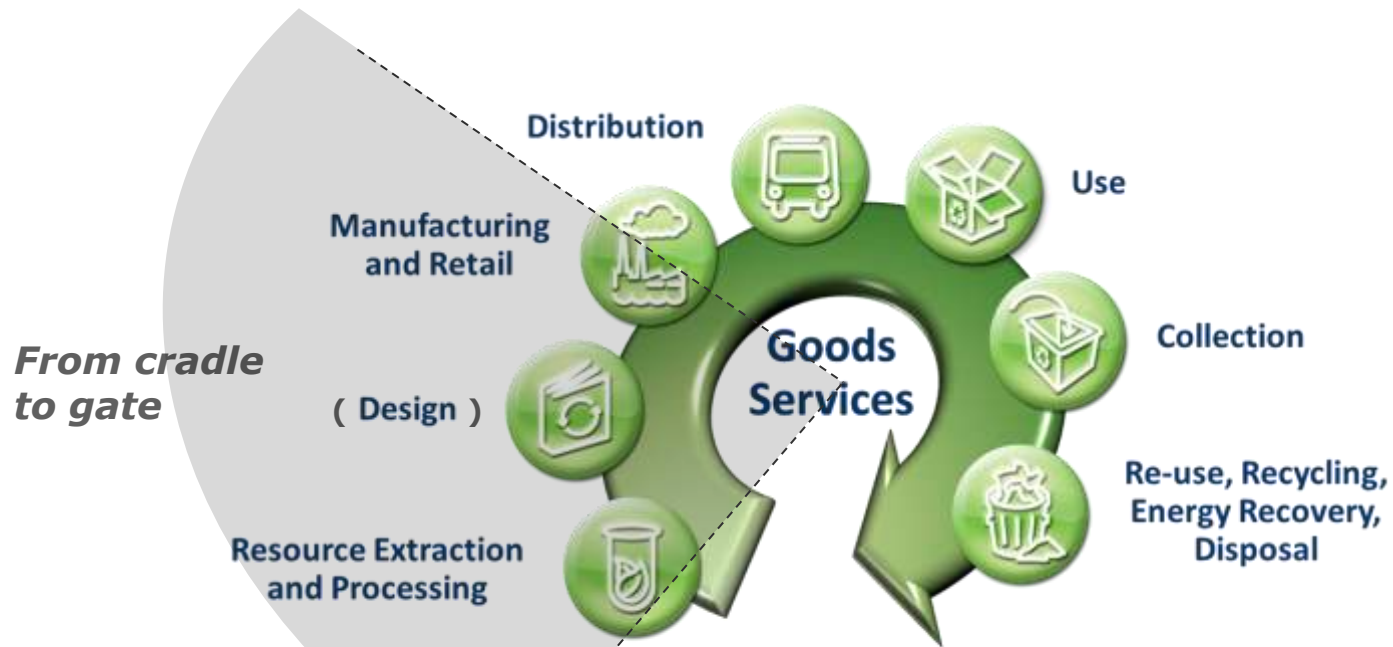
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Il concetto di ciclo di vita



