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NEO-ENDOGENOUS RURAL DEVELOPMENT IN FAVOR OF ORGANIC FARMING: TWO CASE STUDIES FROM ITALIAN FRAGILE AREAS

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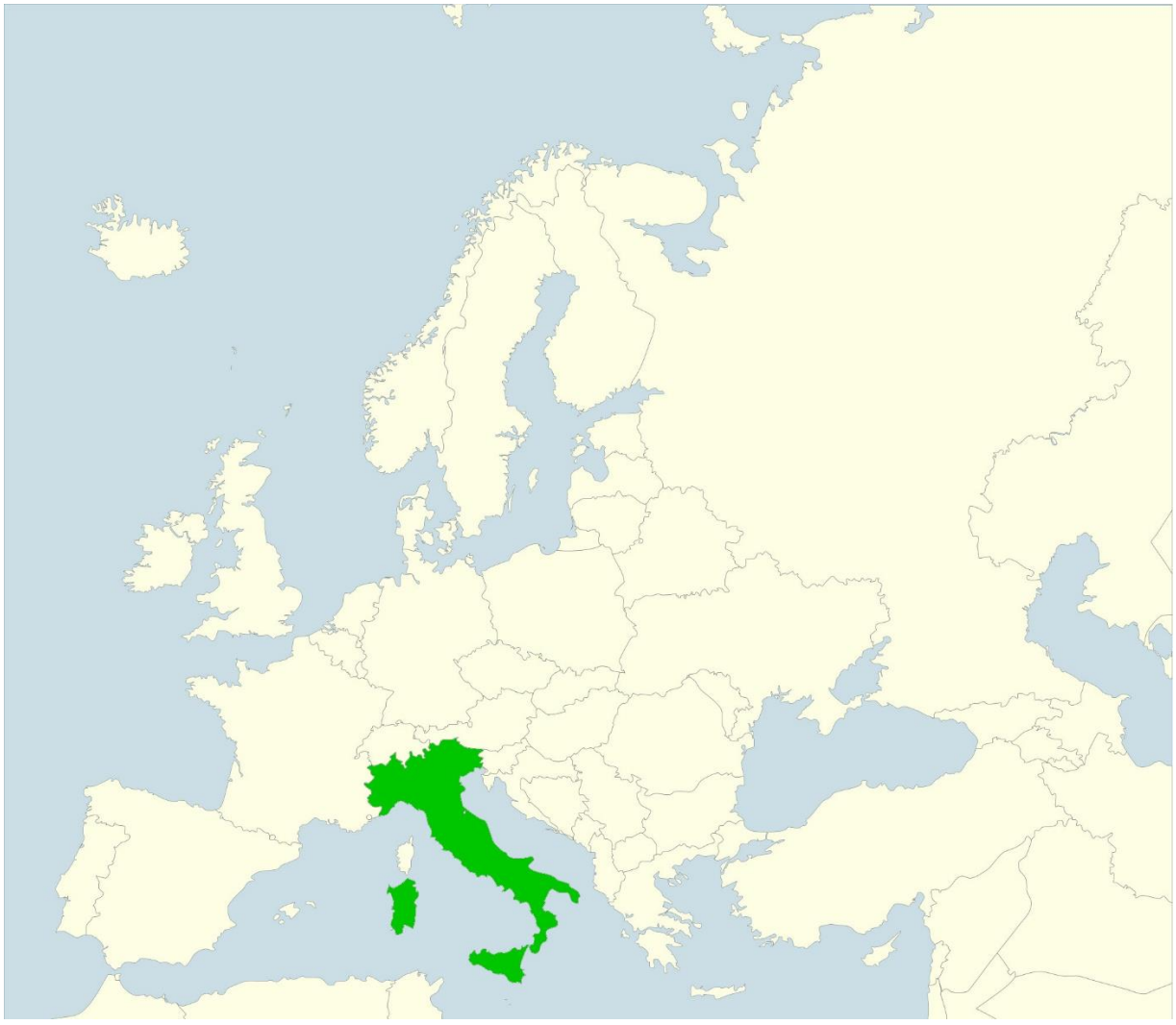

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Abstract: This paper analyses two case studies ascribable to neo-endogenous paradigm for rural development experimented by two small municipalities in Northern (Varese Ligure) and Central-southern (Castel del Giudice) Italian Apennines. By means of different approaches, the two towns have been able to provide local development through organic farming that in turn have boosted economic diversification or new forms of territorial aggregation. They have drawn the attention to the neighbouring communities and have stimulated emulation processes. Through a multivariate analysis this study therefore gets to a distinct partition of the two regional territories (NUTS2), where the cases belong, identifying the municipalities that show greater affinity to the cases in question, in order to offer to policy makers useful elements either for encouraging the replication of best practices or including them in future planning strategies. However, while the cluster that includes Varese Ligure (in Northern Italy) appears more clearly influenced by environmental values and a certain demographic resilience, the one to which Castel del Giudice belongs (in the Center-South) is more influenced by the aging of the population and by a greater structural dependency. Both clusters, however, could find a common way of development centred on the economic potential offered by organic farming due to the affinity shown by the proposed case studies.

Keywords: Neo-endogenous rural development, Organic farming, Inner areas, Empowerment, Rural development policies

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Abstract: Il paper propone due casi studio riconducibili al paradigma dello sviluppo rurale neo-endogeno, sperimentati da due piccoli comuni appenninici del nord (Varese Ligure) e del centro-sud dell'Italia (Castel del Giudice). Pur partendo da approcci differenti le due comunità pongono entrambe al centro del proprio processo di sviluppo l'agricoltura biologica, plasmando su di essa le altre iniziative di diversificazione delle economie locali, sollecitando al contempo l'attenzione e la spinta all'emulazione delle comunità vicine. Attraverso l'analisi multivariata lo studio perviene pertanto ad una distinta partizione del territorio regionale (NUTS2) cui i casi appartengono, individuando i comuni che mostrano maggiore affinità ai casi in oggetto, al fine di offrire ai policy maker locali e regionali elementi utili per stimolare la replicazione di alcune pratiche esperite dagli stessi. Tuttavia, mentre il cluster cui appartiene Varese Ligure (al Nord) è più chiaramente influenzato dai valori ambientali e da una certa resilienza demografica, quello cui appartiene Castel del Giudice (al Centro-Sud) è maggiormente influenzato dall'invecchiamento della popolazione e da una maggiore dipendenza strutturale. Entrambi tuttavia, per l'affinità dimostrata ai casi analizzati, potrebbero trovare una comune via di sviluppo centrata sul potenziale economico offerto dall'agricoltura biologica.

Keywords: Sviluppo rurale neo-endogeno, Agricoltura biologica, Aree interne, Empowerment, Politiche di sviluppo rurale

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1. Introduction

The significant growth in consumption of organic food recorded in recent years, as well as the widespread consumers' distrust in industrial food safety, have stimulated the organization of different types of short *face-to-face* supply chains (Renting et al., 2003; Brunori et al., 2011; Viganò et al., 2012) seen as a viable way to get to a closer knowledge of the producers and/or of the productive context. Such a set of favorable market conditions have prompted peripheral or marginal rural territories to rely on organic supply chains for the structuring of a holistic approach to sustainable development not only in agriculture, but in a wider perspective (Schermer et al., 2015), with the final aim of stopping or, at least, downsizing their demographic decline. Moreover, they are experimenting new forms of participatory governance, often

facilitated by the support of private and exogenous actors (Belliggiano et al., 2017; Sturla et al., 2018).

In fact, according to the critical review of locally-based development processes, brought along by the neo-endogenous approach, whenever endogenous resources have been proven unsuitable and / or insufficient for the reaching of the development goals (or even for the mere subsistence) of a community, opportunities offered by the integration between exogenous and endogenous resources should be explored (Ray 2001; Lowe, 2006, Shucksmith, 2010; Bosworth, Atterton, 2012; Bosworth et al., 2016).

This integration of resources obviously requires a clarity of vision from local governments (Bock, 2016), that are supposed to intercept them without affecting locally shared values and/or distorting the underlaid development trajectories, as these represent the identity profile and the implicit strategy shared by the involved communities (De Rubertis et al., 2018).

The development of long-term cooperative practices among endogenous and exogenous actors (Bosworth et al., 2016; Ray, 2001) provides the re-activation of the depressed or more refractory internal resources that, otherwise, would be inexorably doomed to extinction. This might be particularly effective in the most fragile territories[5] by yielding the chance of managing new scale interactions both at local and supra-local level (Labianca et al. 2016).

The involvement of external actors and resources makes it possible for the comparison of local development phenomena linked to organic farming in two different Italian geographical areas, whose economy strongly depends on it (Belliggiano et al., 2017; Carrosio and Natali, 2014) with the paradigm of the neo-endogenous rural development (De Rubertis et al. 2018, Sturla et al., 2019). Such a paradigm acknowledges the limits of the endogenous development in the poorest and most depopulated areas, while pledging for the activation and/or continuation of local development processes by enhancing the collective awareness of the potential of the internal resources as enablers of comprehensive approaches to local sustainability. (Lowe, 2006; Bosworth et al., 2016; Gkartzios and Lowe, 2019). At the same time, it allows the intervention of external actors (Ray, 2001), who are available to integrate specific local conditions (Jack and Anderson, 2002).

The two case studies proposed in this paper, Varese Ligure (Liguria) and Castel del Giudice (Molise), represent – more or less consciously and with different motivations and/or modalities – two examples of neo-endogenous rural development in which organic farming and its supply chains have both played a pivotal role in local processes. The two municipalities have been chosen on the basis of a common approach to local development, that, besides relevant local specificities, it has been tackled from multiple fronts, according to the definition of development as a holistic process toward greater sustainability in environmental, social, and economic terms (Pike, 2006). Varese Ligure, however, devoted most of its endeavors to the improvement of the environmental sustainability of economic and non-economic activities, while Castel del Giudice focused on the recovery of abandoned buildings for the provision of social and sustainable tourist services (Belliggiano and De Rubertis, 2016).

