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## AUTHOR'S NOTE

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## Introduction

- <sup>1</sup> Since the 1980s, the global economy has been experiencing a territorial turning point (Pecqueur, 2006). This movement gave birth to the discipline of territorial economics, which considers the differentiation of territories as an adaptation to globalisation and supposes a greater anchorage of economic activity compared to the conventional economic theory (Pecqueur, 2007). Space is therefore no longer seen as a passive receptacle for economic activities, but rather as a territory “socially constructed, culturally marked and institutionally regulated” (Lopez and Muchnick, 1997, p. 23).

Works on Marshallian districts were the precursors of this discipline and were then enriched by studies on Italian districts, *Milieux*, clusters and local production systems (Pecqueur, 2007). Territorial economics relies on the process of differentiation as a way to offer specific products thanks to the identification and exploitation of territorial resources (Colletis and Pecqueur, 2005). This process offers the potential for self-organisation because it depends on the capacity of local actors to cooperate and act collectively (Torre and Vollet, 2016). It is built over the long term and results in a collective learning dynamic in both know-how and innovation (Colletis *et al.*, 1999; Pecqueur, 2001).

- 2 In a context of globalization, rural mountain territories are undergoing significant transformations (Landel *et al.*, 2018). Some of these territories demonstrate an ability to redefine their development model by differentiating specific food products, as an alternative to production-oriented agriculture (Allaire and Sylvander, 1997). The specificity of a product mobilizes both material attributes linked to intrinsic quality and extrinsic attributes linked to geographical origin (e.g. culture, identity, landscapes) (Cañada and Muchnik, 2011). At the same time, this process results from a specific demand for these products. Mollard (2001) highlighted the existence of a territorial quality rent (TQR) which corresponds to a higher price compared to a generic product, generated by the specificity of the product. The TQR is no longer based on the usual ratio of supply and demand but on a higher willingness to pay from the consumers (Mollard, 2001; Pecqueur, 2001). This specificity is often certified by an official geographical indication, in particular by the protected designation of origin (PDO) (Ditter and Brouard, 2012; Sylvander, 1997).
- 3 This article aims at conducting a socio-historical analysis of the institutional context allowing the development of specific value chains whose product qualification relies on territorial anchorage. For that purpose, we will borrow from Ostrom's institutionalism which distinguishes formal institutions from informal institutions and considers a multi-level approach. Historical analysis is privileged here because Ostrom's approach is evolutionary, that is to say, it emphasizes the central role of institutions, their diversity and their changing character; and is therefore part of historical institutionalism (Chanteau and Labrousse, 2013). The analysis was carried out in the province of Trento, in the Italian Alps, from the beginning of the 19th century to the present day. This case study was chosen because cheese production is an important economic activity. In addition, it presents perennial institutions at different levels regarding the organisation of cheese production and valorisation.
- 4 The contribution is structured as follows: The following part presents the analytical framework, the case study and the methodology. The second part describes the historical analysis. Finally, the third part presents the conclusion.

## Analytical framework, case study and methodology

### Ostrom's institutionalist approach to study quality differentiation of food products linked to a territory

- 5 The institutional approach brings together a diverse set of schools of thought, which are interested in institutions and their impact on the coordination of economic actors (Ditter and Brouard, 2012). In this article, we suggest to borrow from Elinor Ostrom's

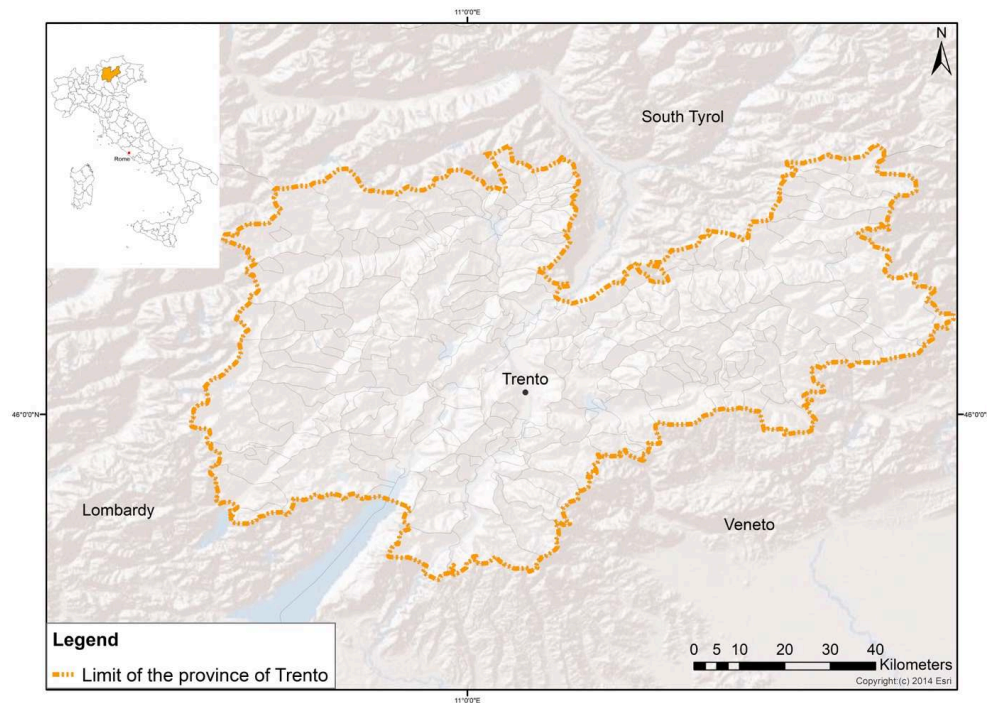
institutionalist approach. Ostrom conducted numerous studies on self-organised communities managing Common Pool Resources (CPRs) to identify the conditions that allow a sustainable management outside public intervention or privatisation (Ostrom, 1990). Ostrom rejects the conventional models of the rational individual. For her, the theory of bounded rationality, which corresponds to a norm-based human behaviour, is a better foundation for explaining collective action (Ostrom, 2007). The behavioural theory of human action indicates that “individuals pursue goals but do so subject to limited constraints of cognition and information processing, incomplete information, and the subtle influence of cultural predispositions and beliefs” (McGinnis, 2011, p. 170).

