CIHEAM
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SUSTAINABILITY ASSESSMENT OF AGRO-FOOD PRODUCTS: THE CASE OF APULIA REGION

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Sustainability

Agro-food system

Geographical area

SUSTAINABILITY

"The sustainable development is the development that ensure to meet the needs of the present without compromising the ability of future generations to meet their own needs".

Brundtland report: Our Common Future, 1987

SUSTAINABILITY

The prevailing definition of sustainability combines three pillars: **social, environmental and economic** sustainability.

The three pillars are not equally developed. **Environmental sustainability** is the most developed of these pillars, and the market often intends sustainability in the environmental sense.

Regione Puglia is fully aware that sustainability is a complicated concept involving the interaction of multiple factors, and has used the term "*sustainability*" only when the three pillars (environmental, economic and socio-cultural sustainability) are involved, accompanied by nutritional-health sustainability.

FOOD SYSTEMS & DIETS

The High Level Panel of Experts on Food Security and Nutrition (HLPE, 2014) provided the following definition for a food system:

"*A **food system** gathers all the elements (environment, people, inputs, processes, infrastructures, institutions, etc.) and activities that relate to the production, processing, distribution, preparation and consumption of food and the outputs of these activities, including socio-economic and environmental outcomes"*

"*A **sustainable food system** (SFS) is a food system that delivers food security and nutrition for all in such a way that the economic, social and environmental bases to generate food security and nutrition for future generations are not compromised"*

"***Sustainable diets** are those diets with low environmental Impacts which contribute to food and nutrition security and to healthy life for present and future generations. Sustainable diets are protective and respectful of biodiversity and ecosystems, culturally acceptable, accessible, economically fair and affordable; nutritionally adequate, safe and healthy; while optimizing natural and human resources*" (*FAO, 2010)*

MEDITERRANEAN DIET

The **Mediterranean Diet** was recognized in 2010 by **UNESCO** as an intangible heritage of humanity

*A **set of skills**, knowledge, practices and traditions ranging from the landscape to the table, including crops, harvesting, fishing, conservation, processing, preparation and consumption of food.*

It is characterized by a nutritional pattern that has remained constant over time and space, consisting mainly of olive oil, cereals, fresh or dried fruit and vegetables, a moderate amount of fish, dairy products and meat, and many condiments and spices, all accompanied from wine or infusions, always respecting the traditions of each community.

***It promotes social interaction,** as the communal meal forms the basis of the social customs and festivities shared by a given community, and has given rise to a considerable body of knowledge, songs, maxims, tales and legends.*

MEDITERRANEAN DIET PYRAMID MODEL

Serra-Majem L, Tomaino L, Dernini S, Berry EM, Lairon D, Ngo de la Cruz J, Bach-Faig A, Donini LM, Medina FX, Belahsen R, Piscopo S, Capone R, Aranceta-Bartrina J, La Vecchia C, Trichopoulou A. Updating the Mediterranean Diet Pyramid towards Sustainability: Focus on Environmental Concerns. Int J Environ Res Public Health. 2020 Nov 25;17(23):8758

DEVIATION OF THE APULIAN POPULATION FROM THE MEDITERRANEAN FOOD MODEL

In Puglia, percentages are combined that could indicate a trend towards behaviors approaching the recommendations, but also slightly less positive indicators of eating behaviors, such as an increase in salty snacks and a decrease in the weekly consumption of legumes.

The ISTAT data, coming from the HEALTH FOR ALL–ITALIA database, show a progressive increase in the prevalence of overweight and obesity in the Apulian adult population since 1994.

The inconveniences caused by moving away from the Mediterranean diet are widespread in all age groups. They are mainly linked to the low consumption of foods of plant origin.

POSITIVE EFFECTS OF THE CONSUMPTION OF TYPICAL APULIAN PRODUCTS ON THE TERRITORY AND THE POPULATION

***The consumption of typical Apulian products contributes to making the regional agro-food system more sustainable**. There are at least **four good reasons** to decide to eat healthy, good and to consume local and seasonal products.*

***The first reason is closely related to health.** Unhealthy lifestyles are the main cause of the most widespread diseases. An unbalanced diet, overweight and obesity are among the main risk factors for the development of various diseases.*

***The second reason is purely economic.** Buying from local producers decreases the number of intermediaries between production and consumption and consequently costs are reduced with an advantage for the producer, who is guaranteed a more equitable remuneration, and for the consumer who can purchase better quality products at lower prices.*

***The third reason is of an environmental nature.** Minimizing the distance between the place of production and the place of sale means reducing collection and transport times to just a few hours, rather than days of travel by plane and truck. This will make it possible to reduce polluting emissions into the atmosphere. Therefore healthier products rich in substances arrive on the table, thus reducing the environmental impact and the consumption of polluting resources in transport and packaging, contributing to the conservation of local biodiversity.*