By investigating these two municipalities, it is possible to verify whether their results have been mirrored at a territorial level, thus assigning further functions to new institutional arrangements such as organic districts.

Organic districts are a peculiarity of the Italian rural territory. They are all based on the idea that farms and agri-food SMEs belonging to the same process and supply chains constitute a ‘district’, whose organization traces back to the definition “industrial district” (Cellura et al., 2012). They are essentially an agreement among social, economic and institutional subjects in

[5] More precisely, both Castel del Giudice and Varese Ligure has been classified as “inner areas” by the italian National Strategy for Inner Areas (SNAI). As such, they face elements of “fragility”: declining population, under-representation of young people within the population, lack of economic opportunities, below average income levels, problems with transport and other issues reflecting their geographic location” (Public Investment Evaluation Unit – UVAL, 2014). Actually, the contraction of the population due to the lack of job opportunities triggers a vicious circle, that leads to the reduction of land maintenance activities and essential services (transport, health, schools) which, in turn, negatively affects demographic trends.

bordering municipalities in territories where the significant presence of organic agriculture and related supply chains is the basis for the holistic development of the area (INNER., 2017). They involve local administrators, farmers, and whoever willing to contribute (associations, tour and other social and economic operators, citizens), to shape local development according to the principles of organic farming (Schermer, 2004). Ever since the establishment of the first Italian organic district, in Cilento in year 2009, their number has grown fast; in 2019, INNER, the association that gathers some of them, has counted 40 of them; 32 already constituted and 8 still in setting up (INNER, 2019).

The experience of the first case study, Varese Ligure, seems to describe the organic district as a natural evolution of rural territories characterized by the presence of organic supply chains. Locally, it has evolved in order to give continuity to local neo-endogenous dynamics. Born under the guidance of the local administration, the leadership of the "Organic district of the Vara Valley" has rapidly shifted into private hands (the local section of Italian association of organic farming – AIAB), once Varese Ligure administrators withdrew their role of designated leaders.

The second case study concerns good practices of neo-endogenous rural development experimented by Castel del Giudice, a small community of South-central Italy. These have been the pivot (as well as the model) for the self-organization of the area and supported the imitative impulses of the neighboring municipalities, thus consolidating a process that has been able to boost socio-economic performances in nearby towns (Belliggiano et al., 2018).

The analysis has been focused on municipalities belonging to the same region, without extension to neighboring territories, since the strict regional relevance of rural development policies in Italy could cause actuation differences that easily make territories incomparable (in terms of eligibility to LAG area, rules for the access to payments, local impacts, etc.). As a consequence, this paper aims at bringing to light the elements for successful neo-endogenous processes, then at verifying whether this kind of approach is able to provide sustainable local development and/or social innovation. At the same time, we have also tried to identify a role for organic farming, in the attempt of verifying how this can determine new models of territorial organization and governance and gather different types of actors and stakeholders around specific objectives. The significant presence of organic agriculture in terms of surface and / or operators in a given area facilitates the adoption of particular models of territorial aggregation, such as organic districts (Italy), eco-regions (Austria) and similar (Biovallées in France). Since experiences of territorial declension of organic farming are multiplying in Europe, literature has already started analyzing them from the point of view of the neo-endogenous perspective (Stotten et al., 2017). It has also provided some empirical evidence of the role of organic supply chains in the development of territorial approaches to organic farming (Schermer et al., 2015), and have discussed their contribution in promoting holistic development in homogeneous territories (Lamine, et al., 2012). In this respect, the present study has the ambition to enrich the existing literature, because it statistically provides a first attempt to match organic farming and features of sustainable development with the purpose of tracing a coherent path for understanding the territorial change.

In order to achieve such a result, as a first step, two regional data sets, one from Liguria and the other from Molise, were set up by exclusive use of indirect statistical sources. Therefore, according to the availability of public data at the municipal level and with the aim to explore the three dimensions of sustainability (social, economic, environmental) as completely as possible, we have considered environmental and socio-economic variables, including those that are representative of the relevance of organic supply chains in local economies. Then, a PCA was performed on the two datasets with the aim of reducing the initial variables in new composite variables so as to better describe the contribution to sustainability at municipal level, that it has suggested to require of a multivariate approach to individualize local sustainability performances (Salvati and Carlucci, 2011, 2014). At a second stage, the same municipalities were clustered, by means of the principal component factor scores. The application of PCA and the segmentation analysis yielded to a more precise identification of the peculiarities both within the two selected areas and compared to those of the surrounding municipalities, especially with those that share the same development strategy or have the same physical geographic and/or

social characteristics (organic district, Leader Areas, internal areas). This might support replication efforts in common zones.

The article is therefore structured as follows: After this first introduction, a theoretical background is outlined in section 2. Successively, the peculiarities of the two case studies are described in section 3 – Methods and results are respectively presented in sections 4 and 5. The discussion with limitations are argued in section 6. Finally, potential conclusions and future perspectives are proposed in the last seventh paragraph.

2. Theoretical background

The latest European policies for structural funds and the European Agricultural Fund for Rural Development (EAFRD) regulations in particular, have kept consolidating bottom-up approaches that are based, as known, on the paradigm of endogenous development. Its principles seem to be more and more shared by territorial actors, who apparently increasingly rely on participatory planning tools, as evidenced by the preliminary sessions for the definition of the strategies of the new regional/local rural development programmes (Rural Development Programmes – RDP and Local Development Strategies – LDS), that is always well attended.

It should be recognized that the adoption of this endogenous approach has set Common Agricultural Policy (CAP) free from the rigid sectoral constraints, leading, starting from the early 2000s, to the definitive abandonment of the productivistic paradigm, in favor of a more area-based approach to rural development policies that takes into account the territorial dimension of the CAP and the simultaneous strengthening of the integration of local initiatives and rural capacity building in policy making (EU, 2016). On the other hand, the endogenous rural development paradigm, basing its action on the mobilization of communities for the identification and valorization of local resources, promotes a more harmonious and sustainable development of the territories (Ploeg van der and Saccomandi, 1995). Moreover, the recent phenomenon of the resistance to food homologation, and therefore to homologated food behaviors, has made it easier to increase the value of local productions, by pointing out the differences attributable both to environmental specificities and to the tacit knowledge of the social context (Belliggiano & De Rubertis, 2013). Organic schemes have soon appeared to be coherent with this framework, so that their wider diffusion has been highly facilitated.

According to the most widespread rhetoric on the endogenous development of rural areas, the valorization of local resources should have protected the territories from the risks of globalization, through a progressive improvement (direct and indirect) of the satisfaction of their needs. The implementation of strategies capable of maintaining significant portions of wealth in the territory through the adoption of real forms of collective engagement (Lowe et al., 1995; Dijk van, 1995; Lowe, 2006) was one of the main tools for achieving such results.

However, the endogenous model has proven to be ineffective in many Italian rural areas, especially in the more fragile ones, where it was primarily aimed at contrasting depopulation and structural dependence, generated by several consecutive decades of exogenous development (Lowe et al., 1995; Ploeg van der, 2012; Navarro et al., 2015; Ferrucci et al., 2017). The simple exercise of identifying endogenous resources and/or the hierarchy of priorities – strongly encouraged by European policies, especially by the second pillar of the CAP – could not guarantee the automatic development of these areas in the absence of local resources and/or actors to catalyze it (Bosworth and Atterton, 2012). In fact, the innermost areas, burdened by weaker demographic and economic bases, still have not autonomously succeeded in leveraging their endogenous resources, although they have proved they can benefit from "exogenous" activations of their development process. In these areas, as in the cases presented in the paper, the local dimension seems to have benefited from an extra-local activation. Therefore, while observing the principles of the endogenous model, a decisive role to the extra-local component must be accounted, so that a specific category of endogenous development paradigm defined as "neo-endogenous" could be identified (Lowe, 2006; Bosworth et al., 2016; Steel and Mitchell, 2017). Neo-endogenous development paradigm doesn't exclude local communities from the development processes, but rather advocates the democratic use of

local resources in order to improve the quality of life in a given area by intensifying social and economic interaction with the global system (Thomaidis and Papathanasiou-Zuhrt, 2018). In addition, therefore, neo-endogenous approaches need territorial arrangements to be able to provide a suitable organizational structure and institutional capacity (Dax et al., 2013).

The first conceptualizations of this paradigm have appeared, as known, in the United Kingdom at the end of the 1990s (Ray, 1999a; 1999b), then defined by the OECD (2006) as a "new rural paradigm". More recently, they have inspired the so-called "Rural Policy 3.0" (OECD, 2016). This paradigm arises above all from the need to interpret the recent processes of social change in rural areas (Bosworth and Atterton, 2012), which could have multiple implications on the territorial identity (De Rubertis et al., 2018).

Local identity is in fact attributable to the degree of awareness and sharing of the development trajectory followed by the community, that is: the way by which different forms of endogenous capital (Ray, 2001) interact with the exogenous factors, according to an organizational structure consistent with the desired development objectives (De Rubertis, 2013). Simultaneous phenomena of social innovation could come together with neo-endogenous development processes or could prompt their birth (Neumeier, 2012, 2017) as they are capable of consolidating or transforming local identity (Navarro et al., 2018).

The acknowledgement of local identities is also at the center of the concept of "local embeddedness", i.e.: whenever economic and social actions are influenced by being and feeling part of a local community (Bosworth and Atterton, 2012). This condition, however, tends to choke entrepreneurial action if solid connections with the outside are lacking. “In-migrant entrepreneurs" (Kalantaridis and Bika, 2006) could instead supply these liaisons, provided that they are able to integrate themselves into the specific local conditions (Jack and Anderson, 2002) and therefore become "neo-endogenous actors" of the territorial development.

