Quality of life and social inclusion of inland areas: a multidimensional approach to performance policies and planning assessment

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Abstract. Improving quality of life and social inclusion is one of the priorities of national and community policies. Adopting the approach based on capabilities-functioning, the aim of this paper is to measure a *Quality of Life* (*QoL*) index of communities, selecting the specific variables that may influence quality of life of inland areas, such as: economic opportunities, health care, education, cultural and leisure activities, work-life balance, health and environmental protection. A *QoL* index for three dimensions (economic, social and environmental) and a global *QoL* were calculated using a non-compensatory method. The values obtained are included in the 70-130 range. The model, applied to the Basilicata region (131 municipalities), takes values in a range between 93 and 105, with 61% of municipalities with a global *QoL* below the regional average (= 100). It tends to assume lower values in inland areas: 62% of inland areas are characterized by a global *QoL* below the regional average, due in part to fewer economic opportunities and social services, but also to the presence of major landslides and seismicity risks, against a greater health and environmental protection. The opportunity to assess the quality of life through an index, over time, may help *policy makers* addressing policies and evaluating their effects. Furthermore, an analysis of spatial autocorrelation helps identify different clusters and spatial outliers, useful for the identification of areas requiring priority interventions and future actions, which should take into account a balanced growth of the economic, social and environmental dimensions related to the quality of life.

Keywords: Quality of Life • Social inclusion • Multidimensional approach • Non-compensatory method • Spatial autocorrelation

1 Introduction

Inland areas, which are predominantly rural, have suffered, especially in the last 50 years, a process of marginalization, which has led to a gradual decline in employment and productivity, reduced share capital, land abandonment, and consequently, the loss of soil protection and a landscape modification. This contributed to public negative stereotyping considering inland areas as “peripheral” zones subject to a negative rela-

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tionship between centre and periphery, which concerns access to services and other economic opportunities, social interaction, culture [1].

To contrast this process of marginalisation, the National Strategy for the Internal Areas (SNAI) was launched in 2012, with focus towards:

- an *intensive* development, with the increase in well-being and social inclusion of those living in these areas;
- An *extensive* development, with the increase in labour demand and utilization of territorial capital.

Therefore, SNAI is set up as a long-term strategy, with a territorial value, to improve social inclusion in a number of multidimensional results, through the provision of public goods and services, by first ensuring socially shared essential standards for everyone and then improving the welfare of less advantaged groups [2].

This means identifying an approach for the evaluation of the performance of territorial type, according to a multidimensional approach. Many features related to people's lives actually depend on the territory in which they live that influences the "socially acceptable level" and implies inequality polarization at a regional scale, thus making it necessary and desirable to carry out a more detailed analysis, with a spatial value.

On the basis of the issues and strategies discussed, the objective of this work is to measure the *Quality of Life* (*QoL*) of people at a local level, based on the existing opportunities in the territory. This is feasible through an approach that provides for the selection and manipulation of variables that can influence the quality of life of inland areas [3] [4], such as: economic opportunities, health care services, education, cultural and leisure activities, work-life balance, health and environmental protection.

This approach can be referred to the theory proposed by Sen [5], based on Capabilities-Functionings. This theory leads us from the space of goods, income, utilities towards the space of the building blocks of living, functionings, which are the set of actions and conditions that affect lives (health, education, nutrition, etc.), and capabilities representing the set of functionings that can be reached on the basis of the type of life, given by opportunities and freedom of choice [6]. Many authors [7] [8] argue, in fact, that conventional measures based on income, wealth and consumption, are insufficient to assess human well-being, since they exclude a large category of key factors, such as environment, health, social inclusion, etc. In fact, the Stiglitz Report [9] laid the foundations for a multidimensional approach to the welfare estimates. This approach is generally regarded as a significant enrichment for policy analysis; on the other hand, there is no consensus on how to define the most appropriate multidimensional space. Following different paths, several studies attempt to calculate an index of quality of life starting from the existing opportunities in the territory [10] [11]. In recent years, there has been growing interest in the compilation of composite indicators of well-being at the local level [12] [13] [14].