***The fourth reason is socio-cultural.** The consumption of typical products makes it possible to enhance local traditions and cultures and their transmission from one generation to the next. The typical products are linked to cultural events, such as festivals, in which the most important characteristics of the Mediterranean diet are highlighted as an individual lifestyle as well as a model of social coexistence for communities. In this diet, food not only meets the mere physical need, but goes to affirm values, such as the family in the importance of getting together at the table and therefore talking and sharing, valuing the different cultures that have their roots in time.*

PUGLIA REGION


ATLANTE
DEI PRODOTTI
TIPICI
AGROALIMENTARI
DI PUGLIA

OBJECTIVE

To Assess the Sustainability of Mediterranean Food Systems through a case study: Apulia Region

To develop a scientifically-sound and easily applicable methodology for the assessment of sustainability of agro-food products on which are based food systems

AGRICULTURE & QUALITY PROJECT

PRODOTTI DI QUALITÀ® PUGLIA

PROJECT AGRICULTURE & QUALITY

Apulia region has undertaken over the last few years a food product enhancement **initiative** by establishing the Regional Quality Scheme "Prodotti di Qualità", which guarantees higher than current market quality standards.

Creation of the guideline based on criteria/themes for each pillar of sustainability.

The businesses fulfilling the optional "sustainability" prerequisite can demonstrate their compliance with it, by displaying an "additional sustainability mark" on the label.

MATERIALS AND METHODS

Preparation of Guideline for the recognition of Voluntary Requirement "Sustainability" in addition to the brand “Quality Products” (Identification of Criteria per Pillar)

Identification of indicators for each sustainability pillar

Implementation of the Methodological approach

GUIDELINE

RECOGNITION OF THE OPTIONAL "SUSTAINABILITY" PREREQUISITE

(Capone *et al.,* 2016)

PRELIMINARY TRANSITIONAL PHASE

The application of the guideline involves a one-year transitional phase and a subsequent normal running phase.

In the preliminary transitional phase the businesses submit to *Regione Puglia* their approach to sustainability that could be referred to one or more pillars among those provided in the guideline

Under normal running conditions the approach of businesses to sustainability should concern necessarily all four pillars.

ADDITIONAL SUSTAINABILITY MARK

The businesses submitted to the RQS or other Quality Schemes could demonstrate their submission to the "optional sustainability prerequisite" using the "*additional sustainability mark*" indicated directly on the product/s complying with the guideline.

The "*additional sustainability mark*" is graphically made up of the symbols of each of the 4 pillars of sustainability referred to in the guideline.

ADDITIONAL SUSTAINABILITY MARK

In the transitional phase the "**additional sustainability mark**" will be authorized for use, upon previous inspection from the Control Body, but it will display exclusively the pillar/s that are ensured and indicate.

Under normal running conditions the additional mark could be used only with the 4 pillars displayed, thus following an overall approach by the applicant business to sustainability.

CONTINUAL IMPROVEMENT

Since the application of a sustainability management system in an agri-food chain is a starting point than an arrival point, it is important always to envisage continual improvement.

The defined sustainability criteria will be monitored to enable assessment of the initial conditions (to define *baseline* values) and of the subsequent improvements needed. Therefore, all operators in the chain must be committed to a continual process of improvement.

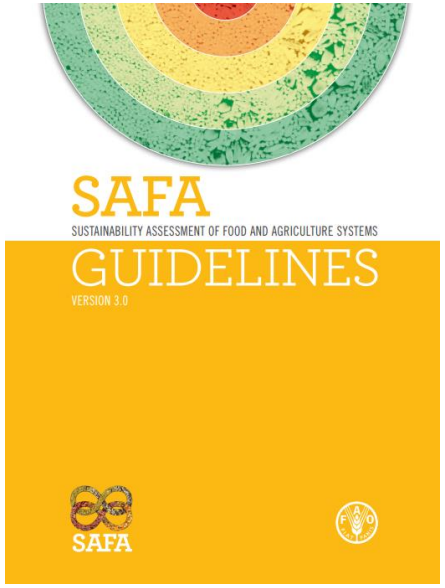
Continual improvement is the basis of any certification process, and the chain or business applying the present guidelines must commit to improvements in each sustainability pillar over time.

In accordance with the principle of continual improvement, the sustainability benchmark values defined in the *sustainability standard* will be updated every five years.