<http://eplca.jrc.ec.europa.eu/>

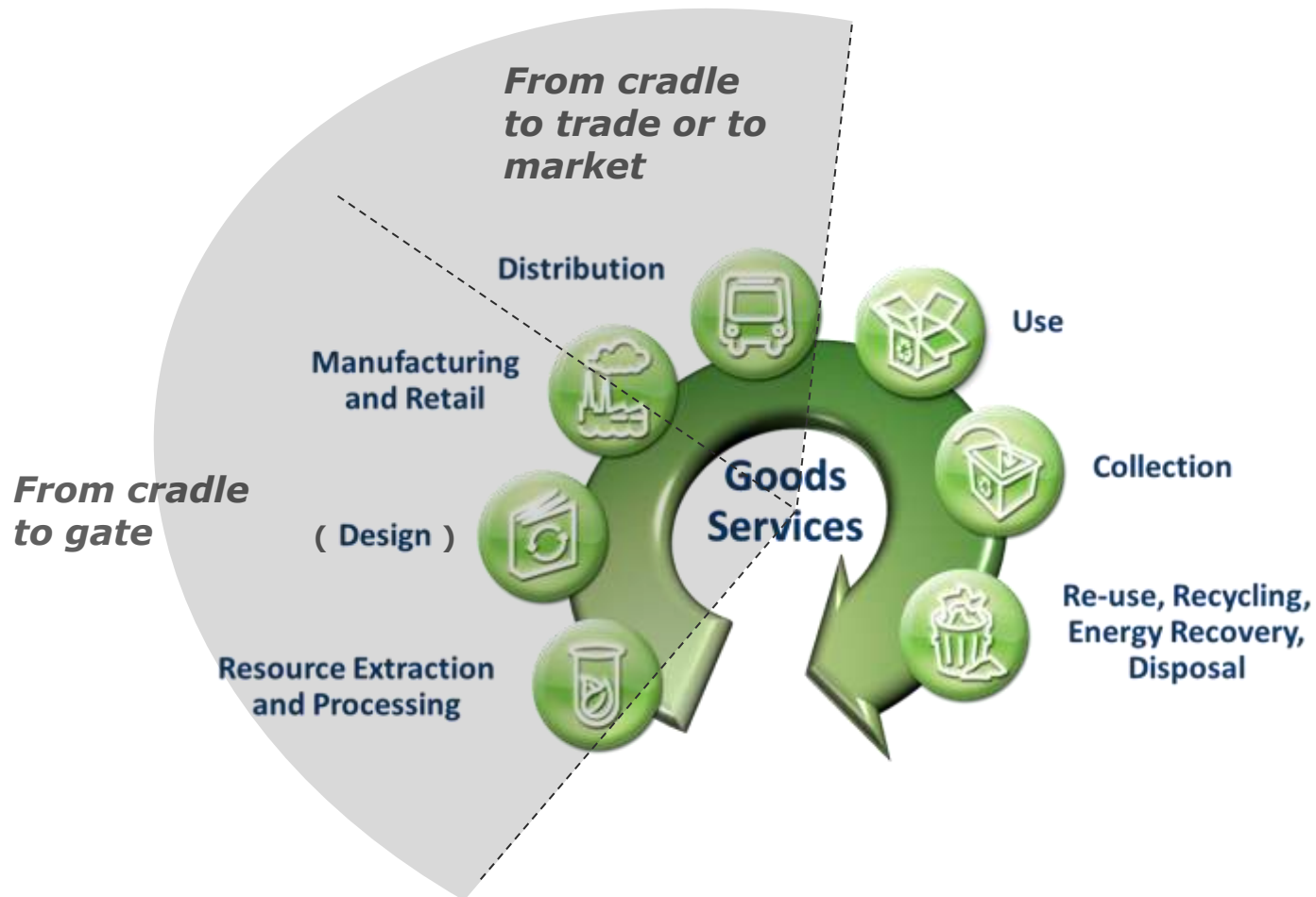
I confini del sistema



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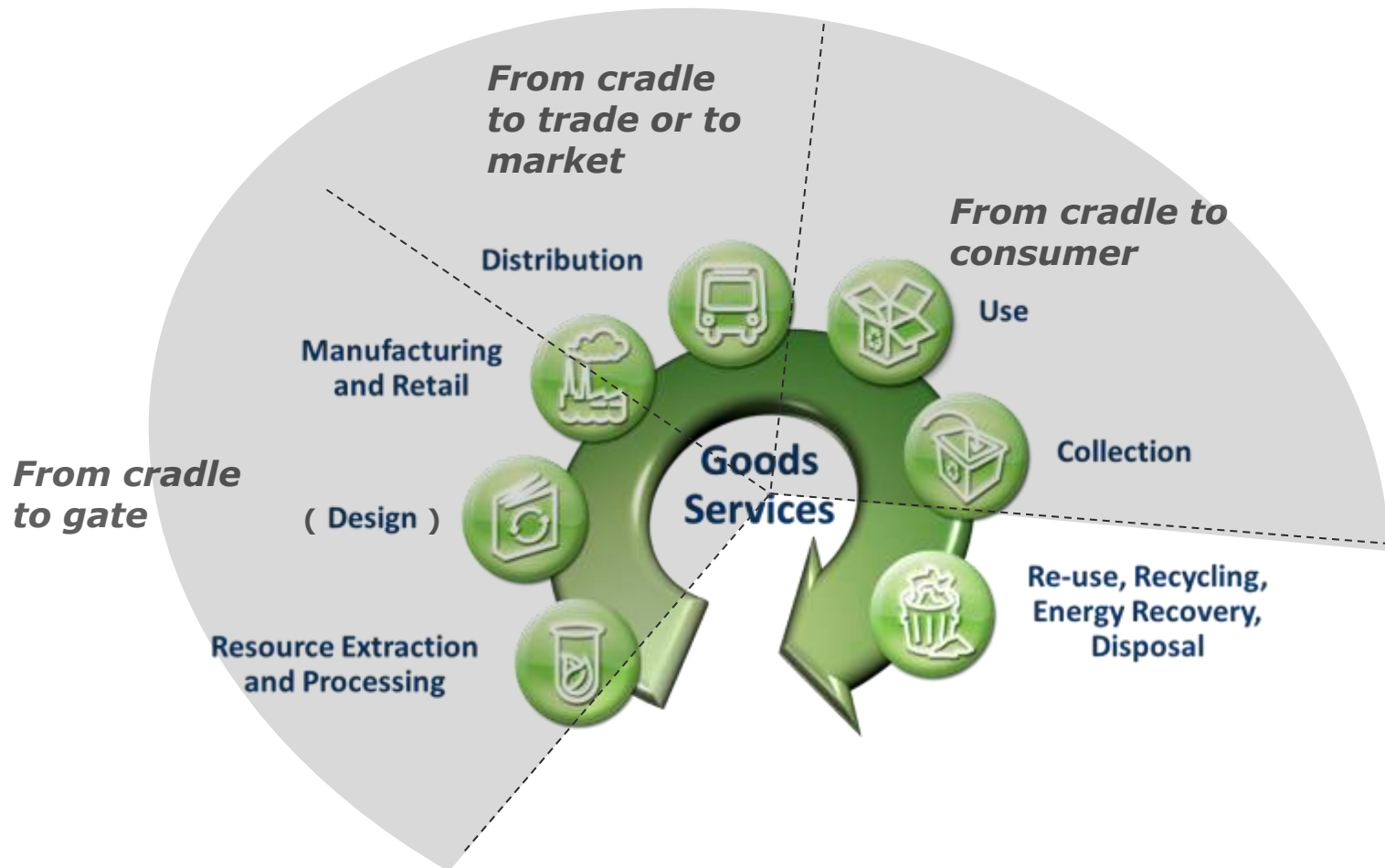
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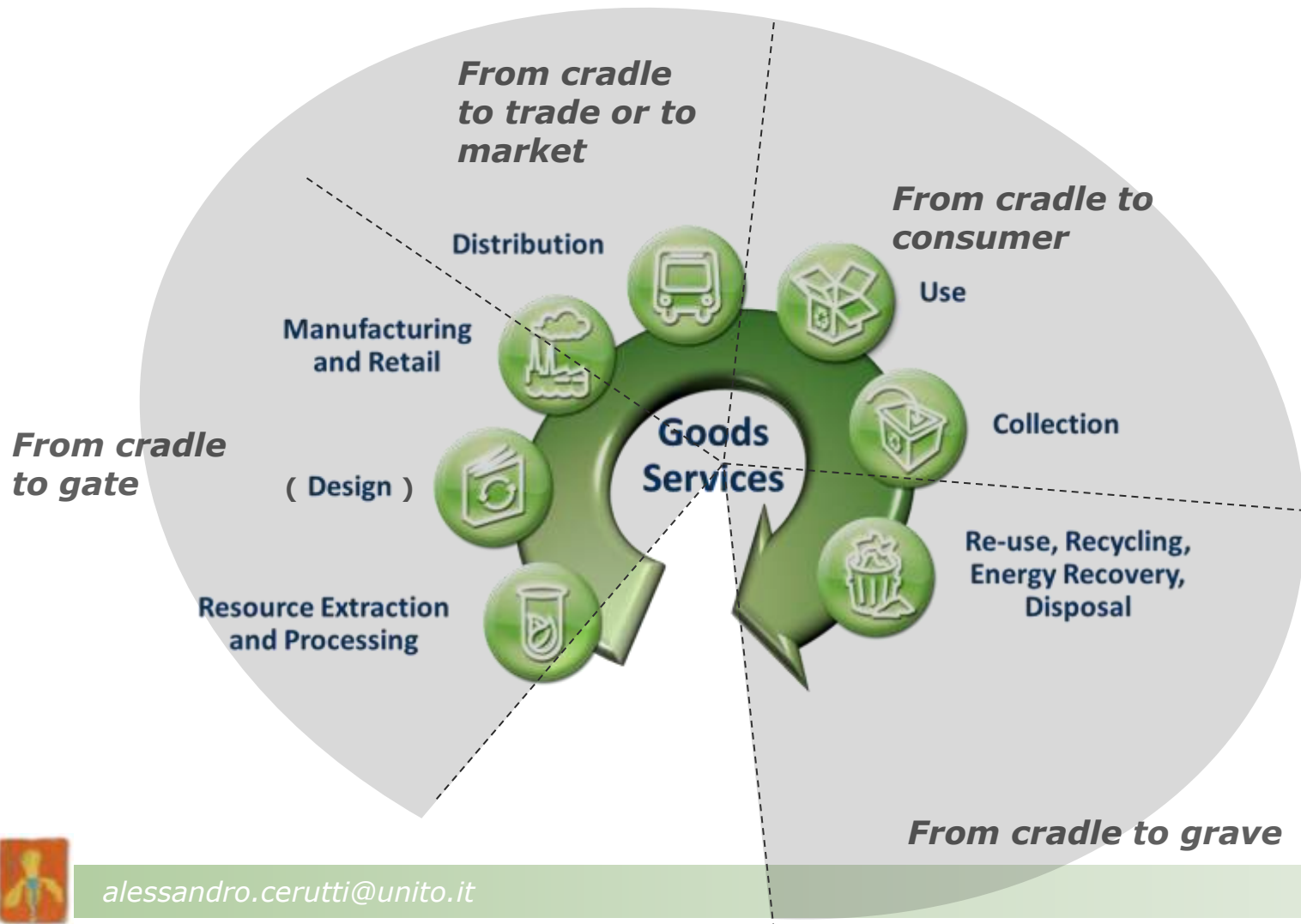
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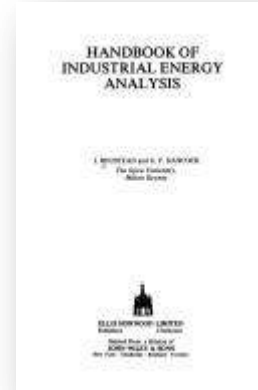
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I confini del sistema





In the UK, **Ian Boustead** calculated the total energy used in the production of various types of beverage containers, including glass, plastic, steel, and aluminium.



Boustead consolidated his methodology to make it applicable to a variety of materials, and published the **Handbook of Industrial Energy Analysis**.

1969

1972

1974

[...]

1979

The **Coca Cola Company** funded a study to compare resource consumption and environmental releases associated with beverage containers.



EPA produced the report "Resource and Environmental Profile Analysis of Nine Beverage Container Alternatives"



Jensen, A. A. Life Cycle Assessment. A guide to approaches, experiences and information sources. 1997. European Environment Agency, 121.

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UN Earth Summit there was a ground-swell of opinion that life-cycle assessment methodologies were among the most promising new tools for a wide range of environmental management tasks.

Wegener Sleeswijk et al (1996) published the first set of guidelines on methodological topics for LCAs of agricultural products in the Netherlands.



LCA FOOD

Vis, J. C., Krozer, J., van Duyse, P. J. C., & Koudijs, H. G. (1992). Milieumatenstudie van margarines (p. 56). Rotterdam

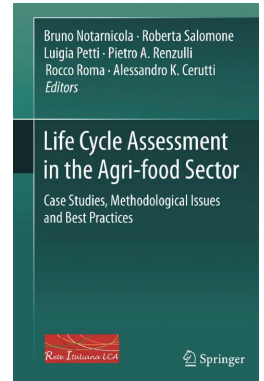


As the same need for agricultural specifications was also felt in other European countries, a number of European research institutes took concerted action to draw up a harmonised approach for use by European agricultural LCA practitioners (Audsley & Alber, 1997).