- 6 Ostrom gives a central place to institutions, defined as “shared understandings among those involved that refer to enforced prescriptions about what actions are required, prohibited, or permitted” (Ostrom, 2011, p. 17). They are considered as determining factors for ensuring long-term commitment and reducing opportunistic behaviours. Institutions can be considered in two forms: formal and informal. On this point, Ostrom’s approach is close to the New Institutional Economics’, especially to North’s institutionalism (1990). First, formal institutions are defined as a set of codified rules (e.g. constitutions, laws), including monitoring and sanctioning mechanisms (Ostrom, 2007). Second, informal institutions (i.e. social norms) are implicit and do not specify the sanctions in case of deviance. Individuals frequently internalise shared norms, in which non-conformity involves both internal and external social costs (e.g. guilt, censorship) (Crawford et Ostrom, 1995). For Ostrom (2007), trust, defined as one individual’s expectations of the behaviour of others, is an instrumental norm for successful collective action.
- 7 In addition, a multi-level approach of institutions allows to analyse the articulation between the micro scale and the macro scale and to understand the influence of the latter at the micro level. For Ostrom (1990), a number of institutions can be constituted by local actors in a self-organising process rather than being imposed by external authorities. Although the practical application of Ostrom’s approach remains focused on the micro scale, she asserts that governments are also important in potentially dealing with collective action problems (Ostrom, 2007). They can enhance the ability of local individuals to engage in effective institutional design, for example by facilitating access to information, by providing conflict resolution arenas or mechanisms to strengthen the sanctions and the monitoring provided locally. They should at least recognise the legitimacy of local actors to establish collective rules for self-organisation (Ostrom, 1990; 2000).

## Cheese production in the province of Trento

- 8 The Autonomous Province of Trento is located in the Alps of northern Italy (fig. 1). It covers an area of 6.200 km<sup>2</sup> and comprises 217 municipalities. Utilised agricultural area represents 1.400 km<sup>2</sup> and is predominantly characterised by meadows and pastures (81%), followed by orchards and vineyards (17%) and arable crops (2%) (ISTAT, 2010). Meadows for hay production, orchards and vineyards are located mainly in the valleys, whereas summer pastures are usually located above 1.500 m of altitude. According to the FBPT (2018), dairy cattle breeding is the main component of livestock sector in the province: of 1.400 farms, 800 are dairy farms.

Fig. : Localisation of the province of Trento



Source: C. Pachoud.

- 9 Dairy farming is strongly connected with dairy cooperatives, which produces typical cheeses (Concast, 2019). The 17 cooperatives are associated to the *Concast-Trentingrana*, the consortium of dairy cooperatives of the province, which ripens and sells the different cheeses that are not sold directly by the cooperatives (Dalpiaz, 2013). The main cheese produced is the *Trentingrana*, a raw milk cheese of pressed cooked paste, which represents approximately 50% of the milk produced (Merz, 2011). Besides drinking milk and yogurt, the remaining part of milk is processed into other traditional cheeses made in different valleys (fig. 2).
- 10 Sturaro *et al.* (2013) distinguished four production systems concerning the dairy sector in the province:
  - The first group is called “original traditional” and represents 50% of the dairy farms. The producers of this group use tie-stall, local breeds, move the lactating cows to summer pastures and use mainly hay and concentrates in winter.
  - The second group is also traditional. However, the producers do not move the lactating cows to summer pastures. They represent 25% of the dairy farms.
  - The third group is traditional using silage, which is not authorised for PDO cheese making. It represents 6% of the dairy farms. Half of them move the cows to summer pastures.
  - The intensive group represents 19% of the dairy farms. The producers use free stall, milking parlour and cosmopolitan breeds. Animal feed is rich in concentrates, imported from other areas. Two thirds of them use silage and many have adopted modern feeding techniques (i.e. unifeed). Most of the producers do not move the cows to summer pastures.

