



From the farm to the agri-food system: an indicators framework for evaluating multi-functionality through the value chain

Filippo F. Fagioli, Lucia Rocchi, Luisa Paolotti, Antonio Boggia

University of Perugia (Italy) - Department of Agricultural, Food and Environmental Sciences

filippofiume.fagioli@gmail.com

83° Meeting of the European Working Group on Multicriteria Decision Aiding (EWG-MCDA) – ESADE Business School, Barcelona



Objectives

To discuss the role of Multi-functionality in Agri-food systems and the reasons of a need for measurement of Multi-functionality

To define a decision support model, based on MCDA, dealing with the integration of the dimensions of multi-functionality for its quantification, to support policy measures

To present a case study on vegetables oil value chains



Table of Contents

- Multi-functionality
- Agri-food value chain
- Creating Sharing Value
- Case of Study
- Multi-functionality Value-Chain Indicator
- Results
- Further development



Multi-functionality

According to the OECD (2001), multi-functionality is a characteristic of agriculture which beyond its primary function of supplying food and fibre, provides various benefits to society in the environmental and socio-economic fields

The dimensions of multi-functionality can be often placed within the three dimensions of sustainability, economic, social and environmental, strengthening the content of the concept of sustainability



Multi-functionality

Keywords	Multi-functionality	Value Chain	Agri-food	Sustainability	MCDA
Multi-functionality	—				
Value Chain	0	—			
Agri-food	1	10	—		
Sustainability	52	147	19	—	
MCDA	0	0	0	26	—

Keywords interaction table - Performed on Scopus

The literature review underline the high interaction between sustainability and other keywords, in particular with value chain, but at the same time demonstrates how multi-functionality represent an issue less, almost nothing considered, under the context of agri-food value chain and MCDA





Multi-functionality

Multi-functionality implies the existence of non-commodity output (NCO) which may exhibit the characteristics of externalities or public goods (Durand & Van Huylenbroeck, 2003).

Defining appropriate non-commodity categories (NCC) allows to distinguish the dimensions of multi-functionality



Multi-functionality

Non-Commodity Categories (NCC)

1- Food Safety

2- Rural Style

3- Resources Conservation (soil, water and biodiversity)

4- Rural Landscape

5- Health and Wellness



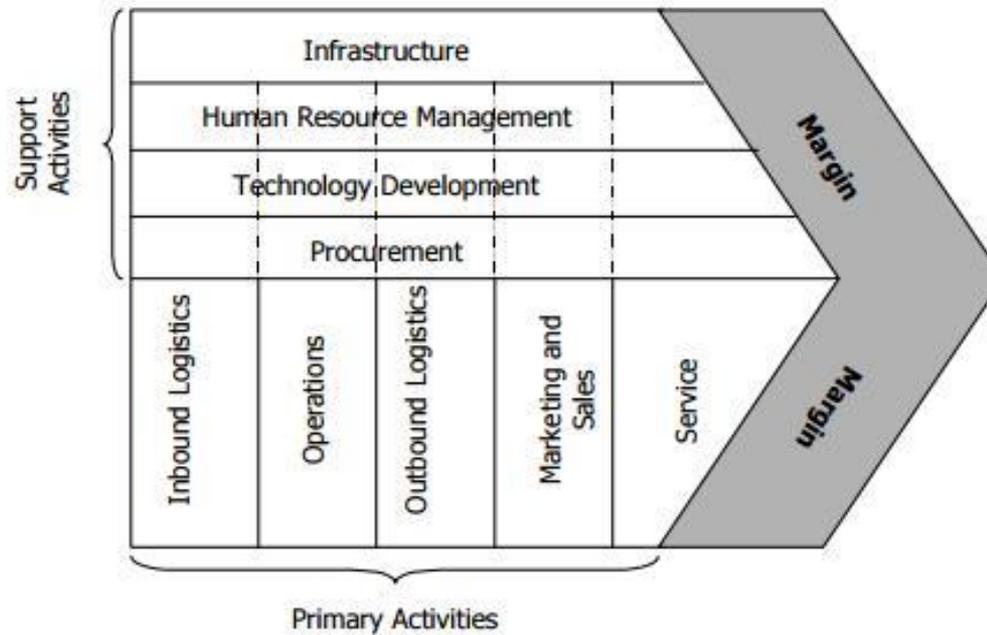
Agri-food value chain

In order to analyze the multi-functionality of the agri-food system it is necessary to identify measurable non-commodity output which characterize the primary activities of the value chain

Porter (1985) defined *value* as the amount buyers are willing to pay for what a firm provides, and conceived the “value chain” as the combination of nine generic value added activities operating within a firm – activities that work together to provide value to customers.