Although the success of the actions depends on the pre-existing social structure of the communities, the competence and creativity of political actors is fundamental, as their initiative can trigger virtuous processes of normative isomorphism (Butkeviciene, 2009). This is what Bock calls “nexogenous approach” (Bock, 2016), emphasizing the gathering of the various forces acting in the same rural space, in order to increase the effectiveness of their individual action (Shucksmith, 2010). Therefore, such an approach reaffirms the need for the construction (or reconstruction) of solid bonds among different endogenous social, political, and economic components, at the same time it gives access to those exogenous resources that are capable of integrating them with the local features and with the common aim of increasing the vitality of the area.

3. Case Studies

3.1 Varese Ligure[6]

As many other towns located in Italian mountain areas, Varese Ligure is facing depopulation and land abandonment (ISTAT data). In order to counteract these detrimental tendencies, in the early nineties, local administrators started a season of renewal of the local cattle farming, both meat and milk, now as then the most important economic activity in town, by promoting its conversion to organic livestock farming. Conversion was accompanied with interventions aimed at avoiding the dispersion of the value added: the meat cooperative was equipped with a new slaughterhouse and, lately, with a packaging room that made direct selling easier. On the other hand, the milk cooperative, until then limited to collecting and selling raw milk to industrial dairies, obtained a new dairy factory that allowed local processing.

[6] The information displayed in this paragraph was taken from the ongoing monitoring of the area, which started in 2011, as part of a project funded by the Ministry of Agriculture (IsoBio) (www.sinab.com), It is based on the results of direct interviews to local actors and stakeholders – including local community – , aimed at exploring strategies and initiatives for their involvement and participation with the consequent purpose of promoting the local organic agriculture and actions for sustainability

Having succeeded in saving the local agricultural sector from disappearing, local administrators became more and more aware that the valorization of local environment and its conservation could become the key for interpreting local development and build a strong territorial reputation, reinforcing local products and supply chains. They therefore set up a comprehensive program of sustainable development focused on energetic self-sufficiency, a more efficient management of municipal services such as waste treatment and water works that earned Varese Ligure the ISO 14001 certification for the municipal territory (the first municipality in Europe).

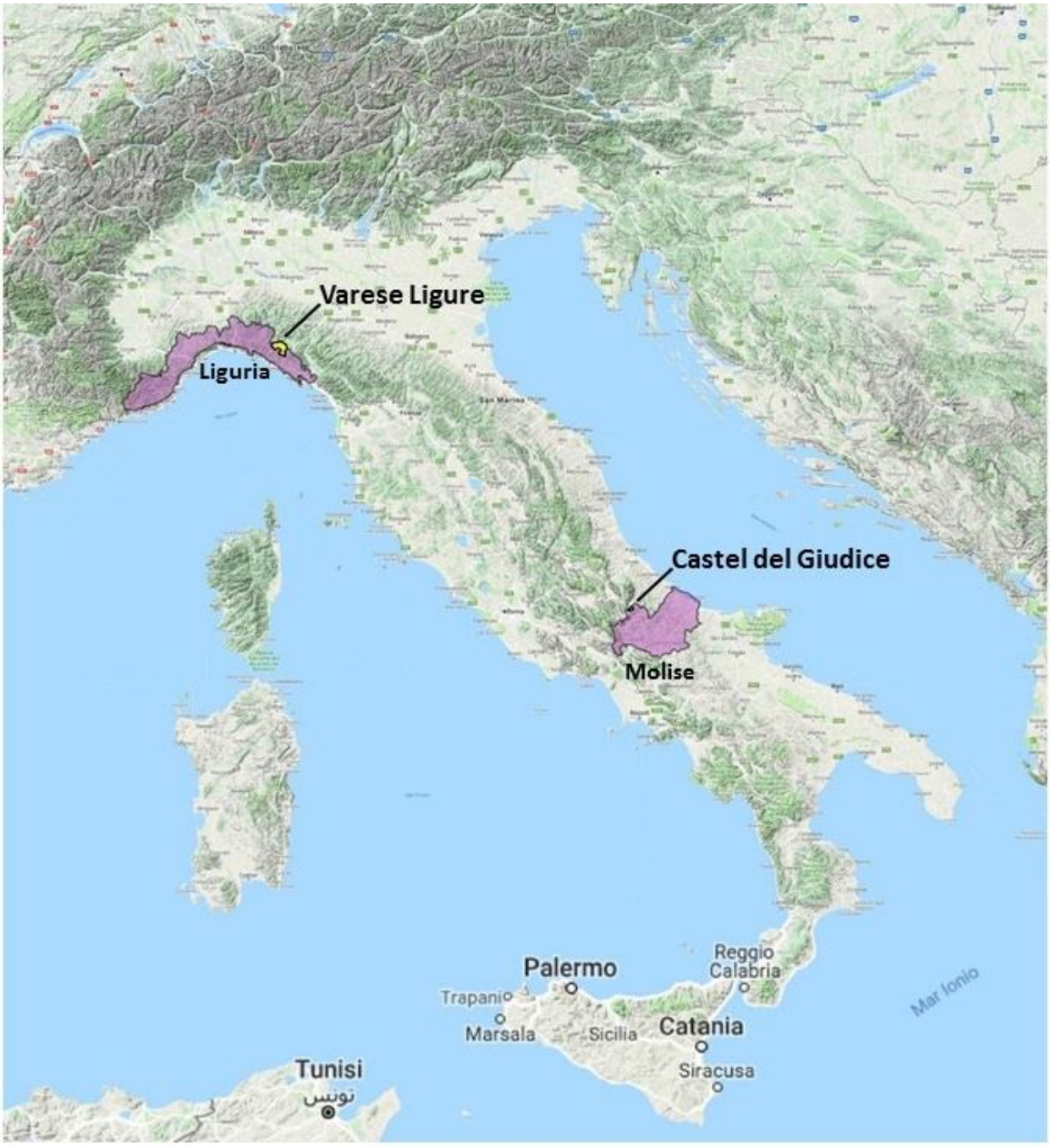

Fig 1. Territorial localization of the study areas. Source: own elaboration

Most of these achievements have been accomplished by means of a huge intake of public funding, coming from different sources, ranging from European structural funds and programmes (i.e., Life), regional and local resources, wisely integrated in order to produce the highest impact. Support to organic farming, for instance, would have not been so attractive to farmers without the renewal of the two processing plants, financed with local funds.

Communitarian sources (above all LEADER) provide the necessary support for structuring the supply chains, both at production and transformation level, while local sources (e.g.: Province of La Spezia) support promotional initiatives even more.

The model of governance adopted was mostly based on deliberation instead of representation. In fact, the active involvement has only concerned the stakeholders who should contribute to the achievement of specific objectives. This model didn't raise g a common awareness of the efforts made by local administrators and failed in creating an understanding of the role of organic farming in preserving local environment. This lack of awareness was also determined by the way in which the farmers themselves were persuaded to convert their farms to organic agriculture and animal husbandry: by using the leverage of self-interest with the promise of higher revenues and the renewal of local roads, rather than information on its environmental and social effects and training.

Nevertheless, organic farming acted as an element of discontinuity that catalysed new forms of engagement both inside local agriculture, with new farmers associations (Consortium "Valle del Biologico") and inside local society, prompting new cultural initiatives led by young farmers and aimed at spreading the values of organic farming (Association "Biological"), despite the evidence that neither activism nor commitment ever reached local population at large. The rising of a strong territorial reputation around organic farming attracted exogenous actors. An entrepreneur from Northern Italy established in Varese Ligure: a diary factory that produces yogurts with the claim "Organic goodness from Varese Ligure". Nowadays, this company is the largest employer in Varese Ligure and organic farming crucially contributed to a "reterritorialization" of the local agriculture on the basis of a more virtuous relationship between economy and environment and by promoting agricultural diversification through the production of fruits, including chestnut, small fruits, aromatic herbs, processed and distributed in short supply chains, mostly local. A great contribution to the consolidation of the new supply chains has been actually given by neo-rurals, attracted by Varese Ligure renown.

The economic success of the two main supply chains determined the spreading of organic farming in the neighbourhood towns, thus preventing land abandonment and allowing the persistence of organic UAA that, although extremely variable, holds the highest size in the Region.

Varese Ligure administrators were the first to understand that such a peculiarity should be officially recognized by a normative intervention. They therefore lobbied for a regional law to regulate organic districts. Their attempts succeeded in 2009, when the first law on organic agriculture regulating organic district in Italy were issued by the Regional Council. After the establishment of the district, the local organic sector was mature enough to express a leader (the local branch of the Italian Association for Organic Agriculture – AIAB) of a partnership made of Varese Ligure and 6 more municipalities of the Vara Valley, two cooperatives, two farmer's associations and 75 farmers. The Organic district is providing for the governance that somehow lacked so far. It has mapped the stakeholders, including citizens and consumers, and organized their delegations in advisory or decision-making bodies (i.e. steering committees and working groups), in order to build a structured social network as a basis of a participatory process. Also, a detailed program, that identifies strengths and weaknesses and establishes consistent lines of intervention, has been drawn up together with a continuous monitoring of the performances. The district itself is therefore an expression of a local context strongly marked by organic farming able to set up a society mature enough to give birth to new institutional arrangements. The organic district could be described as a neo-endogenous phenomenon, in the sense provided by Ray (1998) that is a territorial subject based on a culture economy relying on the attachment of products to the image of a region. It is, in fact, a *super partes* subject presiding over the identification and usage of local resources and, at the same time, connecting its territory with the external areas by means of cooperation projects and/or interacting with regional and national administrations.

3.2 Castel del Giudice[7]

Castel del Giudice is a small outermost municipality in the Province of Isernia, located in the north-west of the Molise region, on the border with the Abruzzi. Like the other Italian internal areas, the nature of the problems that characterize this municipality such as loss of population and its aging, although eminently demographic, has obvious negative consequences from a social and economic perspective.

At the end of the 1990s, Lino Gentile, now as then the Town's mayor, started a diversified and participated development process with the precise aim to stop depopulation of the area.