MATERIALS AND METHODS

To develop a methodology for the assessment of sustainability of agro-food products on which are based food systems

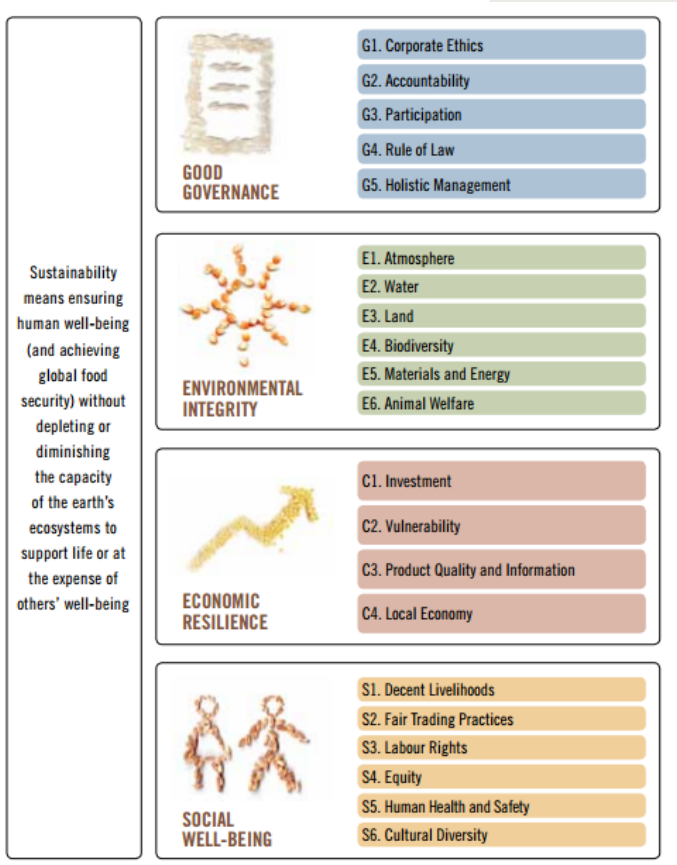
SAFA – SUSTAINABILITY ASSESSMENT OF FOOD AND AGRICULTURE SYSTEMS GUIDELINES



SAFA

The guiding vision of SAFA is that food and agriculture systems are characterized by four dimensions of sustainability.

- Good Governance
- Environmental Integrity
- Economic Resilience
- Social well-being



For each of these four dimensions of sustainability, SAFA outlines essential elements of sustainability

The 21 themes and 58 sub-themes were defined by SAFA Guidelines

Performance indicators for each sub-theme facilitate measuring progress towards sustainability.

SAFA INDICATORS

Types of used indicators

Performance-based (results-oriented or outcome) indicators: focused on the results of compliance with an objective and can measure the performance of an operation, identify trends and communicate results.

***Practice-based (prescriptive or process) indicators*:** prescribe that the necessary tools and systems be in place to ensure best practices. The cause-effect between a given practice and a result is however never precise. One can assume that a practice may yield a desired result but with a substantial margin error.

Target-based indicators: these indicators focus on whether the company has plans, policies or monitoring, with targets and ratings based on steps towards implementing them.

Source: FAO (2013)

SAFA

Determinating Indicators thresholds

Indicator rating SAFA offers a 5 scale rating for performance.

PERFORMANCE	PERCENTAGE SCORES
BEST	80-100 percent
GOOD	60-80 percent
MODERATE	40-60 percent
LIMITED	20-40 percent
UNACCEPTABLE	0-20 percent