Based on the above, the innovative element of the research lies in the implementation of a methodological framework able to obtain real-world summary data (in terms of quality of life), by using a non-compensatory method to aggregate variables, and to enhance the territorial units in which indicators have balanced levels of performance in the three dimensions (economic, social and environmental) of sustainable development. This aggregation function indicates in some detail the imbalances (highlighted by means of a spatial autocorrelation analysis), so as to to verify, in the specific case, the existence of functional relations between what happens in a specific location of the space and what happens in other positions. This enables the identification of the outliers and "homogeneous" areas, characterized by a favourable condition, (in a positive sense) or by marginality (in a negative sense), compared to the general condition (in this case the regional one).

The results represent a tool to assist *policy makers*, within a general concept of equalization of quality of life, to have a redistribution of resources aimed at levelling out imbalances among territories and encouraging social inclusiveness.

2 Materials and methods

2.1 Model implementation

The assumed model is based on the relationship between the level of quality of life of the individuals living in the *i-th* municipality (QoL_i) and the level of existing opportunities in a given area (t_r), including the services s_r provided in the *i-th* area.
The basic assumption is that the individual well-being may be expressed as:

$$QoL_i = f(\bar{y}, t_r) \tag{1}$$

Where$t_r = f(s_r)$, $\bar{y}$ is the vector of individual conditions (employment, gender, etc.) that is considered exogenous to the model.

The indicators that most contribute to define levels of *QoL*, are important to emphasise the territorial disparities in well-being [3] [4], depending on the availability of data at the required level of detail, which is quite high in the present analysis. The dataset applied to develop the model includes a set of **basic indicators** derived from different sources (National Institute of Statistics - ISTAT, property market Observatory, regional technical map - CTR, Higher Institute for Environmental Protection and Research - ISPRA, river basin authority, etc..) that have been grouped in **thematic areas** and further categorised based on the relevant **dimensions** (economic, social and environmental) (see Fig. 1) (Appendix – List of indicators included in the model).

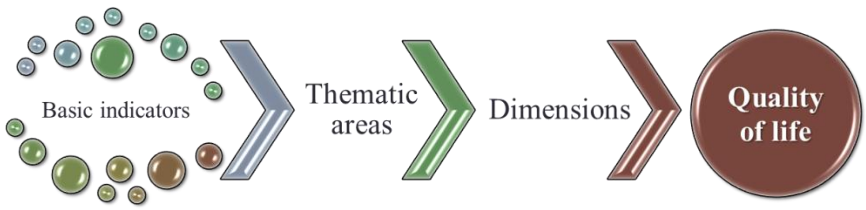

Fig. 1. Grouping process

The economic dimension is meant as the level of wealth owned by a single individual or a population; you can express it in both income and equity terms. The indi-

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cators - relating the economic dimension - concern the number of bank branches and the average estate prices as proxy of the economic well-being and of the economic opportunity of an area. Indeed, the assumption is that the number of bank branches in a municipality is proportional to the population and to the amount of operating volumes (loans and deposits). The average estate prices of the last five years reflect the economic dynamism of an area and depend, for instance, on population trends and on the level of the “services and quality” provided [15].

The concept of social sustainability, defined as the ability to guarantee human welfare conditions (safety, health, education) equally distributed, was considered in terms of spread and proximity to services/facilities/activities that exercise a decisive influence not only on the everyday life organisation of a community, but also on its mobility and degree of external dependence. The presence of healthcare settings is an essential condition influencing citizens’ security, or their possibility to receive preventive care services and appropriate treatment. These services are widespread, although access to them may vary for the citizens of different municipalities. Other factors were included, such as the spread and proximity of education services, recreational facilities (camping sites, sports structures, playgrounds) and cultural activities (libraries, cinema, museums, theatres, etc.), non-decentralised departments (courts, chambers of commerce, etc.).