The Mayor has the great merit of having involved the citizens in the decision-making phases and, in some cases, in financing the activities carried out in the field of social-assistance, agriculture and tourism. With a certain realism about the need of capturing public as well as private external resources for bringing them to completion, Lino Gentile established a fruitful and synergistic collaboration with Ermanno d'Andrea, an entrepreneur from Lombardy, but born and raised in Molise. In particular, he set up a branch of his precision mechanics company (D'Andrea SpA) in the municipality of Castel del Giudice and had made himself available to support socio-economic initiatives.

The first step was the conversion of a disused school building in a socio-assistance residence (SAR) to accommodate elderly and disabled people. To this end, citizens were involved in some public assemblies in order to discuss the opportunity of making such an investment. This was made possible thanks to the invested capital of the Municipality itself and some (new) citizens of Castel del Giudice (in particular, Ermanno D'Andrea), motivated by the necessity of responding to the actual local needs.

In 2003, Melise ltd., a company producing organic apples, settled in Castel del Giudice on the remains of a former company of a businessman from the Veneto who wanted to develop organic farming in Molise. The new entrepreneurial initiative strengthened local organic farming, contributing to the recovery of many abandoned allotments, whose owners readily gave to Melise, by selling or renting them. Once again, the contribution of Ermanno D'Andrea was fundamental in the phase of both the establishment of the Melise and its recapitalization, together with the participation of the Municipality and some local and non-local small investors.

The adoption of the organic production methods was part of a strategy mainly aimed at giving continuity to the choices previously made by the Venetian entrepreneur. However, this has gradually served as a driving force for a series of initiatives in organic agriculture and food processing as well as laying the foundations for the development of synergistic relationships with tourism.

In fact, again at the request of the Mayor of Castel del Giudice, a group of owners were called to express themselves on the opportunity to restructure their stalls and warehouses, located in a hamlet of Castel del Giudice, with the aim of making a widespread hotel: "Borgo Tufi". At this juncture, once the proposal was approved, the ownership of the properties was transferred to the Municipality (the majority shareholder), to D'Andrea SpA and to another company, Edilgem Srl, that merged into a brand new company: Vello SpA. Borgo Tufi (Del Gatto, 2015), therefore, in addition to enjoying the image of uncontaminated territory related to local organic agriculture, uses in its restaurant and bar, the fresh and processed products from Melise as well as from other organic farms recently established in the area. By doing so, this company distributed a commercial outlet to local productions and an immaterial support for their promotion.

This experiment of organic farming, however, was the starting point for a new model of social and economic organization that now is emerging in Castel del Giudice: the community cooperative. It is aimed at stimulating cohesion and synergies between citizens, institutions,

[7] The information displayed in this paragraph was taken from the ongoing research project entitled ≪Development programmes and rural change in the European Union≫ funded by the Spanish Ministry of Economy within its Excellence Programme, CSO2014-56223-P. It is based on the results of direct interviews to local actors and stakeholders – including local community –, aimed at exploring their involvement and participation in the local development processes.

companies and associations by creating a system in which citizenship is, at the same time, producer, supplier and user of goods and services produced.

The first community cooperative, once again promoted by the Mayor and financed with municipal funds and the Rural Development Programme 2014 to 2020 of the Molise Region (Sub-measure 6.1), bases its activity on the collection of wild herbs and on the production of small fruits cultivated with organic methods in abandoned allotments, following what was already done by the Melise.

The development path promoted by the municipality of Castel del Giudice, based on community participation and on valorization and integration of local resources, but anyway supported in weaker spots by the action of external resources, is a case in point of neo-endogenous development. It has already elicited the interest of neighboring municipalities and the LAG to which Castel del Giudice belongs, thus generating emulation effects that could bring to new territorial arrangements, as an organic district, for instance.

Castel del Giudice has become a best practice and an example at national and international level. It has been reported and awarded as a “virtuous municipality” in several contexts, where the features of sustainability, transparence, and legality of its development process has been recognized.

4. Methodology

In order to understand the characteristics of the development processes of Varese Ligure and Castel del Giudice and to verify their possible drivers, we have performed a Principal Component Analysis (PCA), followed by a cluster analysis. The tandem analysis was targeted to the municipalities of the two regions where Varese Ligure and Castel del Giudice belong; the software used for running the analyses was IBM® SPSS® Statistics Ver.21. The strategy of using the tandem analysis was twofold: confirming the characterization of the territorial aggregations already established in the area and successively identifying possible specific clusters of municipalities among those that share the same development path and/or similar socio-economic and environmental constraints (local LAGs, Internal Areas[8]; Varese Ligure was compared also with the other six municipalities of the Organic district) where organic agriculture is developed to the point of conveying the development of specific approaches such as organic districts.

As known, the objective of the PCA is applied to a given dataset in order to reduce the number of correlated variables to a lower number of new variables, the principal components (PCs), uncorrelated and ordered as linear combinations of the starting variables. The first PC, in fact, explains most of the variability of the starting data, the second the immediately lower variance and so on. In this way, original observations are compared against a reduced number of variables, which can be more easily interpreted on the basis of the contribution of each starting variable in determining the PC of choice.

Subsequently, a cluster analysis was performed on the factor scores of the PCA, with the aim of classifying the observations in homogeneous groups distinguished one from the other by the scores themselves. In particular, we used the “k-means” as a non-hierarchical clustering technique, which allows each observation to be attributed to the cluster with the closest centroid.

In the study of the (rural) development processes concerning territorial unit identified at different scale levels (local, district, provincial, regional, state), the use of PCA, (Nieto et al., 2019), cluster analysis, and possibly some composite indices are quite widespread, given the multidimensional nature of these processes (Ievoli et al., 2017 and 2019).

This happens in the present study as well. The municipal level is the most suitable in describing processes promoted by the Mayors of the two towns, as it was carried out by means of local

[8] An Internal Area is identified at central level as lacking from a socio-economic point of view, and therefore object of a precise development strategy.

actions with effects that mainly fall back locally, in the perspective of a holistic approach to sustainability. The local economic recovery of their municipalities, moreover, generated an emulation effect in the close and far towns. Unfortunately, at such a big scale, data availability affects the quality of the analysis, although it was sufficient at least to grasp some regularities of the phenomena studied.

The variables have been selected on the basis of their feasibility in describing the manifold facets of a local development process where the principles of organic farming (IFOAM, 2005) have been transferred to the other economic sectors (Schermer, 2005). Therefore, consistent with the availability of public data at the municipal level and the need to represent the three dimensions of sustainability (social, economic, environmental) as completely as possible, we have considered demographic and social indicators (population density, ageing indexes, migration rate, unemployment rate), wealth (taxable income), diversification of productive activities, specialization in the food industry, relevance of agricultural activities and organic sector and soil consumption.

These variables, obtained separately for each municipality (Liguria with 235 units and Molise with 136 units), were: population density ("density" ISTAT, updated to 2017" ISTAT, 2017)), the impact of land consumed on the territorial area ("ConsLand_Tot"; ISPRA, 2018); impact of the UAA both on the territorial area ("UAA_TerArea"; ISTAT, 2010) and on the total agricultural area ("UAA_TAA"; ISTAT, 2010), organic UAA on the total UAA ("OrgUAA_UAA"; ISTAT, 2010); number of organic operators (farms, food processors and distributors; "OrgOper"; SIAN, 2017); migration balance ("MigrBalance"; ISTAT, 2017), ageing index ("OldAgeIndex") and structural dependency index ("DepIndex"; ISTAT, 2017); youth unemployment rate (more meaningful in respect to depopulation than the total unemployment rate; "YouUnempR"; ISTAT, 2011); per capita average taxable income ("AverTaxInc"; MEF, 2016) and the Shannon index related to diversity of local units of the secondary and tertiary sectors ("ShannonInd"; ISTAT, 2015). The lack of an annual update of most of the variables selected has forced the authors to select the shortest time span available: the eight-years period 2010–2017. However, the unavailability of data at a chosen territorial level often strongly constrains the selection of variables (Shucksmith, 2010), so that it is not always possible to consider all the elements that start and maintain over time the sustainable development process.

All the variables were expressed in percentage terms except the population density, the number of organic operators[9], the migration balance, the average taxable income per capita, and the Shannon Index, which can vary between 0 and 1.

From the analysis of the coefficients of variation, which allows to compare the variability of variables with different units of measure and levels of magnitude, emerged that, both in Liguria and in Molise, most of the variability was expressed by the migration balance, the incidence of organic land area on the total UAA, and the number of organic operators and the population density (Table 2). Furthermore, the values of the first and third quartile and of the median indicated that the distribution of most of the variables detected is sensibly asymmetric (Table 1).

To avoid that the different units of measurement and levels of magnitude of the basic variables influence the results, PCA has been applied on the correlation matrix and not on the covariance one.

Reducing the number of variables via the PCA requires that they are sufficiently correlated with each other. The study of this correlation on Liguria and Molise data showed that, for both regions, the Bartlett sphericity test applied to the correlation matrix rejected the null hypothesis that the correlation matrix is an identity matrix, with a p-value of less than 0.01. Data were moderately suitable for this kind of analysis, although those referred to Molise were slightly better than those related to Liguria. The Kaiser-Meyer-Olkin test, in fact, performed a value of 0.7 for Molise Municipalities and 0.62 for Liguria.

[9] Because of lack of detailed information both on projecting the number of organic operators to the size of any territorial unit and to each specific job assignment we preferred to consider the absolute values and accept some potential over-estimation rather than handle more serious biased data.

Tab 1. Variables descriptive statistics.