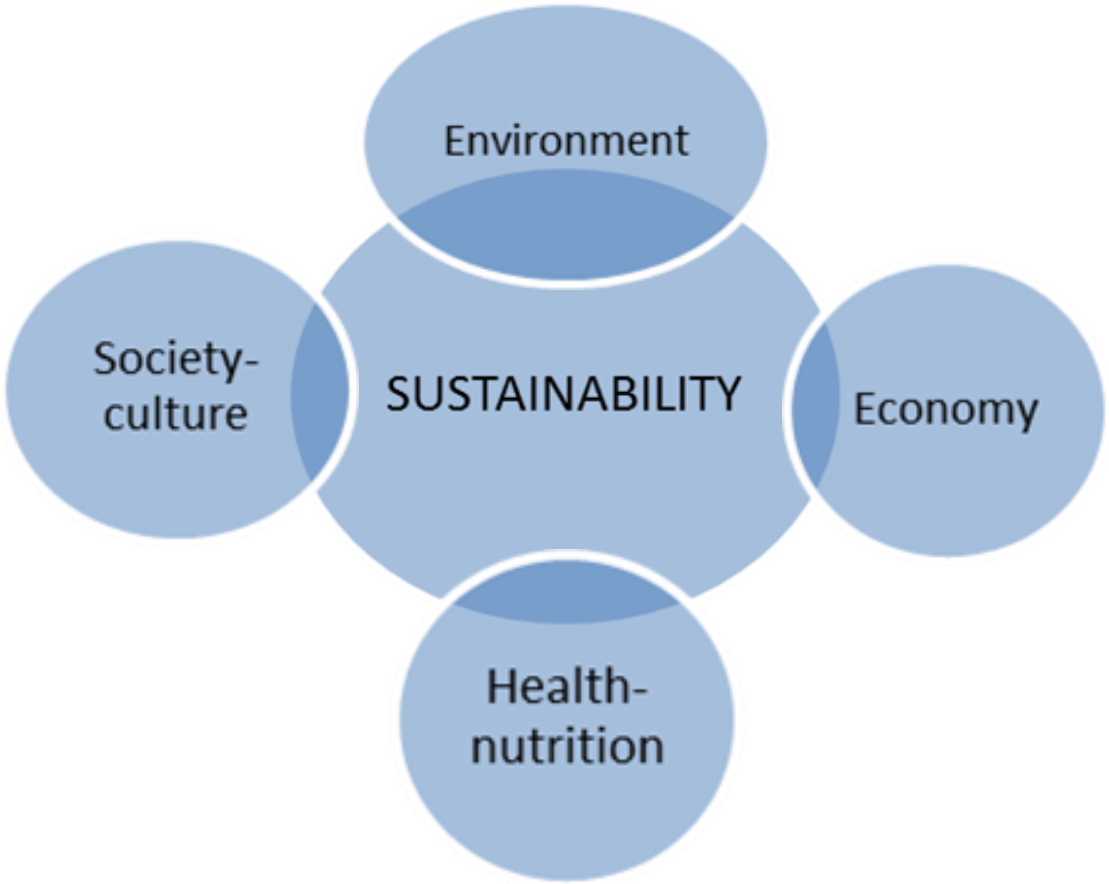
Rating sub-themes

Given that all sub-themes have the same weight, and in several sub-themes, more indicators are present, the weight is distributed evenly among indicators within each sub-theme in these dimensions.

IF NUMBER OF INDICATORS PER SUB-THEME IS:	THEN INDICATOR WEIGHT IN THE GOVERNANCE, SOCIAL AND ECONOMIC DIMENSIONS
1	100 percent
2	50 percent
3	33 percent
4	25 percent

MATERIALS AND METHODS

The four Pillars of the sustainability



CRA
CONSIGLIO PER LA RICERCA E LA SPERIMENTAZIONE IN AGRICOLTURA

ENEA
Agenzia nazionale per le nuove tecnologie, l'energia e lo sviluppo economico sostenibile

FORUM
MEDITERRANEAN FOOD CULTURES

SUSTAINABILITY

Environmental sustainability means **the capacity to preserve the three functions of the environment over time** (Capone *et al.,* 2016): as a supplier of resources, as a receptor of waste and as a direct source of utility.

Economic sustainability may be defined as the **capacity to generate durable growth of economic indicators, especially to generate income and employment** (Capone *et al.,* 2016).

A product or an agri-food chain is economically sustainable when it continually generates income and employment via production, processing and distribution.