Agri-food value chain



Porter 1985



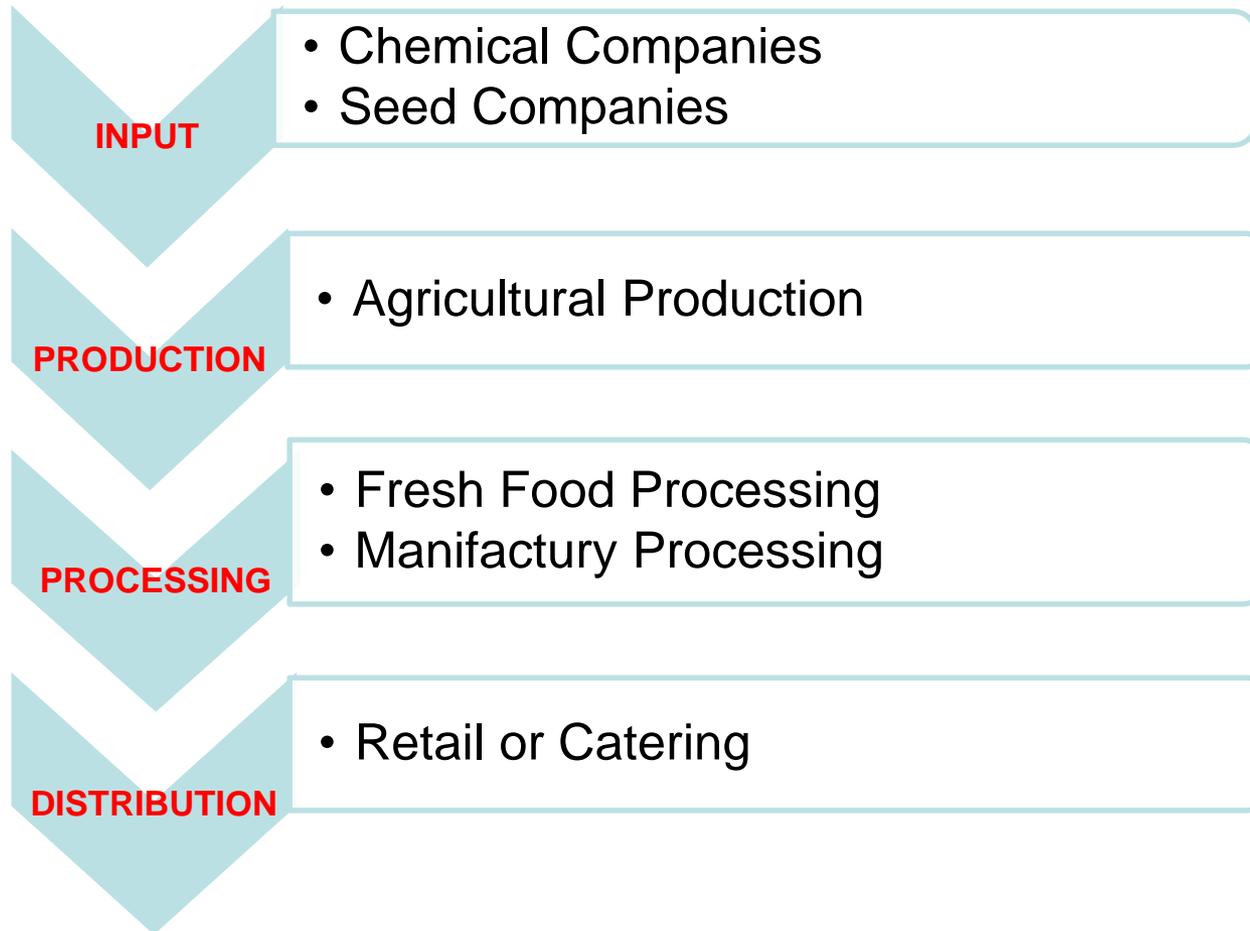


Agri-food value chain

An industry value chain, or a value system (Porter, 1985), includes the suppliers that provide the inputs necessary to the firm along with their value chains. After the firm creates products, these products pass through the value chains of distributors (which also have their own value chains), all the way to the customers. All parts of these chains are included in the value system.



Agri-food value chain



Source: Humphrey & Memedovic, 2006



Creating sharing value

In recent years business increasingly has been viewed as a major cause of social, environmental, and economic problems. Companies are widely perceived to be prospering at the expense of the broader community.

The concept of “*creating shared value*” (Porter & Kramer, 2011) can be defined as policies and operating practices that enhance the competitiveness of a company while simultaneously advancing the economic and social conditions in the communities in which it operates.