Variable	No		Mean	Coefficient of variation	Variance	Minimum	Maximum	Percentiles		
	Valid	Missing						25	50	75
	Liguria									
Density	235	0	256.4012	1.5993	168144.656	4.9968	3100.6223	29.3015	91.8420	308.1808
ConsLand_Tot	235	0	9.4953	0.8210	60.775	1.1349	42.7564	4.1906	6.3758	12.4658
UAA_TerArea	235	0	9.8384	1.0067	98.100	0.1835	74.9050	3.5237	6.8932	12.6633
UAA_TAA	235	0	49.7312	0.4052	406.061	3.5184	99.3671	34.5970	49.6194	64.1368
OrgUAA_UAA	235	0	4.7930	2.2397	115.240	0.0000	79.8033	0.0000	0.7996	4.9033
OrgOper	235	0	2.1617	3.0491	43.444	0.0000	69.0000	0.0000	1.0000	2.0000
MigrBalance	235	0	30.8383	5.9246	33381.119	-51.0000	2650.0000	-3.0000	5.0000	20.0000
OldAgeIndex	234	1	325.0725	0.7395	57785.251	118.5567	3200.0000	220.9719	271.5376	350.3378
DepIndex	235	0	69.5149	0.1874	169.733	50.0952	158.6207	61.3575	67.4354	73.6842
YouUnempR	235	0	23.3196	0.5200	147.047	0.0000	100.0000	17.6000	23.2000	28.1000
AverTaxInc	235	0	22089.8216	0.1478	10662997.497	16808.0397	38175.0861	19970.3552	21728.0651	23519.3173
ShannonInd	235	0	0.6978	0.1411	.010	0.3570	0.8306	0.6431	0.7193	0.7763
	Molise									
Density	136	0	59.0891	1.6297	9272.803	7.6437	878.9470	22.2893	34.9515	58.6770
ConsLand_Tot	136	0	3.8741	0.6009	5.419	1.1010	19.7723	2.5873	3.3848	4.7189
UAA_TerArea	136	0	38.8933	0.5822	512.719	1.3082	91.1200	20.8083	35.6616	56.2215
UAA_TAA	136	0	73.9661	0.2532	350.851	12.5644	99.7595	61.4277	79.9660	87.0058
OrgUAA_UAA	136	0	2.1123	2.5364	28.704	0.0000	50.1561	0.0000	0.0000	2.3231
OrgOper	136	0	3.7574	1.5832	35.385	0.0000	38.0000	0.0000	2.0000	5.0000
MigrBalance	136	0	6.0074	6.0767	1332.585	-60.0000	318.0000	-6.0000	0.0000	8.7500
OldAgeIndex	136	0	340.4814	0.9742	110013.619	110.0000	3700.0000	202.3902	289.6968	377.0833
DepIndex	136	0	61.8159	0.2316	204.965	35.4839	128.4615	53.0161	59.4487	67.0062
YouUnempR	136	0	38.7169	0.3325	165.769	0.0000	73.3000	30.5000	40.0000	46.5750
AverTaxInc	136	0	18601.4263	0.1179	4807661.884	14874.8030	27488.8233	17113.6421	18277.3273	19579.5559
ShannonInd	136	0	0.6764	0.1312	.008	0.3354	0.8218	0.6390	0.6886	0.7345

This diversity was reflected in the results of the PCA which led to the identification of five principal components for Liguria and four for Molise, applying the rule that the number of new variables must be equal to that of eigenvalues greater than the unit, which explained, respectively, 74.6% and 66% of the total variance (Tables 2 & 3).

The rotation of the main components through the Varimax method with Kaiser normalization significantly improved their interpretation in both cases (Tables 4 & 5).

Tab 2. Liguria: total variance explained.

Component	Initial eigenvalues			Weights of non-rotated factors			Weights of rotated factors		
	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %
1	3.257	27.141	27.141	3.257	27.141	27.141	2.361	19.672	19.672
2	1.828	15.233	42.375	1.828	15.233	42.375	1.884	15.697	35.369
3	1.499	12.491	54.865	1.499	12.491	54.865	1.749	14.578	49.947
4	1.295	10.790	65.655	1.295	10.790	65.655	1.717	14.309	64.257
5	1.071	8.925	74.581	1.071	8.925	74.581	1.239	10.324	74.581
6	.935	7.792	82.372						
7	.576	4.799	87.171						
8	.430	3.580	90.751						
9	.413	3.443	94.194						
10	.351	2.921	97.115						
11	.222	1.854	98.969						
12	.124	1.031	100.000						

Tab 3. Molise: total variance explained.

Component	Initial eigenvalues			Weights of non-rotated factors			Weights of rotated factors		
	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %
1	3.473	28.943	28.943	3.473	28.943	28.943	2.684	22.369	22.369
2	1.933	16.109	45.051	1.933	16.109	45.051	2.179	18.162	40.531
3	1.380	11.503	56.554	1.380	11.503	56.554	1.917	15.976	56.507
4	1.133	9.440	65.994	1.133	9.440	65.994	1.138	9.487	65.994
5	.899	7.492	73.487						
6	.747	6.222	79.709						
7	.606	5.049	84.758						
8	.541	4.509	89.267						
9	.490	4.086	93.353						
10	.413	3.438	96.792						
11	.283	2.356	99.148						
12	.102	.852	100.000						

Tab 4. Liguria: Rotated matrix of components.

	Component				
	1	2	3	4	5
AverTaxInc	.787	-.076	-.004	-.129	.199
Density	.772	.393	-.014	.183	-.229
ConsLand_Tot	.745	.171	-.113	.368	-.255
ShannonInd	.709	.090	-.387	-.005	.091
OrgOper	.042	.912	-.010	.106	.200
MigrBalance	.204	.894	-.026	-.111	-.131
DepIndex	-.066	-.008	.893	-.105	.024
OldAgeIndex	-.169	-.016	.849	-.085	-.038
UAA_TerArea	.011	.091	-.181	.856	-.026
UAA_TAA	.100	-.087	-.012	.851	-.088
OrgLA_UAA	.018	.180	.138	.078	.858
YouUnempR	.015	.089	.125	.161	-.520

Tab 5. Molise: Rotated matrix of components.

	Component			
	1	2	3	4
Density	.890	.197	.167	-.005
ConsLand_Tot	.839	.190	.226	-.026
MigrBalance	.744	-.016	-.075	.013
AverTaxInc	.605	-.301	.378	.049
UAA_TerArea	-.015	.847	.151	-.013
UAA_TAA	.028	.827	.019	-.041
OrgOper	.461	.648	.129	.186
OldAgeIndex	.036	-.152	-.796	-.111
ShannonInd	.193	.163	.754	.096
DepIndex	-.237	.073	-.649	.260
YouUnempR	-.001	.259	-.129	-.765
OrgLA_UAA	.032	.251	-.090	.659

5. Results

Castel del Giudice and Varese Ligure share a vision of local development based on the recovery of the agro-food supply chains and the principles of organic farming. Overall, the variation of the main indexes of sustainable development, taken over the largest time span available, seems to detect the effects of such a strategy with an enhancement of the economic and demographic indexes (tab. 2). The data also highlight the peculiarities of the two processes. The strategy pursued by Castel del Giudice, aimed at the recovery of abandoned UAA and the diversification of the economic activities, seems to have already produced appreciable changes in land use.

In Liguria, the PCA was carried out on 234 out of 235 municipalities because in one of these, the absence of people under 14 prevented the estimate of the demographic indexes. The variables that mostly explained the first component were the *per capita* average taxable income, the population density, the rate of soil consumption, and the Shannon index on the diversity of production activities. Together with a positive migratory balance and a negative

ageing index, which however appeared with rather low coefficients, the **first component** was interpreted through the binomial "**growth-development"**, implying a dynamic economy, able to attract both young people and Italian or foreign citizens to a certain extent.

In the **second component**, "**organic-valorization**", the most influential variables were the number of organic operators and the migratory balance, next to a residual value of the loadings of the population density; indicatives of an organic sector adequately valued all along the supply chain, which is associated with a certain attractiveness to nonresident citizens.

The **third component** was identified as "**resistant, organic-residual**", mainly explained by ageing and structural dependency indices, both appearing with a positive sign, and by the Shannon index. Although the latter appeared with a significantly lower coefficient, its negative value suggested a lack of innovation, which distinguishes older communities. Nevertheless, the slight positivity of the share of organic UAA on the total UAA connoted the residual nature of organic farming and, on the other hand, its contribution to keep up a compromised socio-economic system, however poorly diversified.

"**Agricultural development**" was the name given to the **fourth component**, on which the rate of the UAA on the territorial area and on the total agricultural area had a strong impact, locally. Since soil consumption also appeared with a mildly positive coefficient, it was assumed that the development of the agricultural sector was driven by proximity to urban areas, being able to rely on rather secure market outlets and very diversified distribution channels.

The **last component** was labelled as "**social organic**", mainly explained by the incidence of the organic UAA on the total UAA and by the loading referred to youth unemployment rate that was negative together with low coefficients of density and soil consumption, that also had a negative sign. Therefore, in less densely populated areas, organic farming would seem to constitute an alternative for employment, especially to young people. This was consistent with the national data concerning the greater concentration of young entrepreneurs in organic farms (Viganò, 2013).

As already stated, in Molise the main components with eigenvalue greater than 1 were four. **The first**, **"growth development**", was characterized by the strong relevance of the population density, land consumption, migration balance, and income variables, all appearing with positive values. The loadings described a relative importance of organic operators, as well. This is a clue for a structured sector, whose development rests mainly on the demand from urban areas, which is diversified and, therefore, able to absorb an equally diversified supply, as already observed in Liguria.

"**Agricultural development**", the second component, was mainly explained by the share of SAU on the territorial area and the total agricultural one, as well as by the significant importance of organic operators, alongside, however, an income that appeared with a negative sign. This is another evidence of the struggle of the agricultural sector to guarantee revenues at least matching those of other sectors even when agricultural activity is professionally managed.

The **third component** was characterized by correlation factors that showed a certain **resilience** of the territories gathered in it. Essentially, the most important loading captured the diversification of the productive activities that seemed to strongly contain the ageing and dependence indices, both present with a negative sign. Moreover, the medium-low positive value of the coefficient associated with the variable "income" corroborated the capacity of the socio-economic system to adapt to changes.

Finally, the interpretation of the **fourth component**, we called "**social-organic**", was similar to that of the fifth component identified for Liguria, mainly explained by the share of the organic land area on the UAA and the negative youth unemployment rate.