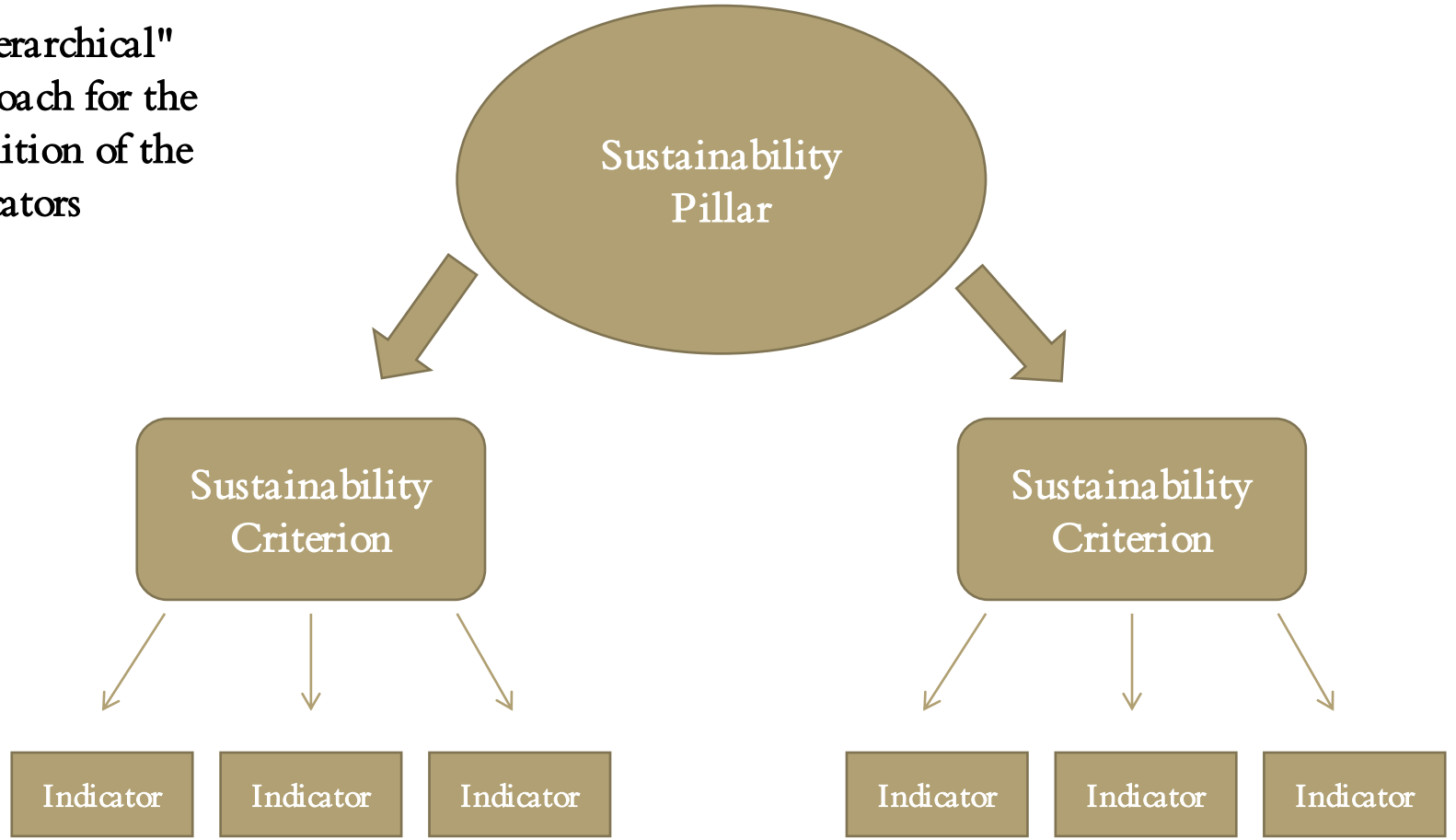
SUSTAINABILITY

Social sustainability may be defined as the **capacity to ensure that the quality of life and conditions of well-being (security, health and education) are equally distributed, regardless social class and gender** (Capone *et al.,* 2016).

Agri-food products are sustainable in terms of nutrition and health if they fulfil health and hygiene standards and satisfy quality requirements: organoleptic, nutritional and dietary characteristics (Capone *et al.,* 2016).

METHODOLOGY

"Hierarchical" approach for the definition of the indicators



Environmental

- Land use and management
- Use of chemical inputs
- Energy and Climate change
- Biodiversity
- Responsible management of losses, by-products and waste

Economic

- Profitability and productivity
- Income level and stability
- Labour and employment
- Investment

Socio-cultural

- Corporate social responsibility
- Women employment
- Social inclusion
- Training of farm workers
- Integration and training of foreign workers
- Respect of animal welfare
- Promotion of local identity
- Transmission of traditional knowledge to new generations
- Good relations with the local community
- Adoption of measures for animal welfare

Health-nutrition

- Healthiness and food safety, Quality, Tracking, Transparency as regards the information shown on the label
- Product nutritional quality

IDENTIFICATION OF INDICATORS FOR EACH SUSTAINABILITY PILLAR

MATERIALS AND METHODS

For each indicator is assigned a **score** from **0 to 10**. In general, the benchmark corresponds to the score 5. Thus, were identified classes of values that correspond to the different scores for each indicator according to the calculated **benchmark**.

The **benchmark** is the value from which an indicator can be considered sustainable

Regardless of the number of criteria and indicators the **highest score** a product can achieve for each pillar of sustainability is 100. The **score for each pillar** of sustainability is obtained using the following formula:

Sustainability pillar score = sum of scores of pillar's criteria x (10 / number of pillar's criteria).

A company is considered "sustainable" if it has for the 4 pillars of sustainability an overall score of at least 200 points. To provide more flexibility to the companies, the minimum score for pillar is 40 points.

ENVIRONMENTAL INDICATORS

Criterion: Land use and management

- Soil Improvement Practices
- Soil Erosion Protection
- Nitrogen Fertilizers Inputs
- Pest Management Inputs
- Soil Compaction from Machinery

Criterion: Use of chemical inputs

- Nitrogen Consumption
- Use of phosphorus pentoxide
- Use of fungicides
- Use of insecticides and acaricides
- Use of Herbicides

Criterion: Energy and Climate change

- Final Energy Consumption
- Mineral Fertilizers Consumption
- Pesticide Consumption
- Lubricant Consumption
- Plastic Consumption
- Energy Intensity

Criterion: Biodiversity

- Crop Diversity
- Number of farm animal species
- Tree Plant density
- Herbaceous plant diversity
- Presence of cover crops
- Legume crop density
- Patch average area
- Semi-natural habitat surface
- Duration of rotations
- Diversity of varieties and animal breeds
- Varietal diversity
- Number of plant varieties at risk of genetic erosion
- Number of animal races
- Number of animal races at risk of genetic erosion

Criterion: Responsible management of losses, by-products and waste:

- Method for the management of production scraps, by-product and waste

ENVIRONMENTAL INDICATORS EXAMPLE

Indicator: Soil Improvement Practices

Soil Improvement Practices (SIP) is a quantitative indicator that aims to evaluate the on-farm application of practices for the conservation/improvement of the chemical-physical and biological properties of the agricultural soil (Hamdy *et al.*, 2001; FAO, 2013).

To calculate the indicator it is necessary to determine the percentage of UAA (Utilised Agricultural Area normally fertilised) of the company on which soil conservation practices are applied (e.g. application of organic fertilizers, soil improvers, correctives to improve the chemical characteristics of the soil; improvement of drainage to reduce water stagnation).