## Methodology

- 11 In the present article, both formal and informal institutions are analysed. Formal institutions, studied at both local and higher administrative levels (i.e. province, state and European levels), correspond to rules implemented to organise the production and the valorisation of the cheeses (e.g. public policies, legal frameworks, specifications, brands). Whereas informal institutions rely on the assessment of trust and are analysed at the local and provincial levels, i.e. among the actors involved in the production and valorisation and toward the provincial government. At the local level, we will focus on two kinds of trust, identified by Dupuy and Torre (2004). First, community trust binds individuals who share common characteristics (i.e. family, religious or ethnic). Second, organisational trust relies on commitments between individuals through repeated and face-to-face situations and/or internal rules.
- 12 Information was first collected through semi-structured interviews with key actors during a session of fieldwork carried out in summer 2019. The selected actors are part of the different organisations of the province involved in the value chain. Their consultation was instrumental to understand better the emergence, evolution and actual functioning of the organisations, as well as the activities conducted and the rules implemented for cheese production and valorisation. In addition, the interviews enabled to assess qualitatively trust between the different local actors, including the producers. Interviews were conducted with two technicians of the Edmund Mach Foundation (EMF)<sup>1</sup>, one inspection veterinarian, the director and ex-director of the Federation of Breeders of the Province of Trento (FBPT)<sup>2</sup>, the director and the laboratory responsible of the *Concast-Trentingrana* consortium, the director and the secretary of the *Primiero* cooperative and the director of one cooperative promoting tourism (A.P.T. San Martino di Castrozza) (table 1).

Table 1: Composition of the interviews conducted with key actors

Organisation	Interviewed persons	Content of the interview
Edmund Mach Foundation (EMF)	Two technicians (interviewed together)	History of the organisation (e.g. creation, evolution) Actual structure and staff Activities and projects conducted Relationships with the other local actors, including the producers (meeting frequency and subject, level of trust)

Federation of Breeders of the Province of Trento (FBPT)	The director and ex-director (interviewed separately)	<p>History of the organisation (e.g. creation, evolution)</p> <p>Actual structure and staff</p> <p>Member number</p> <p>Activities and projects conducted</p> <p>Specifications or other internal rules</p> <p>Relationships with the other local actors (meeting frequency and subject, level of trust)</p>
Inspection services	One veterinarian	<p>History (e.g. creation, evolution)</p> <p>Actual structure and staff</p> <p>Activities conducted</p> <p>Sanitary norms</p> <p>Relation with the producers (level of trust, frequency of meeting and subjects)</p>
Concast-Trentingrana consortium	The director and the laboratory responsible (interviewed separately)	<p>History (e.g. creation, evolution)</p> <p>Actual structure and staff</p> <p>Activities and projects conducted</p> <p>Frequency of meetings (i.e. general assembly)</p> <p>Technical aspects (production type and size, storage, marketing)</p> <p>Specifications and internal production rules</p> <p>Accounting sheet</p> <p>Characteristics of each cooperative (e.g. number of members, production type and size, predominant production systems)</p> <p>Relationships among the cooperatives and with the other actors involved (e.g. trust, conflicts)</p>

Primiero cooperative	The director and the secretary (interviewed separately)	History (e.g. creation, evolution) Actual structure and staff Member number Activities and projects conducted Accountable sheet Production characteristics (quantity, technical aspect, predominant production systems) Specification and internal rules of production Relationships among the producer members and with the other organisations involved (e.g. trust, conflicts)
Cooperative promoting tourism (A.P.T. San Martino di Castrozza)	The director	History (e.g. creation, evolution) Actual structure and staff Members number and who are they Activities and projects conducted Brands, labels Relationships with the actors involved in tourist projects (i.e. trust level)

Source: C. Pachoud.

- 13 Second, historical and scientific literatures about the province and the cheese production were consulted, as narrative, theses and articles (e.g. Bond, 2001; Dalpiaz, 2013; Sturaro *et al.*, 2013). Legal documents, as laws, regulations and specifications, were also examined in order to analyse formal institutions at local level and higher administrative levels along time (i.e. cooperative, provincial, state and European levels).
- 14 Third, to complete and deepen the literature review and the interviews, semi-structured historical interviews (farm biographies) were conducted with four families of producer members of the Primiero cooperative to get details about the history of their properties since the 19<sup>th</sup> century, the evolution of the production systems and the organisation of the cheese production from the 20<sup>th</sup> century until today (table 2). The Primiero cooperative was chosen because it is part of a wider investigation, integrating a social network analysis of advice among the members (45 producers) and an analysis of trust and conflict among members and between members and the other actors involved in the value chain (Pachoud *et al.*, 2020). On the one hand, the farm biographies will support the results obtained from the literature review and the previous interviews. In fact, production systems and rural ways of life were very similar in the province during the 19<sup>th</sup> and 20<sup>th</sup> century (Bond, 2001; Dalpiaz, 2013). While on the other hand, it will deepen the socio-historical dynamics on a micro scale in order to have a more detailed understanding. The four family members were chosen because



they are members of the cooperative since its creation and the father of the “family 4” was one of the founders.

Table 2: Characteristics of the four interviewed families for the farm biography

Farm	Member of the family present for the interview	Implication on the farm (%) (working time)	Age	Farm type	Family workforce (number of people working on the farm)	Number of lactating cows	Meadow area (ha)	Milk production (qt/year)	Member of the board of directors
1	Father	100%	56	Intensive	2	29	30	1717	President
2	Mother and father (interviewed together)	Mother: occasional help <sup>1</sup> Father: 100%	59 and 60	Original traditional	1 + occasional help	24	23	1433	No
3	Mother	100%	76	Original traditional	2	3	7	108	No
4	Father and son (interviewed separately)	Father: 50% Son: 100%	50 and 81	Original traditional	2,5	20	24	740	Son: adviser

Source: C. Pachoud

- 15 The institutional analysis allowed to distinguish three periods of time. The first one between 1800 and 1950 was analysed by mean of the historical literature review and the farm biographies. The second one between 1950 and 2000 and the third one between 2000 and today were analysed through literature (historical, scientific and legal documents), semi-structured interviews with the actors of the different organisations and the farm biographies.