LCA in Agriculture, Agro-Industry and Forestry. Brussels, Belgium



Notarnicola, B., Salomone, R., Petti, L., Renzulli, P. A., Roma, R., & Cerutti, A. K. (Eds.). (2015). *Life Cycle Assessment in the Agri-food Sector: Case Studies, Methodological Issues and Best Practices*. Springer.



1998

2015

1996

2002

International Journal of Life Cycle Assessment



The United Nations Environment Programme (UNEP) and the Society for Environmental Toxicology and Chemistry (SETAC) launched in 2002 an International Life Cycle Partnership, known as the Life Cycle Initiative (LCI),



- Evidenziare i problemi metodologici, i punti critici dell'applicazione della LCA al settore agro-alimentare.
- Filiere studiate: Olio di oliva, Vino, Cereali e derivati, Zootecnia e Frutticoltura
- Individuazione delle migliori pratiche

Bruno Notarnicola · Roberta Salomone
Luigia Petti · Pietro A. Renzulli
Rocco Roma · Alessandro K. Cerutti
Editors

Life Cycle Assessment in the Agri-food Sector

Case Studies, Methodological Issues
and Best Practices



 Springer

La Rete Italiana LCA



L'Associazione Rete Italiana LCA è stata fondata il 6 giugno 2012 da ENEA, Politecnico di Milano, Università di Bari, di Palermo, di Chieti-Pescara, di Padova e dal CIRCC (Consorzio Interuniversitario Nazionale per la Reattività Chimica e la Catalisi)

Punto di riferimento in Italia per i principali operatori in materia di Life Cycle Assessment, favorendo sia la diffusione della metodologia a livello nazionale, sia lo scambio di esperienze applicative tese a sostenere l'approccio del ciclo di vita.

Il gruppo di lavoro alimentare e agro-industriale



Obiettivi

Ampliare le conoscenze relative alla specificità della metodologia di LCA applicata ai settori alimentare e agroindustriale italiano e diffonderne l'impiego per il miglioramento delle prestazioni ambientali delle relative filiere

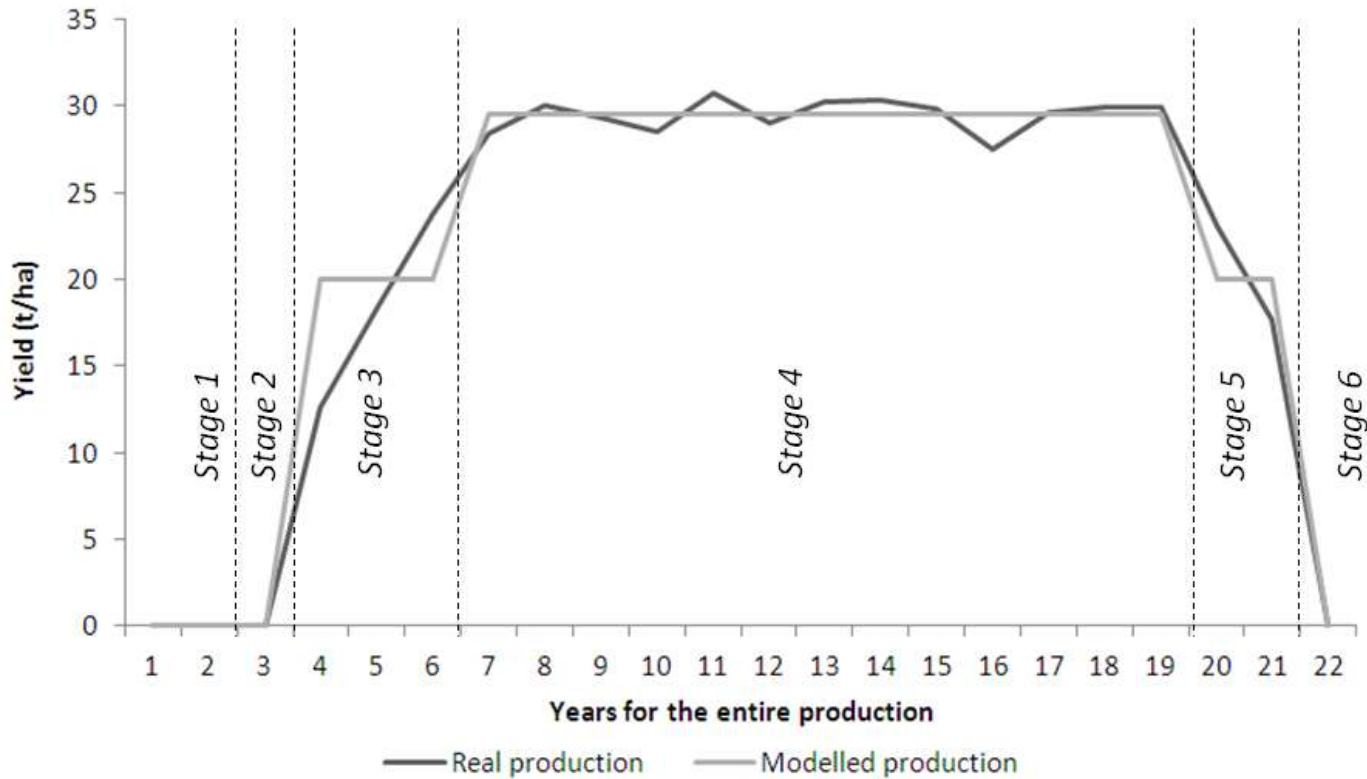
Progetti e attività in corso

- Raccolta di tutti gli studi di Food LCA svolti in Italia.
- Raccolta di tutte le possibili fonti di dati di LCA nella fase agricola, industriale e nei trasporti.
- Definizione e mappatura di altre metodologie applicabili sul comparto alimentare che utilizzano la LCA ed altri fonti
- Progettazione di workshop diretti alle industrie agroalimentari per diffondere l'impiego della LCA.