The score scale ranges from 0 (negative condition, no application) to 10 (positive condition, application on all UAA) (TABLE 4) .

Description	Score
0%	0
1-10%	1
11-20%	2
21-30%	3
31-40%	4
41-50%	5
51-60%	6
61-70%	7
71-80%	8
81-90%	9
91-100%	10

ECONOMIC INDICATORS

Criterion: Profitability and productivity of production factors

- Index of gross profitability per labor unit
- Enhancement rate
- Rate of Return on Invested Capital
- Rate of return of family labour

Criterion: Income level and stability

- Number of products and services produced by the farm
- Distribution of the turnover among different product and services
- Heterogeneity or affinity of products and services supplied
- Index of Commercial Riskiness.

Criterion: Labour and employment

- Index of localisation.

Criterion: Investment

- Specific Investments for the improvement of sustainability performances

ECONOMIC INDICATORS: EXAMPLE

Indicator: Distribution of the turnover among different product and services.
Percent weight of the production value of the first product or non-agricultural activity. It is another indicator enabling the assessment of income source diversification (Gollop and Monahan, 1991).
For this indicators the values go from 0 to 10 according the weight percentage of the production value of the first product or non-agricultural activities. If the first product or extra farming holds 100% of the value of total production of the company, the score is 0. If the first product or business has a value greater than or equal to 70% of the value of farm production has a score of 3; 5 points if the first product or activity reaches 50% of the value of farm production; 7 points if it reaches 40% of the value of production; 10 points if the first product or activity reaches 30% of the value of farm production.

Description	Score
The first product or extra farming holds 100% of the value of total production	0
The first product or extra farming holds 70% of the value of total production	3
The first product or extra farming holds 50% of the value of total production	5
The first product or extra farming holds 40% of the value of total production	7
The first product or extra farming holds 30% of the value of total production	10

SOCIO-CULTURAL INDICATORS

Cultural dimension

Criterion: Promotion of local identity

- Farm activities (different from agricultural production) as a means to promote cultural identity
- Preservation of traditions and local culture

Criterion: Transmission of traditional knowledge to new generations

- Activities to promote the intergenerational transmission of traditional knowledge

Criterion: Good relations with the local community

- Collaboration with the local community, local authorities and civil society

SOCIO-CULTURAL INDICATORS

Social Dimension:

Criterion: Corporate social responsibility for ethical sustainable management along the food chain
Voluntary integration by farms of social concerns in the production process, business operations and relationships with stakeholders

Criterion: Women employment in farming sector at production and management level
Presence of women in the farm

Criterion: Social inclusion
Presence of vulnerable people in the farm

Criterion: Training of farm workers along the food chain
Training activities to favour integration of workers

Criterion: Integration and training of foreign workers
Training for integration of foreign workers

Criterion: Respect of animal welfare
Adoption of measures for animal welfare

SOCIO-CULTURAL INDICATORS: EXAMPLE

Indicator: Voluntary integration by farms of social concerns in the production process, business operations and relationships with stakeholders

It is worth to point out that it goes beyond compliance with legal requirements and identifies practices and behaviours that a farm adopts voluntarily, in the belief to get results that can bring benefits and advantages to the farm as well as the context in which it operates. Particular attention has to be paid to relations with employees, suppliers, customers, partners, local communities and institutions, while performing concrete actions for them. Currently, there are standards and guidelines set by international standard-setting systems, that allow to detect the effective application of the conditions mentioned above (ISO 26000 and SA 8000).

Description	*Score*
No social policy	0
At least a measure of social concern (e.g. workers' rights, protection of consumer rights, occupational safety and health)	1-4
Al least a scheduled informative and training path on CSR dedicated to the farm workers	5-7
Adoption of an Ethical Code	8-9
Certification ISO 26000, SA 8000	10

Method of calculation: Number and type of measures adopted by the farm in order to implement of the principles of social responsibility.

Sustainability benchmark: At least one scheduled information activity on social responsibility addressed to workers.

Other information: If the farm is certified ISO 26000 and/or SA 8000, the verification of the requirements of social sustainability can be considered fully satisfied.

The different scoring depends on the type and frequency of the information activities. It should be also evaluated whether the "employer" has been trained on the mentioned subject.