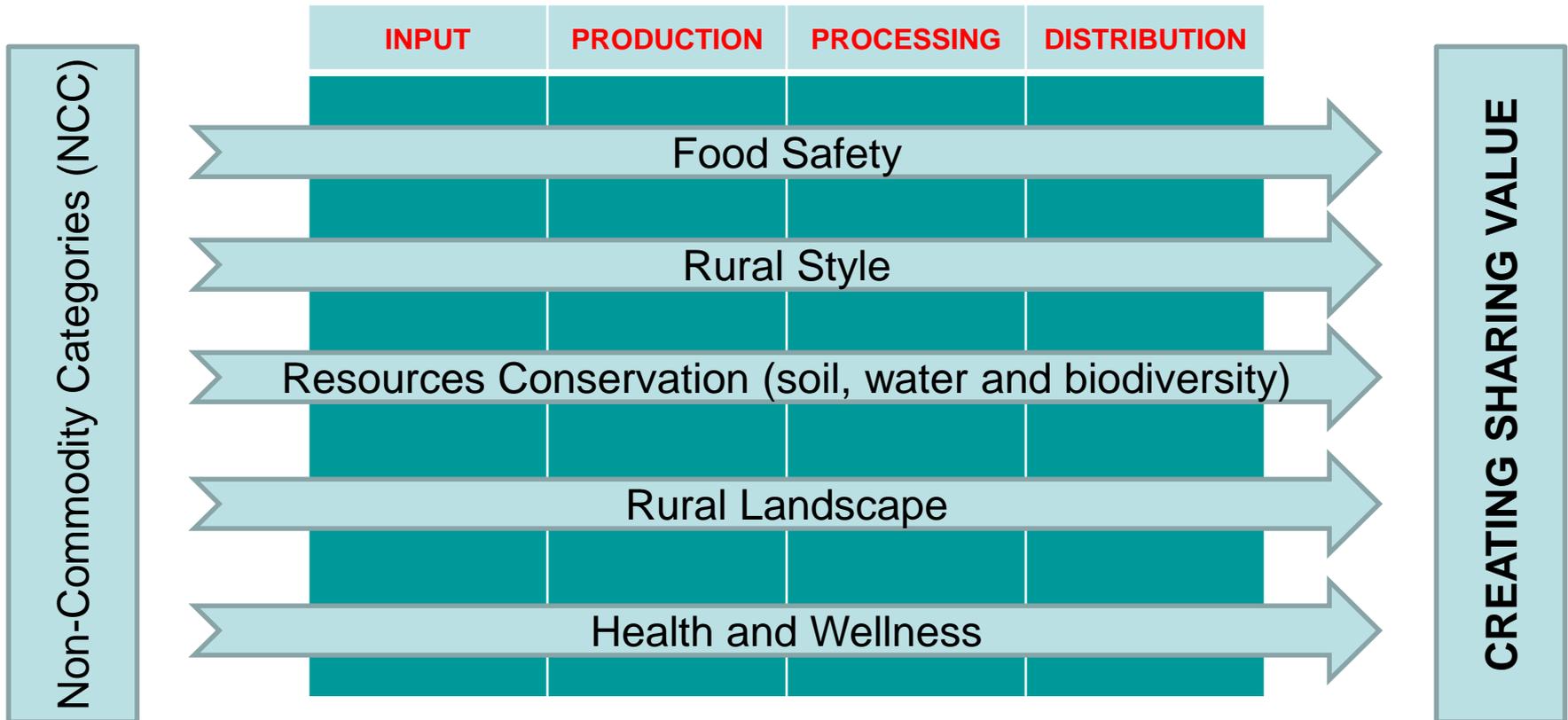
Creating sharing value

A company's value chain inevitably affects—and is affected by—numerous societal issues, such as natural resource and water use, health and safety, working conditions, and equal treatment in the workplace.

The analysis of Multi-functionality of Agri-food System through MCDA, could lead decision maker to identifying and expanding connections between societal and economic progress