## Results

- 16 The historical analysis of the cheese production in the province of Trento was divided into three periods of time that will be presented successively: i) from 1800 to 1950, a subsistence economy based on turn system dairies; ii) from 1950 to 2000, “modernisation” of the agriculture and creation of dairy cooperatives; iii) from 2000 until today, quality enforcement and intensification issues.

## 1800-1950: subsistence economy

### Political and economic context

- 17 The county of Tyrol, which was under Austrian sovereignty of the Habsburgs, annexed the province of Trento in 1816. The authority of the Prince-Bishopric, who were in power since the 11<sup>th</sup> century, thus ended. The Counts of Tyrol have tended to favour the development of peasant property, exempting them from feudal burdens (Giardina *et al.*, 1993). The government constituted district agricultural consortia that were headed by the provincial council of agriculture. The consortia had a role in advice and education to the farmers. It also created an agricultural school with an experimental station at San Michele all'Adige in 1874. The school was important for advising the farmers and the improvement of the quality of the dairy products (Piccinini, 1960). These institutional changes allowed increasing trust between peasants and the government (Bond, 2001). At the same time, there was a high community trust between the peasants because they have stayed in communities for generations (Casari, 2007).
- 18 The land ownership was affected by the particular mountain morphology. It is characterised by the dualistic presence of small fragmented properties and collective pastures and forests. Small fragmented properties, due to the heritage system, were located in the valleys and low mountain areas. They were intended for cultivation. While pastures and forests, managed collectively by the families and regulated by administrative laws, were found on higher altitudes. Collective management of alpine pastures and forests has favoured a previous culture of cooperation among the producers (Casari, 2007; Casari *et al.*, 2019). Production of cereals (wheat, rye, barley, maize and buckwheat), horticulture, sowing for textiles (hemp, linen) and milk products aimed at self-consumption. While crops intended for the market mainly concerned the cultivation of the mulberry for the silkworm, viticulture and fruit trees. However, due to the isolation and low productivity, it was more subsistence agriculture (Cafaro, 1998).

### Difficulties of the agricultural sector

- 19 Traditionally, the cows were moved to highland pastures during summer. In 1900, there were around 600 summer farms. One cheesemaker was present on each farm to process the milk (Battisti, 1904). This organisation is still the same today. However, during this period, there were significant structural deficiencies. There was a lack of care of the pastures and stables for cattle, as well as a lack of hygiene during milking and cheese making. Over the century, the council had launched a program with subsidies for the improvement of pastures, education in accounting and of the cheesemakers (Oliva, 1920).
- 20 The rest of the year on the valley bottoms, the fragmentation of the property and the reduced number of animals (average of 2,6 per farm) resulted in low milk productivity (Zaninelli, 1978). Moreover, the animals were often malnourished because of the limit of forage availability. The meadows were sacrificed in favour of other cultures. Last, little attention was given to the stables, which led to hygiene deficiencies during milking.
- 21 In addition, a series of natural events exacerbated the situation. First, health crises affected the local population, especially pellagra<sup>3</sup>. Then, epidemics impacted the

cultivation of the vine (powdery mildew<sup>4</sup>), the silkworm (pebrine<sup>5</sup>) but also the cultivation of potatoes and cattle. Finally, violent floods occurred in 1882 and 1885. Consequently, the peasants of the province emigrated to tens of thousands to other parts of Europe or to America, especially to Brazil (Dalpiaz, 2013).

### Organisation of the cheese production

- 22 During the 19<sup>th</sup> century, several dairies based on the turn system developed in winter for self-consumption (Leonardi, 1982). These dairies gathered a group of breeders who pooled their milk every day. A turn corresponds to a certain number of days, proportional to the farm production, during which a breeder gets the cheese production. A cheesemaker took over the processing. The producer of the turn gave his help to the cheesemaker and paid him, realised the maturation and paid the fees to cover general expenses of the dairy. If a part exceeded the self-consumption, it was intended for the local market. This system allowed to better overcome the small quantities of the own processing (Bond, 2001).
- 23 “Modernisation” was supported by the provincial council, which realised training courses for cheesemakers and increased quality control. Also, the council organised fairs and exhibitions to raise awareness of the problems (Gilberti, 1920). Furthermore, it supported organisational change of the dairies into cooperatives. However, this first required to increase production and reduce self-consumption. The fragmentation of the dairies and the low productivity of the farms were the main causes of the poor production of dairies. Moreover, the difficulties of transport and parochialism put the brakes on mergers between dairies (Gilberti, 1914). In 1901, there were about 300 social dairies based on this turn system (Battisti, 1904).

### Development of cooperatives

- 24 The origin of the cooperatives is rooted in the Catholic Church. In addition, the Austro-Hungarian government, with the law on economic consortiums of 1873, gave a great impetus to the birth and development of cooperatives (Bond, 2001). The first consumer cooperative, founded in 1890, ensured the supply of basic goods at lower prices and more efficient organisation for the sale of local products. Two years later, in 1892, the first rural fund was created to facilitate access to credit (Dalpiaz, 2013). In 1895, there were 50 cooperatives, of which 28 consumer cooperatives and 13 rural funds (Leonardi, 1982). The federation of the cooperation was founded in 1895 with the tasks of promotion, coordination, assistance and review of balance sheets. However, the first dairy cooperative was only created in 1909. Their number grew up slowly in comparison with rural funds and consumer cooperatives, as it required to overcome self-consumption. The provincial council of agriculture promoted the spread of dairy cooperatives with the clergy, requesting funding from the Diet of Innsbruck to provide assistance and subsidies (Piccinini, 1960).
- 25 In 1918, at the end of the First World War, the province was annexed by the Kingdom of Italy. Cooperatives were then part of a new legislative context. However, they continued to grow: there were 269 cooperatives in 1920. Nevertheless, the advent of fascism led to the abandonment of self-government and to strong centralisation. During that period, the federation of the cooperation was dissolved. Technical assistance was conducted by the technicians of the ambulatory chair of agriculture of