(Moscatelli *et al.*, 2016)

NUTRITION-HEALTH INDICATORS

Criteria: Healthiness and food safety, Quality, Tracking, Transparency as regards the information shown on the label

- Distinctiveness of agri-food companies

Criterion: Product nutritional quality (identification of TRAGET MOLECULES)

- Products derived from solid or liquid foods
- Cereals and derivates
- White fruits
- Red Fruits
- Yellow/Orange Fruits
- Blue-Violet Fruits
- Green Fruits
- White Vegetables
- Red Vegetables
- Yellow/Orange Vegetables
- Blue/Violet Vegetables
- Green Vegetables
- Vegetable Fats
- Animal fats
- Milk and dairy product
- Fish
- Meat
- Eggs
- Legumes
- Tubers

Azzini *et al*, 2018

NUTRITION-HEALTH INDICATORS EXAMPLE

Regulations	Requirements	Score		
Guidelines for the application of reg CE 852/2004	a) Describe in a business document all the rules b) To train and raise staff awareness c) Document and trace the application	0	0,5*	1
ISO/TS 9001 (P-Pr)[1]	Management system for quality in processes	0	0.5*	1
ISO/14001(P-Pr)	Environmental management system	0	0.5*	1
ISO 22000 (P-Pr)	Management system for food security	0	1	2
ISO 22005(Pr)	Traceability certification in the food chain and / or feed	0	0,5*	1
ISO/TS 22002-2009(P-Pr)	Prerequisites for the production of foods	0	0.5*	1
ISO/TS 22002-2011(P-Pr)	Prerequisites for agriculture	0	0,5*	1
Products specifications (Pr)	Use of food or raw materials PDO, PGI, STG etc.	0	0	1
Use of raw materials/products grown and/or raised in Apulia (Pr)	Products whose origin is exclusively regional*	0	0	2**
Total				

** The farm that demonstrates that it has initiated the procedures for accreditation to this rule will get flagged score*
*** The farm that uses products PDO, PGI etc. or raw material exclusively from Apulia region will get the flagged score.*

Vegetable Fats					
	Unsustainable	Sustainable			Tot
	≤5	≥ 5 to ≤ 10			
	Unsustainable	**Sufficient**	**Good**	**Excellent**	
Nutritional markers	**Threshold values**				
Total Fats					
Saturated fats	≤ 13 gr/100 ml	> 13 to ≤ 16 gr/100 ml			
Score	from 0 to 0,5	1	1	1	
Monounsaturated fat	≤ 74 gr/100ml	> 74 to ≤ 85 gr/100 ml			
Score	from 0 to 0.5	1	1	1	
Polyunsaturated fats	≤ 6 gr/100ml	> 6 to ≤ 13 gr/100 ml			
Score	from 0 to 1	1	1.5	2	
Target fatty acids:					
Oleic acid (C18:1)	≤ 65 gr/100ml	> 65 to ≤ 80 gr/100 ml			
Score	from 0 to 1	1	1.5	2	
Linoleic acid (C18:2)	≤ 6 gr/100 ml	> 6 to 8gr/100 ml			
Score	from 0 to 1	1	1.5	2	
Linoleic acid (C18:3)	≤ 0.7 gr/100 ml	> 0.7 to 1 gr/100 ml			
Score	from 0 to 1	1	1.5	2	
Vitamin E	< 12 mg/100ml	> 12 mg to ≤15 mg/100ml			
Score	from 0 to 1	1	1.5	2	
Total Polyphenols	< 14 mg/100ml	> 14 to ≤18mg/100ml			
Score	from 0 to 1	1	1.5	2	
Hydroxytyrosol	≤ 5 mg/100ml	> 5 mg/100 ml			
Score	from 0 to 1	1	1.5	2	
Total					**10**

IMPLEMENTATION OF THE METHODOLOGICAL APPROACH

Local farm

Surface
TAA: 40ha
UAA: 10ha
Woods: 30ha

Certifications:
Organic
PdQP

IMPLEMENTATION OF THE METHODOLOGICAL APPROACH

Raw Products:

- Red Onion and Sponsale onion of Acquaviva
- Black Chickpea

Processed products:

- Scalded Red Sponsale of Acquaviva
- Red Sponsale of Acquaviva in oil
- Cream of Red Sponsale of Acquaviva and Black Chickpea
- Mustard of Red onion of Acquaviva
- Cream of Red Onion of Acquaviva

IMPLEMENTATION OF THE METHODOLOGICAL APPROACH

Sponsale onion:

Environmental Pillar score: 31.25 x (10/4) = 78.12
Economic Pillar score: 26.5 x (10/4) = 66.25
Socio-cultural Pillar score: 43 x (10/8) = 53.75
Nutritional-health Pillar score: 9 x (10/2) = 45

Total score = 243.12 SUSTAINABLE

Black Chickpea

Environmental Pillar score: 31.25 x (10/4) = 78.12
Economic Pillar score: 26.5 x (10/4) = 66.25
Socio-cultural Pillar score: 43 x (10/8) = 53.75
Nutritional-health Pillar score: 8.5 x (10/2) = 42.5

Total score = 240.27 SUSTAINABLE

Scalded Red Sponsale of Acquaviva

Environmental Pillar score: 31.25 x (10/4) = 78.12
Economic Pillar score: 26.5 x (10/4) = 66.25
Socio-cultural Pillar score: 43 x (10/8) = 53.75
Nutritional-health Pillar score: 9 x (10/2) = 45