Sistemi biologici

- Fasi del ciclo di vita non produttive
- Produzioni non costanti nel tempo
- Produzioni pluriennali (in colture arboree o perenni)
- Sequestro del carbonio
- Produzione di sottoprotti organici

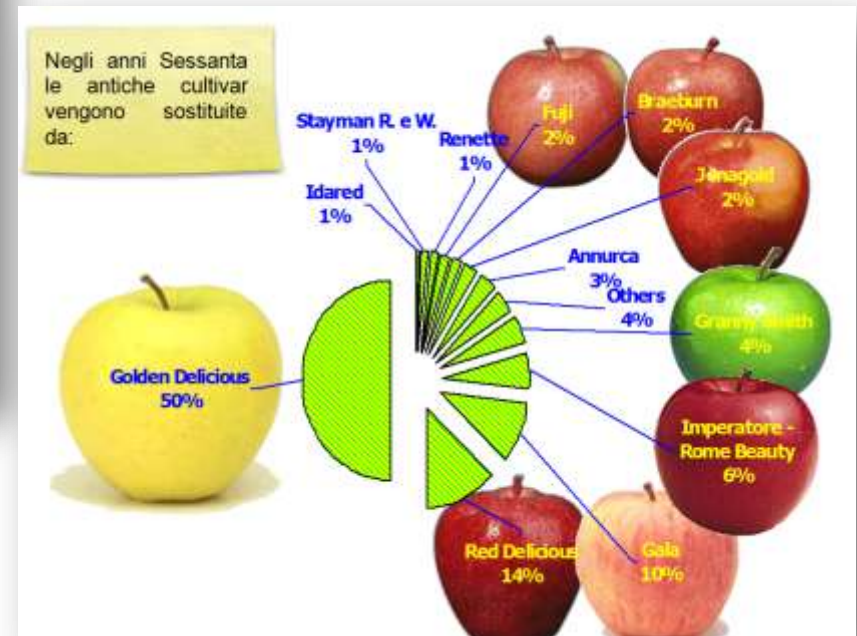
Life Cycle Assessment nel settore agro-alimentare



Cerutti, A. K., Beccaro, G. L., Bruun, S., Bosco, S., Donno, D., Notarnicola, B., & Bounous, G. (2014). **Life cycle assessment application in the fruit sector: state of the art and recommendations for environmental declarations of fruit products.** *Journal of Cleaner Production*, 73, 125-135.

Caso 1: antiche varietà di melo in Piemonte

Cerutti, A. K., Bruun, S., Donno, D., Beccaro, G. L., & Bounous, G. (2013). Environmental sustainability of traditional foods: the case of ancient apple cultivars in Northern Italy assessed by multifunctional LCA. *Journal of Cleaner Production*, 52, 245-252.

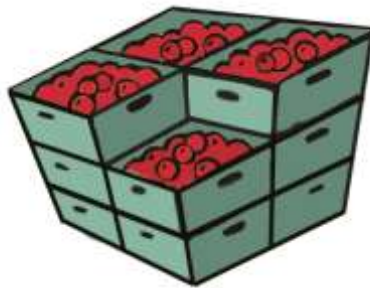


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Table 1
Main agronomic properties of the cultivars studied.

Characteristics	Golden delicious	Grigia di Torriana	Magnana	Runsé
Origin	Clay county, West Virginia (United States)	Barge, Cuneo (Italy)	Bibiana, Torino (Italy)	Cavour, Torino (Italy)
Vigour	Medium-low	Medium-low	Medium	High
Flowering period	Early (2nd week of April)	Early (2nd week of April)	Early (2nd week of April)	Early (2nd week of April)
Harvest period	Early (end of September)	Medium-late (end of October)	Late (2nd week of November)	Late (2nd week of November)
Orchard design (cm)	400–450 * 80–100	450 * 150	450 * 180	500 * 200
Plants per hectare	2200–3000	1450	1230	1000
Yield (t/ha)	40	25	23	20
Wholesale fruit price in 2011 (€/kg)	0.40–0.80	0.60–1.00	0.60–1.00	0.60–1.00