To take into account proximity, the travel time to reach different services was calculated by the isochrones method, using GIS, via the Network Analysis [16]. Among daily trips that influence the organisation of everyday life, those related to work or study were shown to be prevailing, so they were used to derive the homework mobility rate and the mean journey time.

The environmental dimension is expressed in the form of natural capital and/or natural heritage[1], to be understood in the ability to provide essential goods and services for human well-being. Consequently, in order to outline this dimension, the following indicators were considered: population equivalents [18] that reflect the estimated pollutant load produced by domestic and economic activities; the proximity to waste dumps and industrial areas that may affect the environmental health; the availability and extent of areas characterized by high ecological-natural value; and the presence of factors of environmental risk (hydro-geological and seismic risks).

2.2 Aggregation of indicators by a non-compensatory method

A non-compensatory approach, i.e. the method of the coefficient of variation penalty [19], was applied in order to develop the composite indicator. This method enables a synthetic measure of quality of life for each territorial unit x_i , assuming that each component of the *QoL* is not substitutable or is only partially substitutable. This approach, different from other compensatory aggregation methods applied [20], requires a balanced supply of all basic components.

[1] In economic terms, natural capital can be seen as a resource to manage and increase, while the inheritance is the resource within the transmission concept [17].

The method involves standardising indicators by using a transformation criterion to release them from their units of measurement and variability [21]. Therefore, basic indicators have been corrected so as to be ranged within the same scale, by transforming each indicator in a standardised variable with an average of 100 and a mean square deviation of 10; the values obtained will be approximately comprised within the range 70-130.

Thus, once the matrix $X = \{x_{ij}\}$ of n rows (territorial units) and m columns (basic indicators) was constructed, the next step was the matrix $Z = \{z_{ij}\}$:

$$z_{ij} = 100 \pm \frac{\left(x_{ij} - M_{x_j}\right)}{S_{x_j}} 10 \qquad (2)$$

Where $M_{x_j} = \frac{\sum_{i=1}^{n} x_{ij}}{n}$ is the average and $S = \sqrt{\frac{\sum_{i=1}^{n}\left(x_{ij} - M_{x_j}\right)^2}{n}}$ is the mean square deviation.

Then, the aggregation function (Mazziotta-Pareto index - MPI) was "corrected" by a penalty coefficient that depends, for each territorial unit, on the degree of variability of indicators from the mean value ("horizontal variability").

$$MPI_i^{+/-} = M_{z_i} \pm S_{z_i} cv_i \qquad (3)$$

The arithmetic mean (M_{z_i}) of standardised indicators is corrected by subtracting an amount (the product$S_{z_i} cv_i$) proportional to the mean square deviation, and is a direct function of the coefficient of variation.

This variability, measured by the coefficient of variation (cv_i), penalises the scoring of the units with the highest imbalance between the values of indicators and, hence, an imbalanced supply. The use of standardised deviations (S_{z_i}) enables a robust measure that is not influenced by the elimination of a single basic indicator [19]. The main disadvantage lies in the possibility of making only 'relative' comparisons of the values of units over time, with respect to the average. The method has been applied to calculate the *QoL* for each dimension: economic (*EcQoL),* social (*SocQoL*), and environmental (*EnvQoL*) - and then to calculate a global *QoL* (*TotQoL*) that takes into account all basic indicators.

2.3 Spatial autocorrelation analysis

To give to research a specific imprint referred to the geographical context and territorial dynamics, the analysis was accompanied by spatial processing in order to further contribute to the knowledge and research in the area. Thus, although the examination of maps may lead to the rational conclusions on the presence (or absence) of spatial dependence, this analysis enables some conclusions to be drawn, independently of the technique used for the representation (for example in the identification of classes). So

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in this paper we explore a procedure for creating statistically robust hot/cold spot maps. It is possible apply several methods, that include the application of point pattern analysis techniques to identify for spatial clustering, spatial dispersion, spatial autocorrelation, and Local Indicators of Spatial Association (LISA).

