The socio economic sustainability of food quality schemes (FQSs): the case of Parmigiano Reggiano PDO

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Abstract
Sustainability is a complex concept that deals with different dimensions which are economic, social, environmental, cultural and governance-related. Therefore, the aim of a sustainable production should take into consideration all the inputs (natural and social resources) and a particular attention should be given at their protection in order to let them be reproducible in the long-run.
In Geographical Indication (GI) products the aim of developing sustainable food production is evident and tangible. In these products not only the value chain dimension is important, but especially the territorial one. The latter, oft described through the French concept of terroir, strictly relates the product to the producers thanks to the raw materials (for their specific attributes gained due to the geophysical characters) and the know-how (for the attributes, which arise as a consequence of the tradition and the human elements).
The objective of the paper is to describe in a comprehensive way a theoretical framework, which includes the variables that affect the sustainability, starting from the Sustainability Assessment of Food and Agriculture Systems (SAFA) method proposed by the Food and Agriculture Organization of the United Nations (FAO), aggregating together the distinct dimensions (environmental, economic, social and governance-related). The method described is the one applied at a European Project: Strength to Food, focusing on a specific case-study: the Parmigiano Reggiano cheese. The results and the suggestions derived from the observations made on this specific case-study.

Keywords: *Economic, Environmental, and Social Sustainability – Food Quality Schemes Products – Parmigiano Reggiano - Governance*

1. Introduction

Sustainability is a concept which has emerged in the international debate starting from the '80 with the report commonly known as Brundtland Report (WCED, 1987). Since then, this issue has become more and more important.
The Council of the Food and Agriculture Organization of the United Nations (FAO) provided an extensive definition for the sustainable development using the following formulation "*the management and conservation of the natural resource base, and the orientation of technological and institutional change in such a manner as to ensure the attainment and continued satisfaction of human needs for present and future generations. Such sustainable development (in the agriculture, forestry and fisheries sectors) conserves land, water, plant and animal genetic resources, is environmentally non-degrading, technically appropriate, economically viable and socially acceptable*" (FAO, 1989: 65).
In the following decades the concept has become more and more important and evidences could be found also in the prescriptive rules within the international treaties and conferences. For instance, focusing the attention on the European context, the EU regulation has introduced the idea of sustainability starting with the Maastricht Treaty and has reaffirmed it also in the last programming period. In fact, the sustainable-growth is one of the three priorities of Europe 2020. This choice is in line with the Sustainable Development Goals stated by the United Nation (UN), a global campaign launched in 2015.

In agricultural economics, the sustainable development is frequently associated with the Geographical Indications (GI) (FAO, 2009). A reason for this association lies in the essence itself of the GI. Indeed, the core feature that characterize a GI is the territory, understood in its environmental component from one side and, from the other, in its social component. In its legal definition a GI is the expression of a specific territory, since the raw materials and the processing

must occur in a defined geographical area. Of course the know-how and the (traditional) processing methods are as well fundamental to the final output of the product. For this reason, due to this conceptualization it is straightforward that the production should preserve both the environmental component and the social one, on the contrary the GI production itself will be threatened.

Several researchers and projects have addressed the sustainability by assessing the single value chain of a specific product or GI. To the best of our knowledge there are no many attempts to analyse the general impact of a GI at a territorial level. For this reason, the aim of the present work is to assess the sustainability at a broader framework ,that is, by considering the territory as a whole. The assumptions of the French scholars are used as a starting point. In order to define the territory, we adopted the theorization of the *Système Agroalimentaire Localisé* (SYAL), or Localised Agri-food Systems (LAFS) (Muchnik, 1996).
Another important feature to assess the sustainability of a value chain is strictly linked to the idea of quality. To investigate this last concept, we rely on the Convention Theory (Lancaster, 1971). Evidence of the role played by quality may be found at a European level in the Regulation of the Council No 1151/2012. In this regulation quality is also considered as an engine able to foster the rural development. Thanks to this acknowledgement, the significance of the principle of sustainability in a rural framework becomes detectable. A notable evidence of this understanding is stressed in the Rural Development Report 2016 edited by the International Fund for Agricultural Development (IFAD). The IFAD focuses the attention on an inclusive growth and on a sustainable development, both of them achievable through an inclusive rural transformation (IFAD, 2016: 12). In fact, the mere rural transformation may not represent a real sustainable pathway towards a growth process. It is necessary to force and promote an inclusive rural transformation.