Based on the coordinates of the municipalities of Liguria and Molise with respect to the new variables (i.e. the component scores), the cluster analysis was performed (Tables 6 to 9). For both regions, Test F (Tables 7 and 8) assessed how significantly the components scores contributed to the determination of three groups per region. Specifically, almost all the components scores were effective in discriminating the clusters, especially for the first two in

each region, with the exception of the fourth component in Molise (see table 8). The municipalities of Genoa in Liguria and of Campobasso and Termoli, in Molise, respectively, constituted specific groups (cluster 1 and 2). As a matter of fact, these two clusters included the most dynamic urban centers from the economic point of view, high density and highly attractive, with more diversified activities in the case of Genoa and intensive professional agriculture in those of Campobasso and Termoli, combined with a structured and valorized organic sector that gravitates around the three cities.

Tab 6. Centroids of the final clusters.

	Liguria		
	1	2	3
REGR factor score 1	1.2845	1.1761	-0.4324
REGR factor score 2	-0.0347	12.8646	-0.0620
REGR factor score 3	0.4211	-0.1942	-0.1385
REGR factor score 4	0.3555	-1.9924	-0.1064
REGR factor score 5	-0.2409	-1.3922	0.0878
	Molise		
	1	2	3
REGR factor score 1	.10793	6.46715	-.25256
REGR factor score 2	-.89190	1.39776	.64388
REGR factor score 3	.37382	-.09345	-.28283
REGR factor score 4	.16486	-.04503	-.12463

Tab 7. Liguria: ANOVA.

	Cluster		Error			
	Mean of the squares	df	Mean of the squares	df	F	Sig.
REGR factor score 1	64.900	2	.447	231	145.269	.000
REGR factor score 2	83.120	2	.289	231	287.609	.000
REGR factor score 3	6.839	2	.949	231	7.204	.001
REGR factor score 4	6.640	2	.951	231	6.981	.001
REGR factor score 5	3.326	2	.980	231	3.394	.035

Tab 8. Molise: ANOVA.

	Cluster		Error			
	Mean of the squares	df	Mean of the squares	df	F	Sig.
REGR factor score 1	44.586	2	.345	133	129.394	.000
REGR factor score 2	40.777	2	.402	133	101.474	.000
REGR factor score 3	7.101	2	.908	133	7.818	.001
REGR factor score 4	1.380	2	.994	133	1.388	.253

Tab 9. Number of municipalities by cluster.

Cluster		Liguria	Molise
	1	1	58
	2	58	2
	3	175	76
Valid		234	136
Missing		1	0

We labelled the **first cluster of Liguria** as "**declining modernization**". The elements of this cluster showed high income, population density, land consumption, and a greater propensity to diversify production activities, together with a relevant presence of agriculture. Nevertheless, in those places social and economic strength was unsuccessful in curbing the social decline. Correlation indexes with the demographic factors in component 3, that most contribute to this cluster, were actually found strongly positive while the migration rate slightly negative (see centroids in table 6).

The peculiarities of the most numerous cluster (**cluster 3**), the one that also includes Varese Ligure, were somehow specular to those of the previous group of municipalities. Although the centroid related to factor 1 (mostly correlated with socio and economic viability) was mildly negative, it was also negatively related to the factors describing social decline (factor 3), while agricultural intensity and soil consumption provide a minimum contribution to the value of the centroid (factor 4; see tables 4 and 6). However, the cluster 3, although not easily interpretable, seemed to gather together municipalities that match environmental values and demographic resilience. Therefore, this cluster was defined as "**resilient territories**".

As for the Organic district, it was worth to note that all its members belong to Cluster 3 (resilient territories), even if Varese Ligure is strongly characterized with respect to the others by very high negative value of the first component score (-1.55), indicating a poor diversification of production activities associated with low income, reduced population density and low land consumption. However, as expected, the true strength of Varese Ligure lies in the strong development of organic agriculture and its supply chains: some of them already well structured, as in the case of meat and milk sectors, others recently developed. The scores of the second and fifth component, in fact, reached values equal to 4.83 and 5.37 respectively (see table 11).

Furthermore, at the light of the factor scores, the development of the organic sector is connected to relatively low youth unemployment and a positive migration balance. In fact, according to evidences coming from the territory, it contributes to a certain attraction towards non-residential citizens, including many foreigners who settle there to take over agricultural holdings, although the majority of them are employed in caregiving (Carrosio and Natali, 2014). On the other hand, the positive migration rate is not sufficient to counter the strong ageing of local population and, therefore, the lowering values of the dependency index (see table 1). In this respect, in the organic district, Zignago and Rocchetta Vara were the most similar municipalities to Varese, although the magnitude of the scores were lower than those registered for Varese Ligure especially for the first two components (see table 11), highlighting a weakness of the same features. The most dissimilar municipalities appeared to be Maissana and mainly Carrodano, where even organic farming seemed to play an insignificant role. However, analyzing Varese Ligure in a wider context, such as that of the LAG or the internal area of belonging, it became clear that the municipalities of the Organic district constituted a distinct block, as their scores got the same sign, with the exception of few cases that concern, as already seen, also the organic sector. Furthermore, in the Organic district, the component scores that synthesize the development of organic agriculture reached the highest values.

The high number of municipalities in the LAG "Provincia della Spezia" (29 units), to which Varese Ligure belongs, highlights the absence of common features with the Organic district municipalities. Only 24% of the municipalities belonged to the cluster 2 of Liguria, "declining modernization", but also the remaining municipalities outside the organic district showed a scarce diffusion of organic agriculture, mainly due to the absence of organized supply chains; also they showed a relatively more diversified and profitable economy and a lower social fragility because to a smaller incidence of over 65 residents. Therefore, the LAG's municipalities were quite heterogeneous: they surely face the challenge of developing profitable cooperative relationships that mutually compensate their different weaknesses and enhance their strengths for the benefit of the whole territory.

Tab 10. Indexes of sustainability for the two case studies.

Index	Description	UoM	Year	Value	10 year Variation
Varese Ligure					
AverTaxInc	Average Pro capite taxable income	€	2016	19.148	11.5%
ConsLand_Tot*	Land consumption on total municipal area	%	2016	4.26	0.1%
Density	Population density	inhab/Km^2	2017	14.83	-7.9%
DepIndex	Structural dependency index	%	2017	78.48	-11.2%
MigrBalance	Migratory balance	n.	2017	11	-73.2%
OldAgeIndex	Ageing index	n.	2017	450.31	-19.2%
OrgOper	Number of organic operators	n.	2017	60	-
OrgUAA_UAA	Organic UAA per Total UAA	%	2010	59.03	-
ShannonIndex*	Diversification of economic activities	n.	2016	2.10	-1.6%
UAA_TerAREA	Total UAA per Territorial Area	%	2010	20.18	-12.8%
UAA_TAA	Total UAA per Total Agricultural Area	%	2010	52.82	-10.7%
YouUnempR	Youth unemployment rate	%	2011	12.50	-
Castel del Giudice					
Index	**Description**	**UoM**	**Year**	**Value**	**10 year Variation**
AverTaxInc	Average Pro capite taxable income	€	2016	19.583	20.9%
ConsLand_Tot*	Land consumption on total municipal area	%	2016	38.15	0.1%
Density	Population density	inhab/Km^2	2017	22.21	-7.3%
DepIndex	Structural dependency index	%	2017	58.94	-36.6%
MigrBalance	Migratory balance	n.	2017	1	-75.0%
OldAgeIndex	Ageing index	n.	2017	388.00	-0.1%
OrgOper	Number of organic operators	n.	2017	3	-
OrgUAA_UAA	Organic UAA per Total UAA	%	2010	50.16	-
ShannonIndex*	Diversification of economic activities	n.	2016	1.93	48.3%
UAA_TerAREA	Total UAA per Territorial Area	%	2010	7.13	62.6%
UAA_TAA	Total UAA per Total agricultural area	%	2010	73.91	-19.0%
YouUnempR	Youth unemployment rate	%	2011	16.70	-

** Var. 2016 - 2012*

Tab 11. Territorial aggregations around Varese Ligure: factor scores.

	F1 - Growth - Development	F2 - Organic-valorization	F3 - Resistant organic residual	F4 - Agricultural development	F5 - Social - Organic	Cluster	Territorial aggregation [1]
Carro	-0.165	0.485	2.306	-0.400	1.794	3	OD; LAG: IA
Carrodano	-0.621	-0.198	0.851	-0.431	-0.541	3	OD; LAG; IA
Maissana	-0.137	-0.353	1.206	0.268	1.365	3	OD; LAG; IA
Rocchetta di Vara	-0.092	0.440	1.334	1.057	3.562	3	OD; LAG;IA
Sesta Godano	0.330	0.265	1.235	-0.695	1.318	3	OD; LAG;IA
Varese Ligure	-1.555	4.830	0.745	1.847	5.374	3	OD; LAG;IA
Zignago	-0.686	0.822	0.708	1.726	4.580	3	OD; LAG;IA
Ameglia	0.922	-0.303	0.113	0.304	0.330	2	LAG
Arcola	0.914	-0.226	-0.587	0.166	-0.625	2	LAG
Beverino	-0.066	-0.128	-0.587	-0.881	0.189	3	LAG; IA
Bolano	0.783	-0.101	-0.535	-0.406	-0.527	2	LAG
Bonassola	0.071	-0.113	1.416	-0.900	-0.643	3	LAG; IA
Borghetto di Vara	0.010	-0.184	-0.142	-1.601	0.153	3	LAG
Brugnato	-0.265	-0.074	-0.355	-1.376	-0.348	3	LAG; IA
Calice al Cornoviglio	-0.764	0.069	-0.099	-0.689	0.275	3	LAG; IA
Castelnuovo Marga	0.756	0.173	-0.226	0.763	-0.113	2	LAG
Deiva Marina	0.352	-0.373	0.284	-1.421	-0.153	3	LAG
Follo	0.325	-0.165	-1.140	-1.020	0.528	3	LAG
Framura	-0.240	-0.106	1.050	-1.285	-0.077	3	LAG
Levanto	0.766	-0.176	-0.068	-1.253	0.391	3	LAG
Monterosso al Mare	-0.592	-0.034	-0.198	-1.056	0.206	3	LAG
Ortonovo	0.967	-0.184	-0.550	0.761	-0.643	2	LAG
Pignone	-0.480	-0.183	-0.125	-1.602	-0.199	3	LAG; IA
Riccò del Golfo di Spezia	0.752	-0.562	-0.852	-1.616	0.436	3	LAG; IA
Riomaggiore	-0.258	-0.074	1.246	-0.318	0.597	3	LAG
Rocchetta di Vara	0.461	0.646	-1.060	0.281	-0.858	3	LAG
Santo Stefano di Magra	0.849	1.186	-0.547	0.852	-0.202	3	LAG
Sarzana	-0.891	-0.027	1.099	-0.468	0.001	2	LAG
Vernazza	0.740	-0.218	-0.244	-0.052	-0.342	3	LAG
Vezzano Ligure	-0.165	0.485	2.306	-0.400	1.794	2	LAG