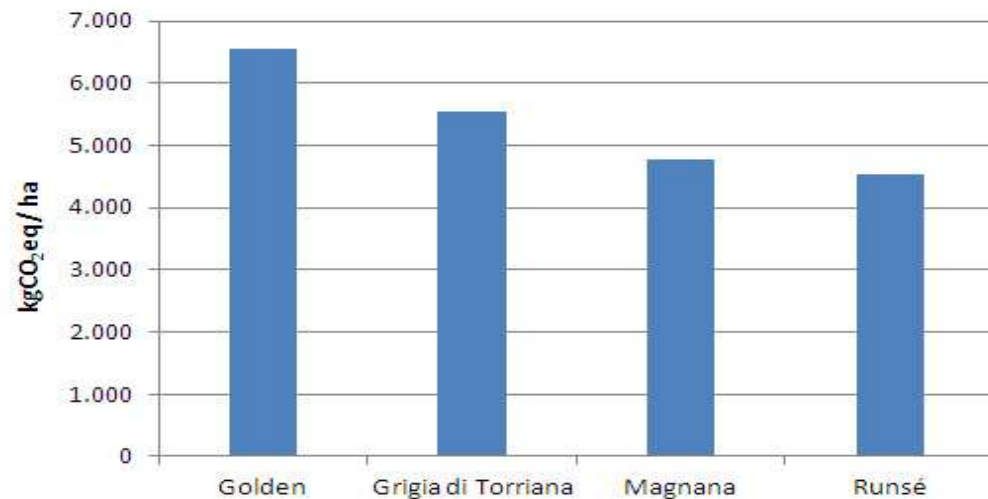
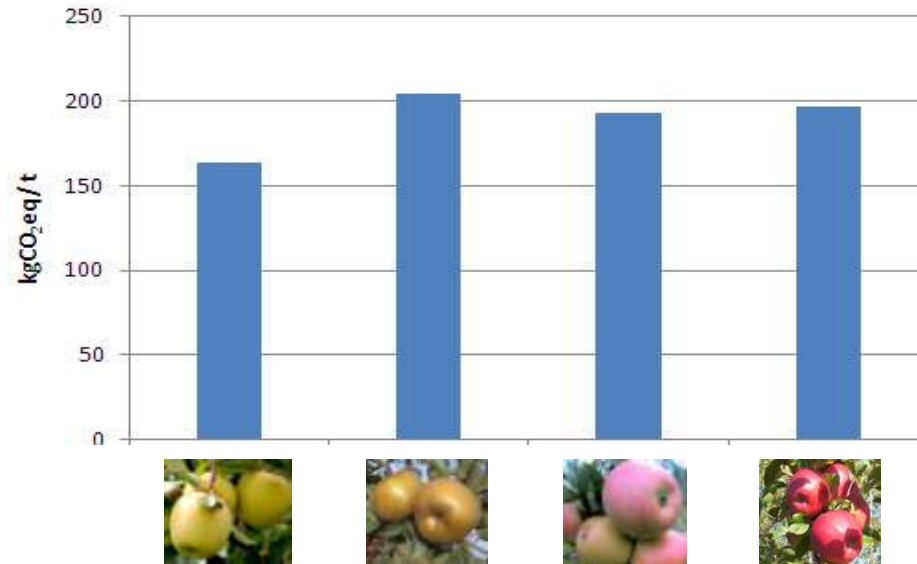
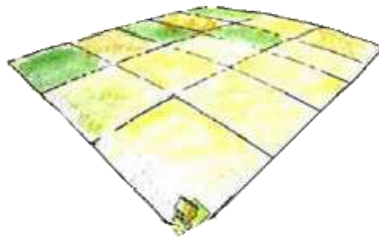
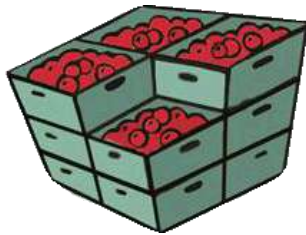


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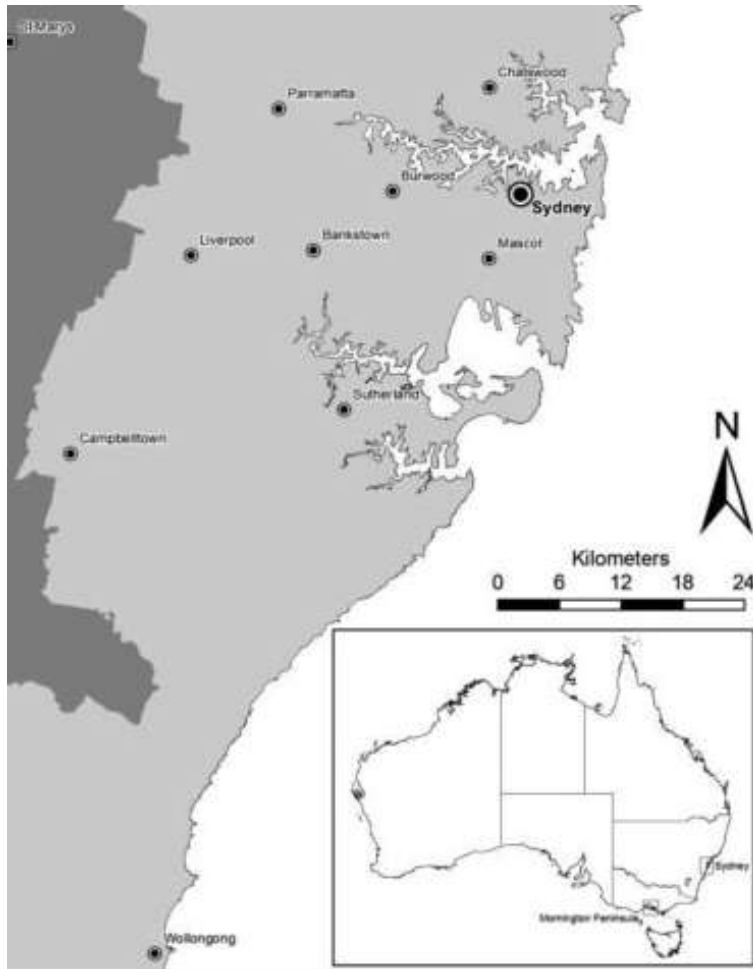
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Rothwell, A., Ridoutt, B., Page, G., & Bellotti, W. (2015). Environmental performance of local food: trade-offs and implications for climate resilience in a developed city. *Journal of Cleaner Production*.