The objective of this paper is assessing the sustainability at the territorial level by analysing a specific case study of a value chain: the one of the Parmigiano Reggiano (PR) cheese. We rely on an integrated method which is inspired with the Sustainability Assessment of Food and Agriculture Systems (SAFA) elaborated by the FAO and that has been adopted and adapted within the European Project Strength to Food (S2F).
In our research the insight of the key-role of the social dimension has been verified. The social sides and the governance model are the aspects that mostly influence the development of the rural territories where the production of PR is based. At the same time, these results demonstrate that an inclusive transformation is thereby reachable with undeniable advantages also from an economic and environmental perspective.
The new approach we used linked together the different theoretical frameworks that could be applied simultaneously with the aim of a broader observation of the impacts on a territory. This task is particularly important if we observe the GI's performances: sometimes they create real benefits to producers and consumers, sometimes "they have failed to become economically sustainable. Performance of GIs has been generally disappointing in the New Member States of Central and Eastern Europe (Gorton, Török and Tregear, 2014), where overall, rural economies are more dependent on agriculture and incomes are lower. Research on how GIs can be harnessed to positively affect rural development, particularly in disadvantaged rural areas, is thus vital" (Strength2Food Proposal: 5).

2. Literature Review

The most relevant GI's specificity is the one of encompassing and embedding together the value chain and the territory, conceived in the French understanding of *terroir*.

A system conceived in this way underlines the importance of the value chain, that must be careful in capturing the process' changes in order to harmonize them with the essence and peculiarities of the GI. At the same time, for the efficient functioning of the system, it is necessary a legal acknowledge of the chain, as stressed in the literature (Barjolle, Sylvander and Thevenod-Mottet, 2011). Indeed, a structured and organized supply chain is able to establish fair relations among its members and to protect their interests (Arfini et al., 2016).

The second key-feature embedded in a GI is the territorial factor. A first insight on the importance of the territory, conceived in a 360° view, is presented by the French scholars that introduced the concept of *terroir* (Bérard and Marchenay, 1995), in the positive meaning proposed by Capus (Capus, 1947). Some authors offer an extensive interpretation of the idea, adding to the mere physical features (microbiological, chemical) also the human ones (Barjolle, Boisseaux and Dufour, 1998). For instance the know-how, the tradition, the culture and the history of an area gain an influential weight.

Thanks to the significance conferred to the non-tangible aspects, it is convenient to approach the analysis by the SYAL-concept. Indeed, the SYAL theorization underlines how the social and institutional components provide the value added, thanks to the "interaction among food cultures, human actions and institutions" (Torres Salcido and Muchnik, 2012: 103). In fact, the SYAL summarizes the three peculiar features: the place, the social relationships and the institutional sphere. For this reason it is suitable to approach the analysis through this conceptual theorization.

Within this spatial and human framework, all the actors operate with the aim of reinforcing the mutual advantages. In order to perceive this aim, the most utilized tool is the quality. For instance, the quality could be understood as a social construction as conceptualized in the convention theory (Dupuy et al., 1989). Furthermore, it could be treated as one of the different features that characterize a product (Lancaster, 1971) and, related to the GI, the literature has focused on the investigation from a consumers' perspective (Grunert and Aachmann, 2016). Moreover, some Italian authors (Arfini, Belletti and Marescotti, 2013), list the quality features that characterize a GI. The first relevant factors are the local resources (physical and anthropic ones), the second group encompass the historical traditions and the last one include the collective dimension. In order to explore the latter component, that is to say the interaction among the actors, it is necessary to observe the relationships along the value chain and the management model.

Models and tools to assess the environmental, social and cultural dimensions have been implemented at different levels. An example are the SAFA tools. Nevertheless there is an objective difficulty in aggregating the data for an holistic analysis. Another difficult task is to assess and describe the effects at a local/regional/territorial level. For the GI this is a challenging task, since the presence of a Food Quality Scheme Product is relevant exactly at a territorial level. In fact, GI are considered to be engines that could promote sustainable development in rural areas. In different European Countries a large numbers of empirical studies have affirmed this relationship, as pointed out by Török (Török, 2018). Entirely the same principle is clearly stated in the European Regulation on quality schemes for agricultural products and foodstuffs[1]. Because

[1] Regulation (EU) No 1151/2012, Art. 4: "Operating quality schemes for producers which reward them for their efforts to produce a diverse range of quality products can benefit the rural economy. This is particularly the case in less favoured areas, in mountain

the impacts are relevant but, at the same time, very different in nature, the main objective of our research is to portrait all of them in a unique framework. Pursuing this target, the assessment and the following related policy indications could be more tailored and effective.
The scholars already identify several economic advantages when protecting a particular production with a label. Nevertheless, the analysis carried out, focus the attention on the GI protection from a legal point of view (Belletti et al., 2011).
Surprisingly if the need to find a connection among the different spheres has been concretized in several theoretical elaborations (mentioned above), there have not been many practical assessment's proposals yet. Consequently we try to structure a method that could be applied in concrete cases, aimed at a comprehensive assessment over a geographical area conceived in all its elements.