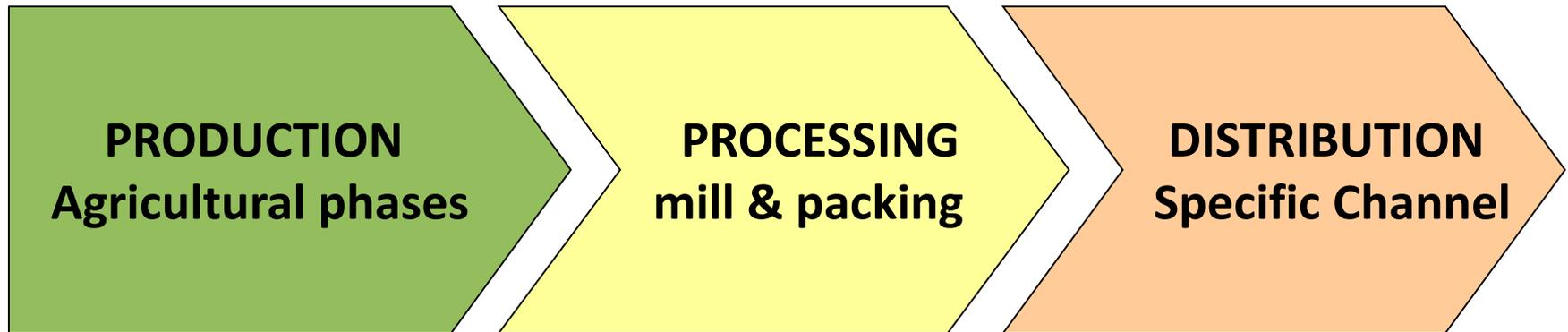


Creating sharing value



Case of Study

VEGETABLE OIL PRODUCTION: GENERAL VALUE CHAIN



Source: International Olive Oil, The Value Chain and Price Formation in the Spanish Olive Oil Industry, 2010



Multi-functionality Value-Chain Indicator

NCC	PRODUCTION	PROCESSING	DISTRIBUTION
FOOD SAFETY	Treatments impact	Traceability impact	-
RURAL STYLE	PDO importance	PGI importance	Direct selling channels
		Traditional Production	Final/semifinal product
RESOURCES CONSERVATION	Sustainable production impact	Oil yield	-
	Biodiversity index	Waste index	-
RURAL LANDSCAPE	Landscape index	-	-
HEALTH AND WELLNESS	-	-	Saturated acid fatty

Quantitative Criteria

Scale Criteria



Multi-functionality Value-Chain Indicator

AUTHOR

Gardini and Lazzarin (2007)
Rupani et al. (2010)
Salomone and Loppolo (2012)
Santucci (2007)
Schimidt (2008)
Yee et al. (2009)
Winen (1998)

DATABASE

6° Censimento dell'agricoltura
Door
Oil world 2013
Roundtable on Sustainable Palm Oil (RSPO)
Sime Darby plantation



Data table

Product	Food1 (Kg/ha)	Food2 (%)	Rural1 (n)	Rural2 (n)	Rural3 (0/1)	Rural4 (0/1)	Rural5 (0/1)	Resources1 (%)	Resources2 (t/ha)	Resources3 (adimensional)	Resources4 (adimensional)	Landscape (adimensional)	H&W (%)
Olive oil	4	10	43	1	0	1	2	0,10	0,900	10	3	10	0,12
Rapeseed oil	11	10	0	0	0	0	1	0,14	0,600	11	2	20	0,06
Palm oil	2	2	0	0	0	0	1	0,20	4,000	7	6	25	0,55



Results - Weighted summation

PRODUCTS	RANKING
Olive oil	0,81
Rapeseed oil	0,44
Palm oil	0,25

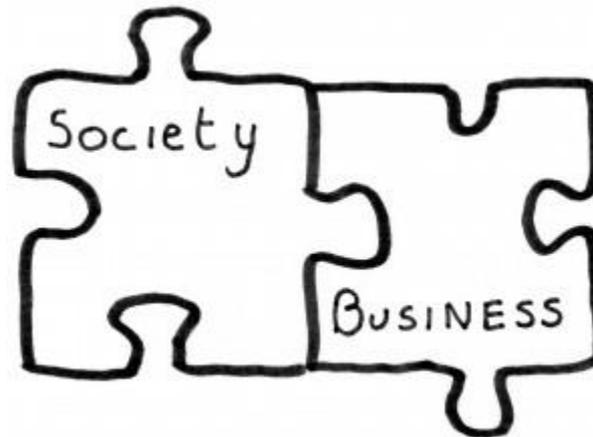


Further Development

- Defining the *value* as the amount that consumers are willing to pay for a product, it would be possible to analyze the different demand functions for products from different multi-functional value chain
- Considering the production of non-commodity output the main characteristic of the multi-functionality, it would be possible to consider also output that produce negative externalities along the value chain
- The Agri-food system is composed by primary activities but also by secondary activities; in this case it would be possible to extend the analysis to the Multi-functionality of these activities



THANK YOU FOR YOUR ATTENTION



Filippo Fiume Fagioli

University of Perugia - Department of Agricultural, Food and
Environmental Sciences

filippofiume.fagioli@gmail.com