[1] OD = organic District "High Vara Valley"; LAG 0 LAG "Province of La Spezia"; IA = Internal Area "Val di Vara"

The Internal Area "Val di Vara" includes 13 municipalities (Fig. 2). All of them are located in the internal hill or mountain areas and belongs to the LAG. They were all found to be part of the cluster 3 (see table 11). This homogeneity between municipalities allowed the identification

of the sub-set of those most closely linked to the development of the agriculture and organic sector, although more vulnerable from a social point of view.

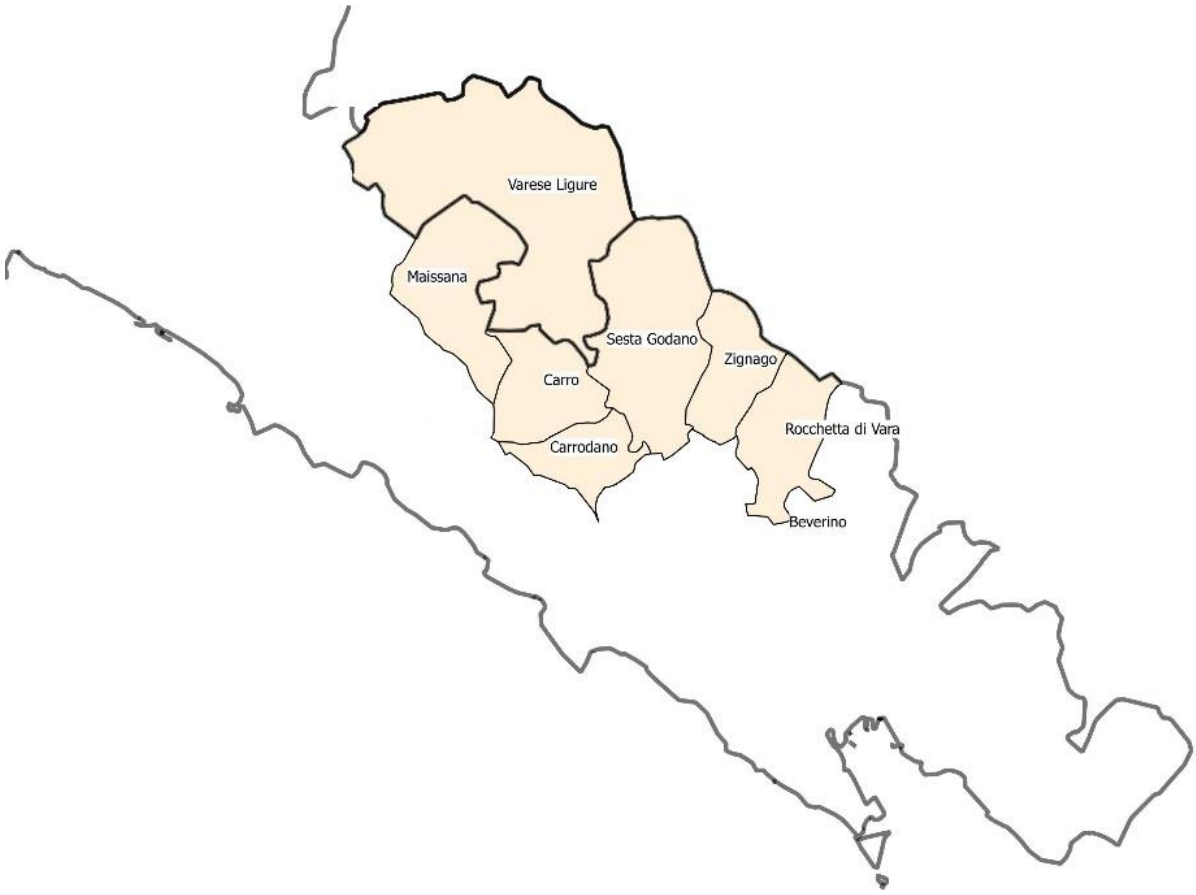

Fig 2. Organic district of the Vara Valley. Source: own elaboration

The analysis on Molise area (see figure 3) assigned Castel del Giudice to **cluster 1**, defined "**organic-driven resilience**" (see table 12). This municipality, despite negative scores from factors 1 and 3 that respectively represent local economic development and resilience, it depicts a positive value for the scores of factors 2 and 4 as an evidence of a relevant presence of organic agriculture and organic operators. All that seems to be connected to positive features due to structural dependence index and youth unemployment. Eventually, the inclusion of the other municipalities in the **third cluster** was mainly caused on the local **relevance organic supply chains**, gathered in factor 1. Those are areas with extensive agriculture, burdened with social and economic decline like, for instance, a high youth unemployment rates and low incomes. Castel del Giudice, in Molise, was characterized within its own cluster by a clearer influence of factor 4 (social-organic) as well as the negatives component of factor 3 (resilience), due to the still unresolved problems of ageing and structural dependence (see table 12).

Tab 12. Territorial aggregations around Castel del Giudice: factor scores.

Municipality	F1 - Growth – Development	F2 - Agricultural development	F3 - Resilience	F4 - Social – Organic	Cluster	Territorial aggregation[1]
Agnone	0.802	-0.803	0.622	-0.461	1	LAG;IA
Belmonte del Sannio	-0.555	0.111	-0.229	0.350	3	LAG;IA
Capracotta	-0.656	0.077	0.301	0.056	3	LAG;IA
Carovilli	-0.351	-1.130	0.473	-0.462	1	LAG;IA
Castel del Giudice	-0.072	0.035	-0.564	6.338	1	LAG;IA
Castelverrino	1.719	-1.362	-6.224	-1.958	3	LAG;IA
Chiauci	0.376	-0.455	-0.917	-1.639	3	LAG;IA
Civitanova del Sannio	-0.399	-0.840	0.581	0.117	1	LAG;IA
Forlì del Sannio	-0.462	-1.511	-0.271	-0.512	1	LAG;IA
Pescolanciano	-0.139	-0.651	0.518	-0.564	1	LAG;IA
Pescopennataro	0.245	-2.000	0.445	0.963	1	LAG;IA
Pietrabbondante	0.346	-1.580	-0.425	0.064	1	LAG;IA
Poggio Sannita	-0.323	-0.539	-1.227	2.083	1	LAG;IA
Rionero Sannitico	0.168	-0.534	0.734	0.199	1	LAG;IA
Roccasicura	-0.463	-0.987	0.224	-1.257	1	LAG;IA
San Pietro Avellana	0.227	-1.821	-0.658	0.821	1	LAG;IA
Sant'Angelo del Pesco	-0.158	-1.685	-0.150	1.196	1	LAG;IA
Vastogirardi	-0.421	-0.769	0.557	1.461	1	LAG;IA
Castelbottaccio	-0.179	0.781	-3.491	2.194	3	IA
Civitacampomarano	-0.439	-0.513	-1.245	-0.197	3	IA
Duronia	-0.065	-0.128	-1.581	-1.395	3	IA
Limosano	-0.565	1.026	0.374	-0.614	3	IA
Lucito	-0.553	0.538	-1.175	-0.621	3	IA
Montagano	-0.168	-0.249	0.255	-0.523	1	IA
Montefalcone nel Sannio	-0.553	0.288	-0.121	-1.211	3	IA
Petrella Tifernina	-0.229	-0.066	0.003	0.230	3	IA
Roccavivara	-0.109	-1.048	0.110	1.057	1	IA
Salcito	-0.542	0.222	-0.476	-0.661	3	IA
San Felice del Molise	-0.496	1.585	-1.006	1.331	3	IA
Trivento	-0.616	0.923	0.665	-0.014	3	IA
Bagnoli del Trigno	-0.312	0.611	-0.680	0.329	3	IA
Frosolone	0.306	0.200	0.893	0.667	1	IA
Macchiagodena	0.010	0.218	0.103	0.675	3	IA
Sant'Elena Sannita	0.277	-0.586	-1.070	-0.361	3	IA
Sessano del Molise	0.210	-1.347	-0.319	-0.528	1	IA

[1]LAG = LAG "Alto Molise"; IA = Internal Area "High and Medium Sannio"