3. Methodology

Within the European Project S2F, 29 Food Quality Schemes (FQSs) case-studies from different European Countries and 2 from No-European Countries have been selected.
Quantitative indicators for assessing the economic, the social and the environmental topics have been developed, as listed in table 1.

Table 1

Sustainability pillar	Type	Sub-Type	Code
Economic	Price premium, Profitability, Value Distribution	Price premium	Ec1
Economic	Local multiplier effect (LM3)	Local multiplier effect (LM3)	Ec2
Environmental	Carbon footprint	Carbon footprint per unit of product	En1
Environmental	Foodmiles	Distance travelled per unit of product	En2
Environmental	Water footprint	Green water footprint (net consumption of water) Grey water footprint (water pollution) Blue water	En3
Social	Employment	Labour to production ratio	So1
Social	Governance	Bargaining power distribution	So2
Social	Social capital	Educational attainment	So3
Social	Social capital	Generational change Gender equality	So5

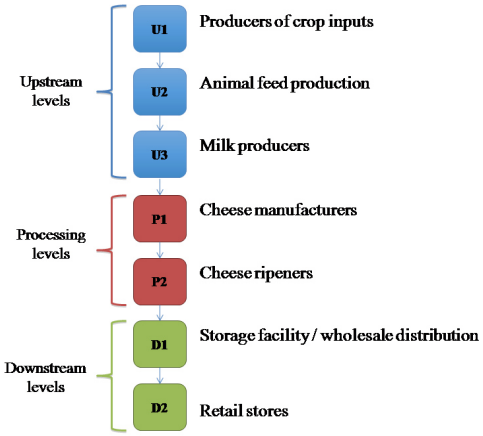
Source: Bellassen, V. et al. (2017)

The economic indicators aim at picturing the situation with regards to the price and profitability generated by a FQS product, besides the capability of such a product to improve the trade flows at a national and an European level (Ec1). Secondly, the multiplier effect over the producing and

areas and in the most remote regions, where the farming sector accounts for a significant part of the economy and production costs are high. In this way quality schemes are able to contribute to and complement rural development policy as well as market and income support policies of the common agricultural policy (CAP). In particular, they may contribute to areas in which the farming sector is of greater economic importance and, especially, to disadvantaged areas."

processing area is investigated with the aim of demonstrating the advantages for the local communities (Ec2).
The environmental indicators capture the impact on natural sources, for instance on air (En1, En2) and water (En3). At the same time they could offer further interpretation, such as consumers' habits: the food miles could reveal if "FQS products are preferentially consumed locally or on the contrary if they benefit from their reputation to be exported further than their standard references" (Bellassen et al., 2017: 53). What the impacts on air concerns (En1 and En2), the carbon emissions is calculated, regarding the impact on water the total amount of water consumption and the pollution at all stages is measured.
The social indicators offers the possibility to observe the impact on employment (So1), the repartition of bargaining power among supply chain actors (So2), the educational level of the people working in the supply chain (So3), and the sustainability according to the demographic and gendre structure (So5).
The way in which the method has been formulated is inspired to the FAO-approach SAFA. SAFA indicators enable the self-evaluation about sustainability with regard to 4 macro-dimension: governance, social, economy and environment. For each of these aspects twenty-one themes and fifty-eight themes have been identified, respectively. Similarly, in our project the elements listed above have been outlined in order to capture the four different sustainability pillars, with mandatory indicators (table 1) and additional complementary ones.
The indicators listed in this table have been measured at the different steps of the value chain, which has been described previously in three levels: upstream, processing and downstream. For each of this sectors, sub-levels are delineated. For example, in a cheese production the value chain has been conceived as set in the following figure.

Figure 1



Source: Bellassen, V. et al. (2017)

Evaluating the indicator for each stage, the analysis is deeper and the assessment more complete. Proceeding in this way every weak point could be exactly detected and identified, consequently solutions could be designed in a more precise way.

Beside the evaluation through the above mentioned indicators, a particular task of the project aims at assessing the impact of FQS to rural economies and territorial cohesion. In line with the philosophy of the project, the target is to evaluate the effects in a broader extension. That means considering the whole local area where the production of the GIs observed is based.