Trento and still by the School of San Michele all'Adige (Dalpiaz, 2013). An attempt was made to “modernise” agriculture, mainly by replacing local breeds (*Rendena*) with more productive breeds (*Simmental*). They also tried to develop new technologies for cheese making especially through the foundation in 1921 of a dairy school at San Michele all'Adige. Moreover, in 1929, the summer farm *Juribello* was founded, which aimed at creating a summer school for shepherds to improve the management of summer farms (APT, 2010). The fascist government tended to reduce the number of dairies and to reorganise them into cooperatives. However, in the beginning, there was a low convenience from the breeders to the adoption of more complex structures and turn system dairies based on base on a high community trust that still prevailed (Bond, 2001).

## 1950 – 2000: “modernisation” of agriculture and organisation of the production in cooperatives

### Grant of the province's autonomy and economic context

- 26 The autonomy of the province of Trento was granted in 1948. At that time, the autonomy concerned the sectors of agriculture, tourism, handicrafts, credit and the development and supervision of cooperatives. The federation of the cooperation was reconstituted and the autonomy gave it renewed impetus. Over the decades, the autonomy was gradually extended to almost all the competencies of a nation-state, with the exception of justice and foreign affairs.
- 27 The years following the Second World War were also marked by a great economic transformation in the province. From a local economy concentrated on agriculture, the industrial and tertiary sectors became important. This led to the exit of the agricultural sector from a large number of people. 40% of the population was occupied in agriculture in 1951; this proportion fell to 14% in 1971. This phenomenon increased the depopulation in the upper mountain areas and the abandonment of breeding activity, especially by young people (Bond, 2001).

### “Modernisation” of the livestock sector

- 28 Since the 1960s, we observed an important “modernisation” of the livestock sector. The number of breeders and dairy cattle were constantly decreasing while production remained relatively stable between 1950 and 2010 and then increased in the last years (table 3). This has been due to an increased specialisation of breeders, mechanisation (i.e. milking parlour, tractors) and genetics (improvement of local breeds and arrival of highly productive breeds such as *Holstein*). Genetic selection enabled a noteworthy increase in productivity; for example, the productivity doubled between 1961 and 1994, passing from 2.269 to 4.503 kg/cow/year (Bond, 2001). In 1957, producers created the FBPT to manage the herd book of the different breeds (Dalpiaz, 2013).

Table 3: Evolution of milk production, evolution of dairy, member and cow number, and milk productivity between 1951 and 2018

	1951	1961	1971	1981	1994	2000	2010	2018

<b>Total milk production (T)</b>	122.000	118.000	105.000	110.000	117.519	114.300	118.000	151.955
<b>Conferred milk to dairies (T)</b>	65.000	62.000	61.000	65.000	93.768	102.870	106.200	119.762
<b>Dairy cooperatives</b>	55	98	81	51	30	22	18	17
<b>Turn system dairies</b>	200	120	44	16	1	1	1	1
<b>Member number</b>	15.000	9.500	5.700	4.900	2.900	1.515	791	729
<b>Cow number</b>	60.000	52.000	37.200	35.000	26.100	25.500	25.040	24.500
<b>Productivity (kg milk/cow/year)</b>	2.033	2.269	2.823	3.143	4.503	4.482	4.713	6.202

Source: APT, 2010; FBPT, 2018; Concast, 2019

- 29 Furthermore, there was an improvement in milk quality through better management of meadows and pastures, which also increased cow productivity. Stables were improved as well as milking practices. In the province, such progress was supported by provincial technical assistance and research (e.g. San Michele all'Adige, University of Trento and Padua) (Dalpiaz, 2013).
- 30 “Modernisation” allowed the passage from subsistence and fragmented farms to an activity specialised in larger units and intended for the market. This led to the closure of small farms. This process favoured the widespread diffusion of dairy cooperatives. The province gave economic support to dairies to incentive the conversion toward cooperatives. Cooperatives allowed then to aggregate transformation and marketing functions. In addition, its dimension allows the processing of a higher quantity of milk and professional cheesemakers enabled technical improvement in processing and maturation. Last, their dimension gave a higher bargaining power; it became then easier to find markets and to sell at higher prices (Bond, 2001). From the 1960s until today, there have been numerous merger operations in order to improve rationality (Dalpiaz, 2013). The development of dairy cooperatives allowed the emergence and strengthening of organisational trust among producers who came from different communities. Moreover, the role of support of the province and proximity with the local populations strengthened their trust relationships.

### Organisation of cheese production in cooperatives

- 31 In order to coordinate and strengthen the dairy sector, a second-level cooperative, called Consortium of social dairies and milk producers of the province of Trento (Concast), was created in 1951 at Trento. It has a role in technical assistance to cheesemakers and dairies. The first major initiative was the acquisition of a laboratory for milk analysis in 1970. From 1972, the payment according to the milk quality was introduced, with monthly withdrawals on each farm to determine the analytical parameters. Controls on compliance with health and hygiene regulations for milk and cheese production was carried out by the provincial veterinary services (Dalpiaz, 2013).