Total score = 243.12 SUSTAINABLE

Red Sponsale of Acquaviva in oil

Environmental Pillar score: 31.25 x (10/4) = 78.12
Economic Pillar score: 26.5 x (10/4) = 66.25
Socio-cultural Pillar score: 43 x (10/8) = 53.75
Nutritional-health Pillar score: 8.5 x (10/2) = 42.5

Total score = 240.27 SUSTAINABLE

Cream of Red Sponsale of Acquaviva and Black Chickpea

Environmental Pillar score: 31.25 x (10/4) = 78.12
Economic Pillar score: 26.5 x (10/4) = 66.25
Socio-cultural Pillar score: 43 x (10/8) = 53.75
Nutritional-health Pillar score: 7 x (10/2) = 35

Total score = 233,12 NOT SUSTAINABLE

Mustard of Red onion of Acquaviva

Environmental Pillar score: 31.25 x (10/4) = 78.12
Economic Pillar score: 26.5 x (10/4) = 66.25
Socio-cultural Pillar score: 43 x (10/8) = 53.75
Nutritional-health Pillar score: 11 x (10/2) = 55

Total score = 253.12 SUSTAINABLE

Cream of Red Onion of Acquaviva

Environmental Pillar score: 31.25 x (10/4) = 78.12
Economic Pillar score: 26.5 x (10/4) = 66.25
Socio-cultural Pillar score: 43 x (10/8) = 53.75
Nutritional-health Pillar score: 12 x (10/2) = 60

Total score = 258.12 SUSTAINABLE

FINAL CONSIDERATIONS

FINAL CONSIDERATIONS

As a pilot experience, the study aims to contribute to the further development of the methodological approach designed by addressing all the critical issues that arise from such an application.

- The methodological approach gave good results
- Some indicators were not considered in the global sustainability assessment
- Assessment of all indicators for the assessment of sustainability in normal running conditions
- Assessment of Products from different farms/enterprises
- Farm's interest in adhering to the Regional Quality Scheme and to the Sustainability Certification
- Valorisation of their products / wider market possibility

REFERENCES

ANPA – Agenzia Nazionale per l'Ambiente (2000) – Contaminazione dei suoli da fonti diffuse. In: Annuario dei Dati Ambientali 2000 – Area Tematica Geosfera.

Azzini E., Maiani G., Turrini A., Intorre F., Lo Feudo G., Capone R., Bottalico F., El Bilali H. and Polito A. (2018). The health-nutrition dimension: a methodological approach to assess the nutritional sustainability of the typical agro-food products and the Mediterranean diet. Journal of the Science of Food and Agriculture DOI10.1002/jsfa.8877.

Capone R., El Bilali H., Bottalico F. (2016). Assessing the Sustainability of Typical Agro-Food-Products: Insight from Apulia Region, Italy. *New Medit;* 15(1): 28-35.

FAO (2013). *Sustainability Assessment of Food and Agriculture systems – SAFA. Guidelines*. Version 3.0; December 2013. Rome.

Gollop, F.M., Monahan J.L. (1991). A Generalized Index of Diversification: Trends in U.S. Manufacturing, *The Review of Economics and Statistics*, 73 (2): 318-330.

Hamdy A., Ladisa G., Trisorio Liuzzi G. (2001) - Desertificazione: alcune considerazioni preliminari sugli indicatori. Rapporto attività 2000 - CIHEAM-IAMB / Comitato Tecnico Nazionale_Conservazione della Natura, ANPA Agenzia Nazionale per la Protezione dell'Ambiente.

HLPE (2014). Food Losses and Waste in the Context of Sustainable Food Systems. HLPE, Rome. Available at: http://www.fao.org/3/a-i3901e.pdf

Ladisa G. (2001) - Criteri di quantificazione delle aree sensibili alla desertificazione in ambienti mediterranei. Tesi di Dottorato di Ricerca. Università degli Studi di Padova - Università degli Studi di Bari.

Ladisa G., Todorovic M.,Trisorio Liuzzi G. (2010) – Assessment of desertification in semi-arid mediterranean environments: the case study of Apulia region (Southern Italy). In Zdruli P., Kapur S. & Faz Cano A. (eds.) - Land degradation and desertification: mitigation and remediation. Springer, New York: 493-516. ISBN 978-90-481-8656-3

Moscatelli S., Gamboni M., Dernini S., Capone R., El Bilali H., Bottalico F., Debs Ph., Cardone G. (2017). Exploring the Socio-cultural Sustainability of Traditional and Typical Agro-food Products: Case study of Apulia Region, South-eastern Italy. Journal of Food and Nutrition Research, 5/1: 6-14. DOI: 10.12691/jfnr-5-1-2. http://www.sciepub.com/portal/downloads?doi=10.12691/jfnr-5-1-2&filename=jfnr-5-1-2.pdf

WCED (World Commission on Environment and Development), (1987). *Our common future*. Report of the 1987 World Commission on Environment and Development. Oxford University Press, Oxford.

THANK YOU FOR YOUR ATTENTION