Per questo studio il **cibo locale** è stato considerato come quella cresciuto all'interno del bacino di Sydney, comprese le distanze fino a 80 km su strada dal mercato di Sydney.

Produzione e estrazione
materie prime

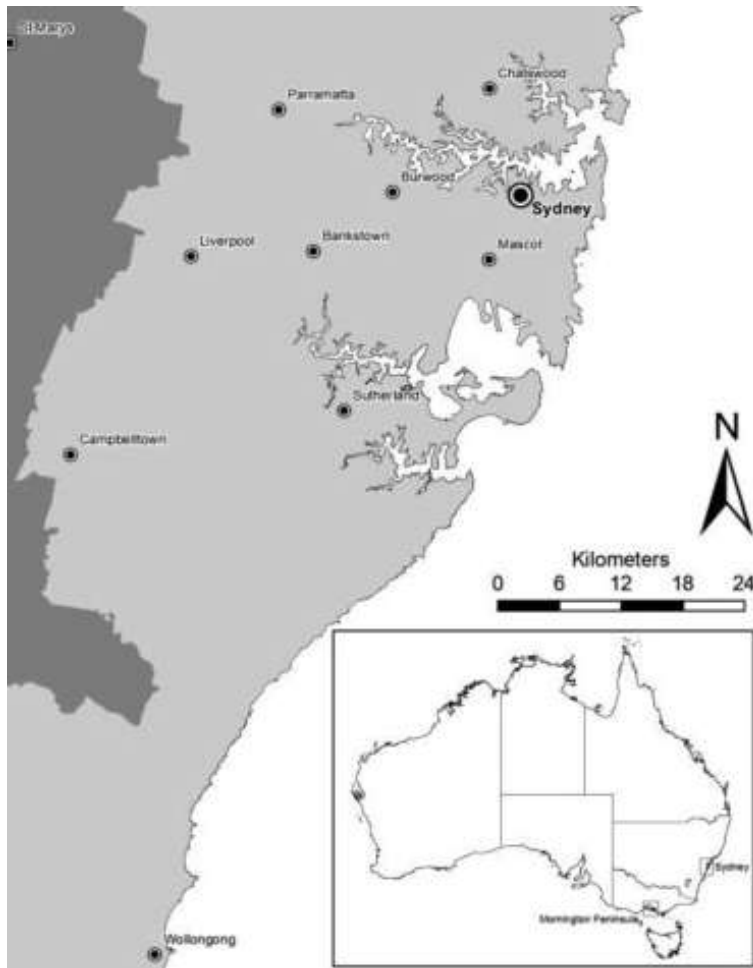


Gestione post-raccolta
e packaging



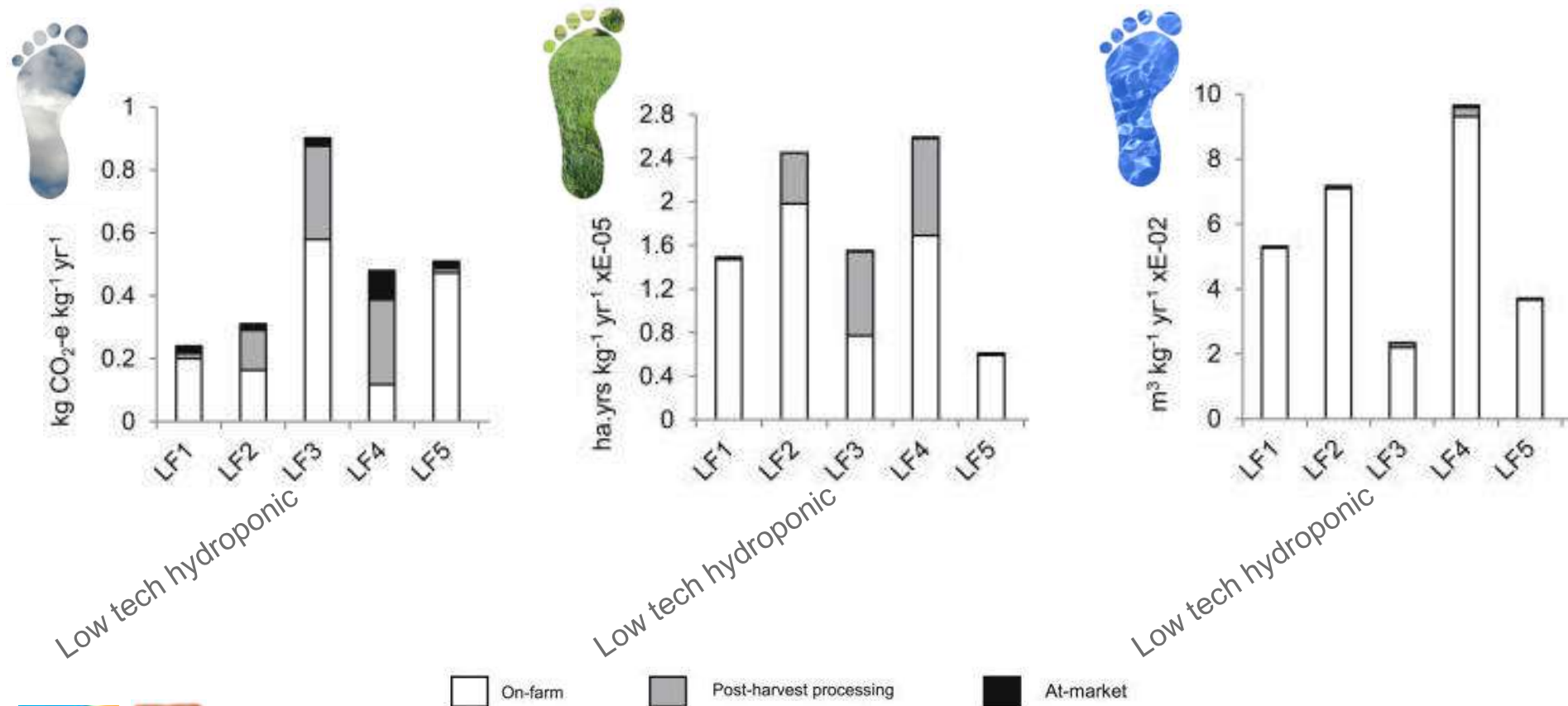
Trasporto refrigerato ai
mercati di Sydney