- 32 After the Second World War, the production of *Trentingrana* developed in the entire province. Production was no longer seasonal whereas all year round. In 1965, the *Trentingrana* joined the consortium of the *Grana Padano* cheese. However, due to the different production conditions (silage-free feeds, mountain areas, etc.), the consortium *Trentingrana* was created in 1973 at Segno with the aim of managing independently the production and promotion (e.g. exhibitions, competitions, advertisements). In 1987, the Italian government approved the PDO certification. In 1988, the conferment of all the *Trentingrana* produced in cooperatives to the consortium became mandatory, excluding the ones sold directly in the dairies. The total conferment of the other traditional cheeses to the consortium was established only in 2004.
- 33 In 1993, in order to have a harmonised management, the two consortia merged under the unique consortium *Concast-Trentingrana*. The actions carried out are technical assistance to dairies and cheesemakers; development of consortium regulations and control of their application in dairies and farms; milk and cheese analyses in the laboratory and payment according to their quality. It also realises the maturation and commercialisation of cheese under the branch *gruppo formaggi del Trentino*. The consortium also produces and sells butter since 1992 and milk powder since 1993. Promotion is carried out by the consortium, as well as research projects in collaboration with universities (Dalpiaz, 2013). Last, in 1990 and then in 2001 the consortium developed specifications for the production of milk containing all aspects relating to the production of milk and the feeding of cows (e.g. feeding without silage and GMOs).

## From the 2000s: how to conciliate quality valorisation and production intensification

### Organisation of the cheese production today

- 34 In the province of Trento, there are 17 dairies associated to the *Concast-Trentingrana* consortium. Approximately 80% of total milk production (120.000 tons a year) is processed by these cooperatives, which regroup 729 milk producers (91% of the total number of milk producers). The cooperatives associated with the consortium give a better revenue to the producers compared to the average national revenue: the price of one-litter milk was around €0,58 in 2018, compared to €0,37 in Lombardy (national reference) (Concast, 2019).
- 35 In addition, the FBPT, the veterinary inspection services and the EMF are important actors who committed to cheese valorisation at the provincial level. They often work together to implement projects to improve cheese quality (e.g. improvement of meadows and pastures, and sanitary quality of milk). Also, the federation of the cooperation still plays an important role as representation, assistance, protection and review of the balance sheets of the cooperatives of the province. These actors enjoy a high level of trust from the producers (Pachoud *et al.*, 2020).

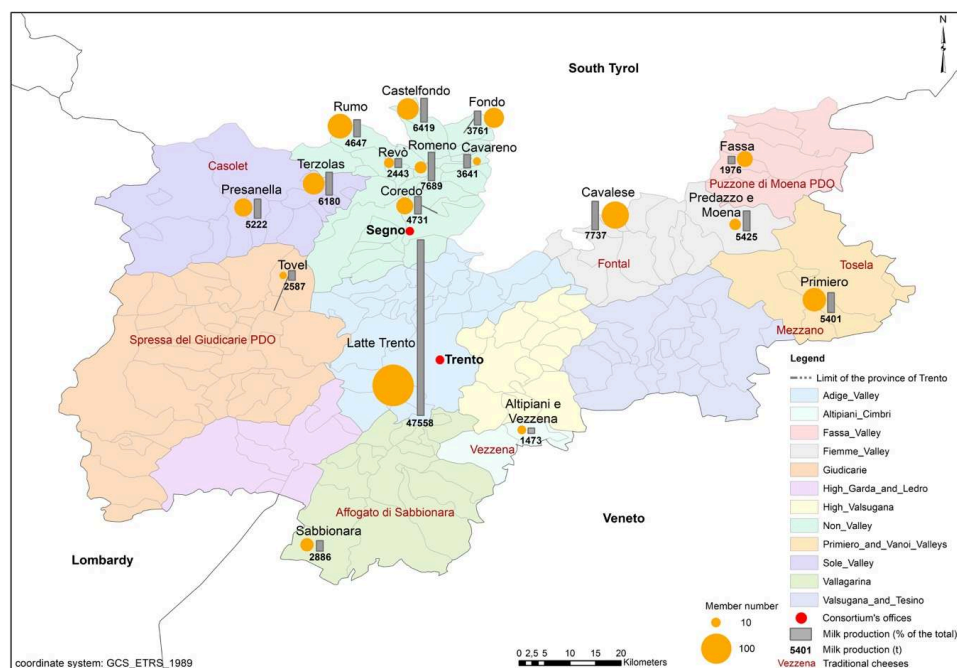
### Intensification of the milk production

- 36 During the last decades, there was a decline in traditional extensive livestock systems. In general, there was an abandonment of mountain pastures, especially the steepest

mountain areas. Between 2000 and 2018, there was a reduction of 4,5% in meadows and pastures (ISTAT, 2018). Intensification took place in the valleys, which are more disposed to mechanisation, where meadows are used intensively (several cuts per season) or transformed into annual or permanent croplands. There has been an expansion of intensive permanent crops (vineyards and fruit trees). Vineyards, for example, increased by 11,8% between 2000 and 2018 (ISTAT, 2018). In parallel, between 2000 and 2018, dairy farms decreased from 1.800 to 800 and the average herd size increased from 13,2 to 30,6 cows per farm (FBPT, 2018; ISTAT, 2018).