In particular, the first aspect to be assessed is the contribution of the FQS to local economies. Secondly the generation of territorial public goods (PG) has been observed. The PG are defined as follows: use of natural resources, landscape maintenance, animal welfare, cultural heritage preservation. The third aspect observed is the impact of GI on the non-farm rural economy, expressed as auxiliary services, such as farm tourism, cultural heritage and other agri-food and local territorial synergies. Fourthly we analyze the influence of different governance mechanisms in the valorisation of producers' know-how and local resource. Finally we focus on the social cohesion issue, in term of creation of social capital and social networks.
Since the dimensions to be analysed have a different nature (social, cultural, environmental and economic), we chose an apparatus with both quantitative and qualitative indicators. Thanks to the previous definition of indicators, for the economic, environmental and social pillars we could use some of the above itemized ones.
Regarding the PG, information about the historical background, the traditional know-how, the local bio-psychical structure of the natural elements (for instance the soil, the water, the air) and the animal welfare have been pointed out.
In order to explore the auxiliary services, the research has focused on the presence of different economic activities, complementary to the one related to the PGI product. The aim of picturing an economic diversification, has also identified the social involvement of different players within the territory. Among the different economic activities, a particular care has been put in outlining collateral services, such as the presence of support and administrative centres or research and development agencies, as well as dedicated laboratories which could play an important role in providing services to the main PGI-related activity.
Concerning the governance, the analysis' objective targets at describing the cooperation and the involvement of different players, both institutional and private. The researched data aimed at describing the presence or not of a Product's Organisation (PO) and, eventually, its structure; the composition of the producers' corporate; the effectiveness of institutional activities. The extracted information could directly be linked with the latter aspect: the social cohesion.
In fact the social cohesion framework could be interpreted as a result and a consequence of some particular governance schemes. The shareholding structure of the farms and the processing industries, the presence of PO and inter-branch organisations, such as certification authorities give a straight perception of the cooperation level of the different players within the area.
Different ways have been adopted in order to collect the above described information. The Local Multiplier 3-approach (LM3[2]) was used to assess the contribution of the FQS to local economies. The issues related to PG, auxiliary services, governance and social cohesion were examined through a mix of some of the indicators described in table 1 and other specific ones chosen in order to better capture the four dimensions. The following list enumerates these indictors. Concerning the dimension of PG the selected indicators are:

- Carbon foot print per unit of product and per hectare (En1)
- Green – Grey and Blue water (En3)
- Labour to production ratio (So1)
- Undesiderable turnover (So1)
- Educational attainment (So3)
- Generational change (So5)

[2] LM3 as developed by the New Economics Foundation.

Moving to the auxiliary services, they are investigated through:

- The degree of economic diversification in the local area
- The impact of the touristic activities on the local budget
- The ev. increase in the opening of agritourisms or farm restaurants
- The ev. increase in the opening of other touristic infrastructures
- The presence of any collateral services, related to the product, located in the area
- The presence of the manufacturing phases connected with the sale of the QS-product located in the area
- Other side activities that could have arisen in the area (e.g. handmade artisanal products)
- The presence of cultural/eno-gastronomic routes
- The number of farms/firms belonging the QS in the territory

For the governance aspects, the chosen indicator is:

- Bargain power distribution (So2)

Finally, regarding the social cohesion, the high lightened aspects are:

- Farms' and processing companies' distribution related to the different shareholding structure (family-owned company, cooperative, corporation)
- The presence of a Product's Organisation or a Consortium
- The chain's subjects representation in the management board of the QS
- The presence of any certification authorities
- The presence of any inter-professional organization

Additionally to the collection of data through these indicators, the method has focused on the documents' analysis. Specifically, the Code of Practice and other written sources, for instance web-sites and focus reports, are often plenty of data related to the object of the research.

Congruously with the information collected, the data have been interpreted adopting a multi-criteria analysis through the final elaboration of a radar chart, rather than a composite indicator. Thanks to this approach and the flexibility of this tool, the data could be compared both to an industrial counterpart of the same product-typology or to a benchmark, considered a 'best-practice' case.
Focusing the attention on our case-study, in the following table (table 2) the values calculated for each indicator are shown.