Rothwell, A., Ridoutt, B., Page, G., & Bellotti, W. (2015). Environmental performance of local food: trade-offs and implications for climate resilience in a developed city. *Journal of Cleaner Production*.



Farm	Farm size (workable ha)	Technology	Distance to market (km)	Production season
LF1	30	Field (transplants)	60	All year
LF2	24	Field (direct seeding)	56	Feb to Dec
LF3	1.8	Low tech hydroponic (transplants)	39	All year
LF5	2	High tech greenhouse (transplants)	56	All year
LF4	160	Field (transplants)	930	All year

Rothwell, A., Ridoutt, B., Page, G., & Bellotti, W. (2015). Environmental performance of local food: trade-offs and implications for climate resilience in a developed city. *Journal of Cleaner Production*.

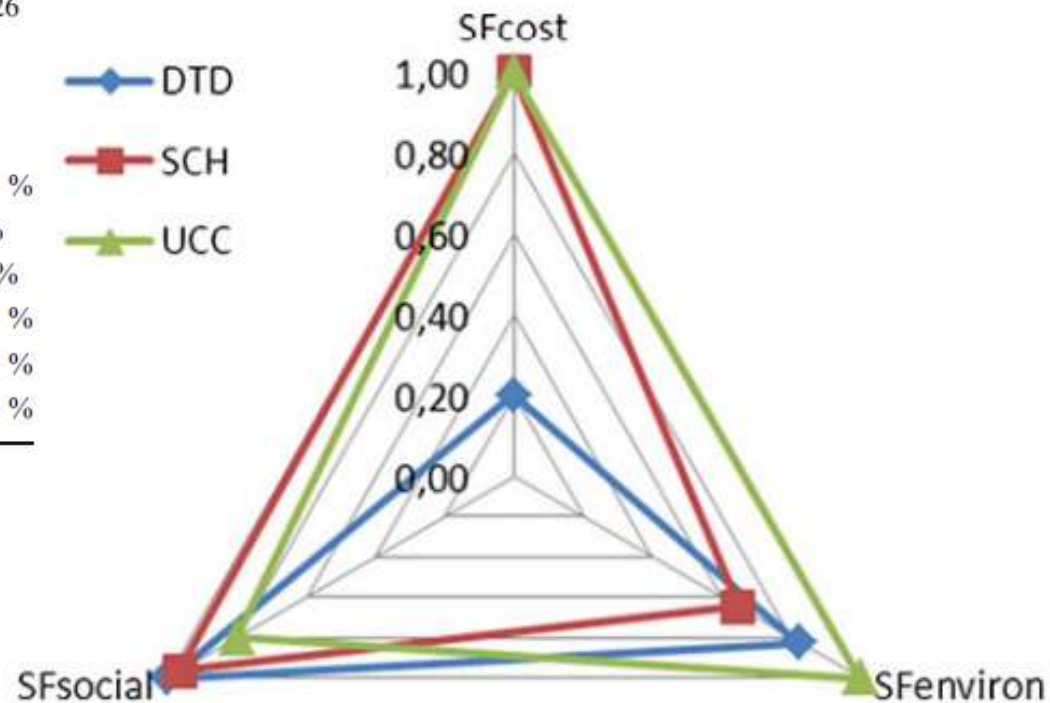


On-farm
 Post-harvest processing
 At-market

Vinyes, E., Oliver-Solà, J., Ugaya, C., Rieradevall, J., & Gasol, C. M. (2013). Application of LCSA to used cooking oil waste management. *The International Journal of Life Cycle Assessment*, 18(2), 445-455.

Table 6 S-LCA results

Social indicators	DTD	SCH	UCC
Total employees	55	20	9
Total working hours	92,843	29,156	9,126
Total employees with disabilities	38	8	0
Total employees with higher education	9	5	2
Total employees with basic education	46	15	12
Equal opportunities (sex)	100 %	100 %	100 %
Equal opportunities (disabilities)	33 %	17 %	0 %
Children's environmental education	17 %	100 %	25 %
Local employment	100 %	100 %	100 %
Public commitments to sustainability issues	100 %	100 %	100 %
Contribution to economic development	100 %	100 %	100 %



Aspetti chiave

- Pluralità di impatti vs singoli indicatori
- Scelta dei confini del sistema e unità funzionale
- Efficienza vs sufficienza
- Aspetti che l'LCA non riesce (*ancora?*) a quantificare

Grazie dell'attenzione

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