- 37 Milk production and the number of members per cooperative differ widely from one cooperative to another (fig. 2). *Latte Trento* became the largest cooperative (40% of the milk produced) after performing many mergers (Dalpiaz, 2013). This cooperative produces mainly pasteurized drinking milk, but also butter, yogurt and cheese. It commercialises all their products under its own brand *Latte Trento*, except for the *Trentingrana*, which is conferred in totality to the consortium. Moreover, in some valleys, the farms became more intensive. They use technical innovations (e.g. unifeed, free stalls), cosmopolitan breeds and abandoned mostly the use of summer pastures. Higher productivity is observed in the cooperative of Cavareno and Romeno (*Non Valley*), *Latte Trento* (*Valsugana*), Tovel (*Guidicarie Valley*) and Predazzo and Moena (*Fiemme Valley*). The level of production among members of the same cooperative can also differ substantially. For example, within the cooperative of Primiero, the largest producer produces 300 T/year of milk, whereas the smallest one produces 11 T/year. Although it was shown that trust among members is high, the intensification phenomenon led to increasing conflicts among “traditional” and “intensive” producers (Pachoud *et al.*, 2020).

Fig. 2: Localisation of the dairy cooperatives in the province of Trento and share of milk conferred to the consortium and member number per cooperative in 2018



Source: C. Pachoud



- 38 Today, there are 305 summer farms. Only half of them are intended for lactating cows and host about 11.500 cows (47% of the total). The other half of the summer farms graze with late lactating cows or heifers (FBPT, 2018).

### Valorisation of the cheese quality

- 39 In 2018, milk produced on the mountain pastures was around 9.000 tons (6% of total milk production). 90 summer farms directly processed 2.000 tons of milk into cheese. The remaining 7.000 tons were brought to the dairies in the valleys to make cheese marketed by the consortium under the brand *Sapori di Malga*, created in 2008. For the Trentingrana PDO, this represents only 0.5% of cheese production in 2018. For the other traditional cheeses, this represents around 4% of their total production. According to the consortium, the share of cheese marketed under this brand should increase in the coming years.
- 40 In addition to the brands developed by the consortium, other tools were recently used to valorise the quality of the cheese. First, the PDO framework (n°2081/92) of the European Union legislation is an instrumental regulation to protect the cheese, though a label that links the quality of the products to its origin. The *Trentingrana*, *Spressa delle Giudicarie* and *Puzzone di Moena* obtained the PDO certification, respectively in 1987, 2002 and 2014. Second, the Slow Food Presidium, delivered by the Slow Food foundation created in 2003, aims at sustaining quality production at risk of extinction, recovering traditional processing methods and safeguarding local breeds. The *Trentingrana*, *Puzzone di Moena*, *Casòlet* and *Vezzena* received the presidium. Also, the brand *qualità Trentino*, created in 2009 and managed by the province, is an indication of origin, which aims at communicating and identifying the quality of the food products made in the province.
- 41 In the last two decades in the province, gastronomic tourism for the discovery of local products, mainly cheese, greatly increased. In 2017, 671 farms of the province practiced agritourist activities, it means an increase of 14% compared to 2016 (ISTAT, 2018). On alpine pastures, around 30 summer farms practice agritourist activities (i.e. accommodation, restoration and degustation). The province developed the brand *Agritur Trentino* that is a tourism offer of rural structures to taste local products and to assist or participate in their fabrication. Moreover, 14 tourism entities spread in the different municipalities, coordinate, organise and promote events for tourists. They work in collaboration with cooperatives or nature parks (e.g. Park *Paneveggio Pale di San Martino*). Many events are related to the discovery of local dairy products. For example, *Latte in Festa* allows tasting diverse dairy products made on summer farms. *Albe in malga* gives tourists the opportunity to go on summer farms to participate in the morning milking.
- 42 To summarise, fig. 3 presents the formal institutions devised at the different administrative levels (i.e. provincial, national and European) and the formal and informal (i.e. trust) institutions at the local level for the three defined periods. This figure shows that institutions aiming at the organisation of cheese production and valorisation in the province of Trento developed and strengthened between the different levels over time. The development of formal institutions was facilitated by increasing organisational trust among the local actors, especially among the producers, and trust toward the provincial government, which has given crucial support to localised collective action.



Fig. 3: Institutions devised at the administrative levels and local level for cheese production and valorisation in the province of Trento for the three defined periods

	1800-1950: Subsistence economy	1950-2000: "modernization" of agriculture and cooperative organisation	From the 2000s: quality enforcement and intensification
<b>Formal institutions</b>	<b>Administrative levels</b> Agricultural and rural development policies (e.g. subsidies) Peasant property facilitation Collective management of alpine pastures  <b>Local level</b> Turn system dairies	<b>Administrative levels</b> Agricultural and rural development policies (e.g. subsidies) Province autonomy PDO framework Hygiene policy Provincial Nature Park Collective management of alpine pastures  <b>Local level</b> Dairy cooperatives and consortium Payment to milk quality Total conferment of milk and cheese Milk production specification ( <i>gruppo formaggi del Trentino</i> ) Herd book specification	<b>Administrative levels</b> Agricultural and rural development policies (e.g. subsidies) Province autonomy PDO framework Hygiene policy Provincial Nature Park Slow food presidia Production specification ( <i>Qualità Trentino</i> ) Tourism development policy (e.g. <i>Agritur Trentino</i> ) Collective management of alpine pastures  <b>Local level</b> Dairy cooperatives and consortium Payment to milk quality Total conferment of milk and cheese Milk production specification ( <i>gruppo formaggi del Trentino</i> ) Herd book specification Milk quotas Valorisation policy (e.g. <i>Sapori di Malga</i> , tourist events)
<b>Community trust</b>	++	+	+
<b>Organisational trust</b>	-	+	++
<b>Trust toward the provincial government</b>	+	++	++