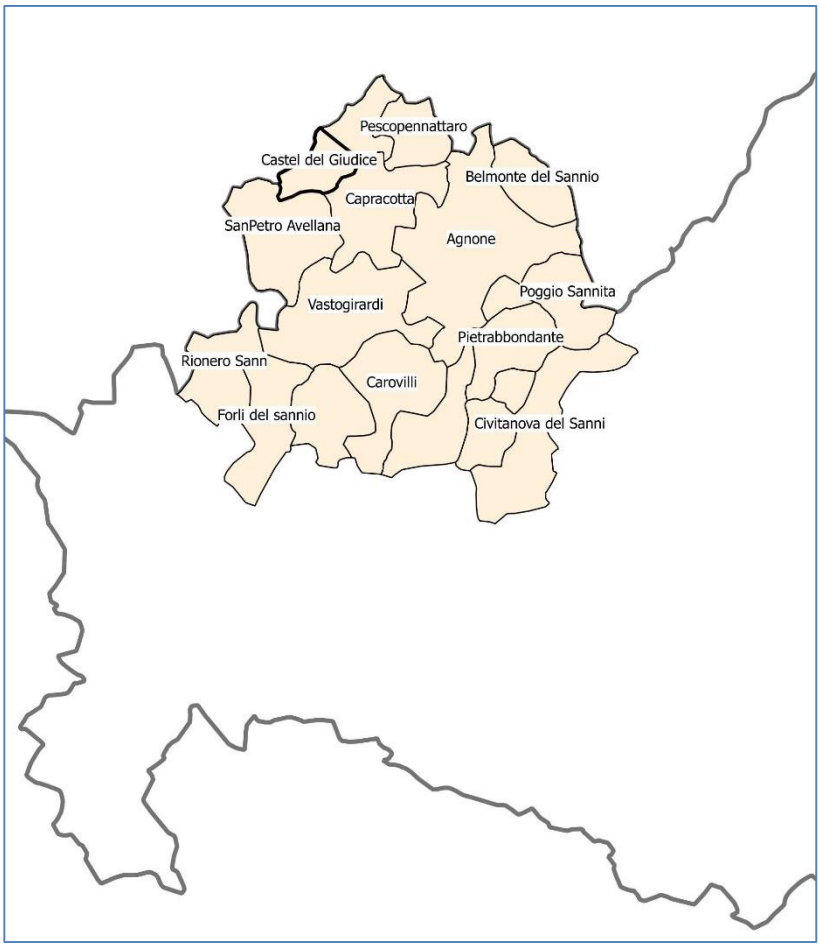

Fig 3. LAG "Alto Molise". Source: own elaboration

In the Leader area to which Castel del Giudice belongs (LAG "Alto Molise", composed by 18 municipalities) similar characteristics were presented by three other municipalities (Poggio Sannita, Sant'Angelo del Pesco and Vastogirardi), whereas the other two municipalities (San Pietro Avellana and Pescopennettaro) showed positive values of factor 4, although accompanied by factor 3 scores with opposite sign in respect to Castel del Giudice; also other factors have different intensities. The PCA detected similar features also in municipalities that didn't belong to Castel del Giudice cluster (e.g.: Belmonte del Sannio, Capracotta).

The same results substantially emerged from the comparison of the factor scores of Castel del Giudice with the municipalities belonging to larger areas, such as the Internal Area "High and Medium Sannio" and the municipalities of the inner mountain areas, although it should be noted that four municipalities (Castelbottaccio, San Felice del Molise, and Roccavivara) obtained the same high positive value of the factor 4, but different signs and intensities for factors 2 and 3.

Eventually, the multivariate analysis of the two case studies, if interpreted at the light of the steps of their development path, allows the identification of the organic district as a last stage of an evolutionary course prompted by neo-endogenous processes in which organic supply chains are central. In the high Vara Valley, the Organic district is a consequence of emulation effects that led the neighboring municipalities to replicate some elements of the success of Varese Ligure. On the other hand, a territorial overview of the factor scores of Castel del Giudice and its neighboring municipalities, reveals that the same type of processes is taking place nearby. Closer municipalities (Pescopennataro, San Pietro Avellana, Sant'Angelo del Pesco and Vastogirardi), all belonging to the "organic-driven resilience" cluster and to the LAG "Alto Molise", are characterized by relatively high positive values of the "social organic" factor 4 and negative values of factor 2 "agricultural development", similarly to Castel del Giudice.

6. Discussion

The tandem analysis “PCA + cluster analysis” has been often utilized in territorial classification (among others, Soares et al., 2003; del Campo et al., 2008; Mahmood & Ahmed, 2014). In this paper, the refinement of the PCA results by means of a cluster analysis and the subsequent exploration at the level of territorial governance has proven to be effective in pinpointing two different development processes, that, although not directly comparable, we both labelled as “neo-endogenous”. The overview of the two case studies allowed the identification of a common line of development that involves organic supply chains. As far as the action of the supply chain is supported with the contribution of exogenous actors, that give strength and perspective to the development processes, it will also induce effects of emulations when the critical mass is reached at territorial level. Nevertheless, these effects need to be governed by new institutional arrangements.

The results of the PCA have shown that local development, in both regions, follows similar paths. On one hand, it was made possible to identify a group of municipalities that are more growth-oriented, even at the expenses of their territories, that are immune to depopulation and act as attractors. On the other hand, there is a consistent knot of municipalities where agriculture and supply chains have a prominent role in local development. Moreover, it seems that, whenever organic farming gets to a certain territorial relevance, there are also social benefits, such as an increment of migration rates and lower youth unemployment. In between, there are the municipalities we defined as “resistant”, where demographic decline is counteracted with economic diversification.

In such a framework, the cluster analysis placed Varese Ligure among those municipalities where the scarce performance of socio-demographic indicators was paired with a certain presence of organic farming and a pristine territory characterized by extensive agricultural practices. The focus on the municipalities of the Organic district, all belonging to the same cluster, have shown that, whenever local organic farming and its supply chain are strengthened, territories become more attractive and it is possible to counter local unemployment.

Within the cluster, the most relevant similarities were registered among the scores of factor 5 (social-organic) of those municipalities belonging to the Organic district; if not in the magnitude, at least in the polarities, as it should be expected from a territory that is relying on organic farming for its development.

Organic supply chains had a fundamental role in local processes. Although the socio-economic effects of their establishment have not been reached yet outside Varese Ligure, their presence have created the conditions for the birth of the Organic district and made the territory more attractive.

Similar insights can be claimed for Castel del Giudice and neighboring municipalities. Here, the choices entailed a more complex approach to local development, they envisaged the early involvement of neo-endogenous actors and a stronger diversification of local economy with the result of incrementing the average revenues, although still ineffective in counteracting depopulation. Although the growing territorial relevance of organic farming has not been steered towards a district yet, the stakeholders started to discuss about this possibility (Comune di Castel del Giudice, 2017). In line with that, the results of this study identified a first group of municipalities with higher presence of organic farming. This can be considered as an aspect of identity that it might easily trigger mechanisms of cooperation, similarly to what was observed in Varese Ligure and surrounding area.

Still, the clustering process showed that the municipalities with the most similar composition of factor scores were the ones already located in the Local Action Group, thus proving that an inner capacity of the territories to self-organize and curb the decline does already exist.

The statistical procedures used in this work granted the selection of a set of suitable variables to be reasonably applied in other studies concerned with territorial dimension of development. All of them are easily retrievable from national data wares, although the main limitation has concerned the time discontinuity of the variables selected because of their lack of complete availability. Even though this year-missing may attenuate the dynamics at the level of local

development, on the other hand, it doesn't affect the empirical evidences found during the eight-year period of investigation. The integrated tandem approach (i.e., PCA and cluster analysis) seems to be appropriate in responding to the research needs in the field of policies assessment, that are rapidly shifting from the analysis focused on farms or specific sectors, towards the evaluation of complex phenomena at a territorial level.

7. Conclusions

The two case studies describe a process of neo-endogenous centered around organic farming.

In Varese Ligure, the strengthening of the local organic supply chains contributed to the rise of a strong territorial reputation that attracted exogenous actors and led to the birth of the organic district that now is called to manage internal area resources and assets (Sturla et. al, 2019). In Castel del Giudice, exogenous actors have collaborated with local administrators for a greater diversification of economic activities, thus prompting a season of renewal that led to a radical change in local economic and social structure. Despite these changes, however, the organic farming remains the main driver of the social change.

Both in Varese Ligure and Castel del Giudice, the development of organic farming followed steps, which led even to the identification, in the second case, of a potential organic district in the area through the PCs and cluster analysis, according to a scheme that has been already observed in similar circumstances. Schermer and Kirchengast (2008), in fact, outlined three phases in the development of an organic district. The first phase, prompted by the conversion of some farms, leads to an above-average incidence of organic UAA that, in turn, fosters the association of organic producers. The second phase establishes a network among the various operators in the organic supply chains, whereas in the last third phase networks widen beyond the agro-food supply chain till reaching all the actors and stakeholders in the territory, so as to facilitate the transfer of organic agriculture principles to other activities that are carried out on the territory (Schermer, 2004), including consumption. Actually, not all the organic districts follow this process. In Italy, some of them started before the consolidation of local organic agriculture, so that the conversion of farms to this method of production was more like a top-down goal of the organic district, rather than the starting point that legitimizes its constitution. This kind of approach fails in fostering awareness in farmers and, therefore, in creating a local collaborative milieu that involves the community at large, actively shared by all organic producers (Schermer and Kirchengast, 2008). Compared to other forms of agriculture, in fact, organic farming contributes most to rural development thanks overall to the closer relationship between producers and consumers (Schermer and Kirchengast, 2008), that characterizes alternative food networks, implying a relationship of trust focused on products safety between producers and consumers, but not necessarily resident of a particular territory. However, the importance of having local community to support organic farming as a means to consolidate its effects on sustainable land management (Eyhorn et al., 2019), it is inherent to the same definition of organic district drafted by its main promoters (AIAB, 2016; INNER, 2017), that provides that citizens are fully entitled to participate to the sustainable management of local resources (see note 2). In the case studies described in this paper, indeed, citizens' involvement is part of the process. In the Vara Valley, it has been fostered by the organic district, while in Castel del Giudice it has been part of a specific strategy from the very beginning. In both the areas, the setting up of viable short supply chains for organic products has been a pivotal point, since it activated internal potential for development that involved a wider group of actors, therefore, it resulted in new institutional arrangements, in accordance to neo-endogenous development model (Ray, 2001).

Since scholars' interest on organic district has been growing, future research efforts should go beyond the exploration of the role of organic supply chains in local development and be focused on the investigation of the organic district as a community and thus understanding how neo-endogenous processes affect local societies as a whole.

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