Table 2

	Tot Value for PR-Case Study	Value at Specific Level						
Indicator		U1	U2	U3	P1	P2	D1	D2
Ec1 - €/kg-1		0,49			9,32		19,9	
Ec2 (LM3)	2,68							
En1 - kg CO_2	26641	1515			25126			
En2								
En3 (Green) - m^3/kg	63,63	4,33						
En3 (Grey) - m^3/kg		0,51						
En3 (Blue) - m^3/kg		7,33			51,46			
So1 - Annual Work Unit/ton		0,003			0,025			
So2								
So3 - %				26	25	24,8		24,8
So5 - Generational change - %		33			79			
So5 - Gender Equality - %								

4. Results

Even if the results are partial and not fully completed yet, the following emergent themes were identified from the analysis of our case study: the strong connection between the PR and its territory, and the core role played by non-tangible features. Among the latter, for our case study the heaviest ones are related to the governance scheme and the strong social cohesion. Furthermore, the PR has been defined as "an emblematic case of endogenous development" (de Roest, 2000: 47), thanks to this two elements: the weight of the local resources, from one hand, and their synergic exploitation by the local communities and institutions from the other hand. This example may suggest a possible pathway with the aim of strengthening a rural development process.

In our case study the governance system and the strict co-operation between different institutional and no-institutional levels seem to reveal a social heritage coming from the historical background and an awareness based at the community level.

The remarkable robustness of the PR system is based on a common vision and on the sharing of the same goals by the different actors. This strengths is surely influenced by the presence, at the top of the governance-system, of a collective body: the PR *Consorzio* (CFPR). Its activities encompass a great variety of tasks. They could be summarized with a broad managerial role in terms of legal protection, quality control, and commercial promotion.

A strengths to be outlined is the degree of representation of all the subjects involved in the chain. In fact, as specified by art. 21 of the Association's Statue "Each category set forth in Article 2 item a) (matured cheese supply chain) […] shall have the right to be represented in the Consortium Bodies in a percentage proportional to the quantity of product put into the "Parmigiano Reggiano" PDO supply chain in the individual provinces and in the entire production area, should such quantity be sufficient to express at least one member (with rounding up)". According to this legislative provision the representation is subdivided as follows:

1. dairies shall be entitled to a minimum representation percentage of 66%;
2. farmers shall be entitled to a maximum representation percentage of 17%;
3. maturers and/or packers shall be entitled to a maximum representation percentage of 17%.

The dairies are members of the CFPR and the effectiveness of the role played by this body could be detectable in observing the identification process it has experienced. Indeed, as pointed out by de Roest (2000), the presence of this institution was central in facilitating a common view and pursue of the same objective by the different dairies, especially in the period in which they had deep opposite political positions[3]. A collective body has enabled the arise of a common collective work.

It is worth noting that besides the CFPR another "institutional" body fulfills the certification activities: the *Organismo Controllo Qualità Produzioni Regolamentate* (OCQPR). It deals, amongst other PDO/PGI products, with the certification of the PR. The OCQPR has a cooperative form as well.

As a result of the solid bridge that links the FQS product to the territory and the evidence that the PR chain rely on a solid shared basis involving different actors, it could be argued that a chain constructed like this is more sustainable than a counterpart without a quality label. The attention at the preservation of the heritage (natural and cultural), the involvement of different

[3] After the Second World War the political positions in the Emilia-Romagna Region were contrasting: from one side there were the one supporting the Communist views, from the other the one supporting the Christian-Democratic Party.

competences and skills, the presence of collateral services contribute to the improvement of the local economy, considered in all its sides.
These aspects are the value added that differentiate the level of sustainability of the PR production and the success of such a scheme is heavily influenced by the social and governance details.

5. Discussion and concluding remarks

In the contemporary world, sustainability in all its facets has emerged as a vital theme, also, or better said: especially, in the agricultural economics.
Sustainability has to be conceived in all the different dimensions (economic, social, environmental and cultural) and in a food-product these traits come into a manifest sight within the territory.
In fact, the territory incorporates in itself all the different aspects and could represent the value added if compared to other territories and production systems. The value added is a direct result coming from the solid interaction between the territory and the actors involved and it underlines the responsibility of the latter. In fact they are in charge of the reproducibility and the preservation of their heritage, both from a cultural perspective and from an environmental one.
Consistently in the observed case study of Parmigiano Reggiano, it has been detected that the positive performance is ascribable to the social cohesion and the governance model adopted.
An interesting investigation could be carried out comparing similar governance models in FQS chains, in order to explore similarities or differences, also in terms of performance, meant not only in an economic component, but also in the three other factors.
Hence, the low performance of some FQS could be improved through a management, derived from the best practice cases and the comparison carried out.
Of course acting on the social dimension is a process that needs time to be forged and strengthened and the innovation induced will affect the chains on the long run.
Nevertheless, acting on the social basis seems to the authors one of the best ways in order to start a real sustainable process, conceived at the broader sense. Furthermore, it could be also the engine for other social renovation and enhancement that could impact on the collective awareness through the challenges of the contemporary society.

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