Source: C. Pachoud

## Conclusion

- 43 In the province of Trento, during the 19<sup>th</sup> century, most of the agricultural production units were of very small dimensions. The limited production was used to cover the family's needs. In this context, the establishment of dairy cooperatives did not happen, as it requires the development of the market. Thus, the dairies based on a turn system of small dimension and operating eight months a year remained the prevalent structure until the middle of the 20<sup>th</sup> century. "Modernisation", from the 1960s, allowed the progressive passage of an activity oriented toward family self-consumption to industrial processing in cooperatives intended for the market. The cooperative organisation gradually expanded from processing to ripening and from local to national and international marketing of cheese, passing through quality valorisation. At the same time, there is an increasing interest from the consumers toward quality products linked to their origin.
- 44 Collective action for cheese production and valorisation was enabled by the implementation of multi-level institutions over time. First, at the local level (cooperatives and consortium), the implementation of institutional arrangements by the producers themselves demonstrated their high capacity of self-organisation. Many operational rules were defined to improve organisation and valorisation of the products (e.g. total conferment of the milk and cheese, specifications for milk production, payment to quality). These rules do not only explicit ways of doing, but also provide monitoring systems and sanctions in case of noncompliance. Along time, trust among producers consolidated and expended, passing from community to organisational trust, which appears crucial for the success of collective action and the development of cooperatives. Moreover, collective management of alpine pastures gave the foundation of a previous culture of cooperation. Second, at higher levels, governments since the Austrian empire gave an instrumental support to agriculture

modernisation and cooperatives through the implementation of laws, and financial and technical support. They also facilitated the process of cheese valorisation (e.g. labels). In this respect, the provincial autonomy granted in 1948 played a central role. The government has enjoyed a high level of trust from the local actors. In comparison, similar research conducted on the Serrano cheese in southern Brazil showed that a lack of policies to regulate cheese production, a top-down model from the extension agents to the producers to implement cheese valorisation projects, as well as a lack of trust among producers and toward governments lead to collective action failures (Pachoud *et al.*, 2019).

- 45 However, we observe an acceleration of production intensification in the province, and therefore a loss in the link between product, identity and territory. Moreover, the end of milk quotas at the European level in 2015 exacerbated this tendency. Today, producers depend more on imported feed and cosmopolitan breeds and many have abandoned the use of summer pastures. This can be seen as antithetical with the strategies implemented for the quality valorisation. As a result, farm productivity increased dramatically in the last decades. Nonetheless, intensification does not happen everywhere: there are different production levels between producers of different valleys but also among members of the same cooperative. This led to increasing conflicts between “traditional” and “intensive” producers (Pachoud *et al.*, 2020). Thus, the implementation of institutional arrangements at the consortium and cooperative levels appear instrumental to limit the conflicts, control the intensification and strengthen the cheese quality, and therefore its market value. In this sense, the cooperative of Primiero decided in 2018 to implement their own milk quotas to control production and introduced monitoring and sanctioning systems.
- 46 In sum, the transformation of the province of Trento from a marginal and poor territory into one of the richest in Europe depended greatly on institutional complementarity between the local level and higher administrative levels. This process requires therefore long-term commitment at the different scales, trust among the different actors and a creative force from the local actors to implement innovative arrangements in order to adapt to constant changes.

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## NOTES

1. The EMF, founded in 1874, is a public entity, which has a central role in advising the producers, in training and research in agriculture and agrifood.
2. The FBPT is a cooperative of 800 breeder members. It intervenes on two levels: technical for the genetic improvement of dairy cattle, which includes milk controls and semen selection for artificial inseminations, and commercialisation of beef from male calves and culled cows.
3. Pellagra is a disease caused by a deficiency of vitamin B3.
4. Powdery mildew is a series of fungal diseases that affect crop plants.
5. Pebrine is a silkworm disease caused by a fungus.

## ABSTRACTS

Collective action for quality differentiation of food products linked to a territory is a long-term process. It is often hindered by a lack of understanding of multilevel institutional dynamics. This article aims at conducting a socio-historical analysis of the institutional context allowing the development of a specific cheese value-chain in the province of Trento (Italian Alps). Using Ostrom's institutionalist approach, we conducted a historical analysis of the formal and informal multilevel institutions. Our results showed that a subsistence economy prevailed between 1800 and 1950, which implied little commitment from the producers to build up collective organisations, despite government and church incentives. When the “modernisation” of agriculture started around 1950, it meant that the production could be intended for the market, which enabled the development of producers' cooperatives. The province became autonomous in 1948 and supported those local dynamics. Since then, we have observed an increasing level of trust among the different local actors and towards the provincial government. Since 2000, the valorisation of cheese specificity has become a central strategy to face competition at different levels. However, at the same time the production has undergone intensification. This leads to a loss of the link between product and territory. The future challenge is therefore to implement innovative institutional arrangements that allow a sustainable differentiation of cheese.

## INDEX

**Keywords:** Collective Action; Institutions; Specific Product; Mountain cheese; Province of Trento

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