A primary step that is often avoided but is fundamental to the detection of clusters of points/features are global tests, that indicate if clustering and dipersion exist in the original point/feature distribution. For example, whether the features show evidence of clustering or are randomly distributed, and how dispersed the distribution is within the three dimensions of QoL. There are several approaches for analysing a point or feature distribution for spatial randomness. Most of them incorporate the basic principles of hypothesis testing and classical statistics, where the initial assumption is that the point/feature distribution is one of complete spatial randomness (CSR). By setting the CSR assumption as the null hypothesis the point distribution can be compared against a set significance level to accept or reject the null hypothesis. So several techniques and algorithms have been developed and are used in practise for the generation of hotspot maps, used mainly for creating hotspot maps of crime [22] [23], all of which have different merits. These mainly relate to their ease of use, application to different types of events, visual results and interpretation.

In particular, in the case of aggregate counts within a certain geographic area, the use of the spatial autocorrelation technique, Moran's I, is suggested to test for clustering [23]. The spatial autocorrelation analysis expressed the spatial concentration of similar values (in the case of positive interdependence) or different values (in the case of negative interdependence). Therefore, the geo-referenced dataset was tested for the presence of global spatial autocorrelation, Moran's I [24], considering the entire set of observations, indicates the trend of analysed data to focus (or less) in space. Moran's works by comparing the value at any one location with the value at all other locations. The significance of the results can then be tested against a theoretical distribution (one that is normally distributed) by dividing by its theoretical standard deviation [23].

Furtheremore LISA statistics have been described as being particurarly suited to identyfing crime hotspots, but they are applied also to different contexts [25] [26] [27] [28] [29]. LISA statistics assess the local association between data by comparing local averages to global averages. For this reason they are useful in adding definition to hot/cold spots, and placing a special limit on these areas of highest/lower concentration [23]. Therefore the presence of local spatial association was also tested within the analyzed data, for characterizing geographically the area with different types of correlation. Five distinct situations were detected:

- Hot spots: observations with a high value of the variable under study with similar neighbours (if high-high);
- Cold spots: observations characterized by a low value of the variable under study with similar neighbours (if low-low);
- Spatial outliers: observations with a high value of the variable under study but with neighbours characterized by low values for the same variable (if high-low);
- Spatial outliers: observations characterized by a low value of the variable under study but with neighbours characterized by high values for the same variable (case low-high);

- Observations that do not have local autocorrelation situations significantly different from zero (no significance).

More specifically, by applying the Getis-Ord Gi* [30] and the Local Moran I [31] to the three selected dimensions, it is possible to calculate the degree of similarity with respect to other nearby observations, counting - at the same time - the statistical significance.

The expression that characterizes the Getis-Ord Gi * I is the following:

$$G_i^* = \frac{\sum_{j=1}^{n} w_{i,j}\, x_j - \bar{X}\sum_{j=1}^{n} w_{i,j}}{S\sqrt{\frac{\left[n\sum_{j=1}^{n} w_{i,j}^2 - \left(\sum_{j=1}^{n} w_{i,j}\right)^2\right]}{n-1}}} \tag{4}$$

Where x_j is the attribute value for feature j, $w_{i,j}$ is the spatial weight between feature i and j, n is equal to the total number of feature and $\bar{X} = \frac{\sum_{j=1}^{n} x_j}{n}$ $S = \sqrt{\frac{\sum_{j=1}^{n} x_j^2}{n} - (\bar{X})^2}$.

The expression that characterizes the Anselin Local Moran I is the following:

$$I_i = \frac{x_i - \bar{X}}{S_i^2}\sum_{j=1, j\neq i}^{n} w_{i,j}\,(x_j - \bar{X}) \tag{5}$$

Where x_i is the attribute value for feature i, $\bar{X}$ is the average of the corresponding value, $w_{i,j}$ is the spatial weight between feature i and j, and $S_i^2 = \frac{\sum_{j=1,j\neq i}^{n}(x_j - \bar{X})^2}{n-1} - \bar{X}^2$, n is equal to the total number of features.

3 Results

The model, applied to the Basilicata region, assumes a *TotQoL* variable in a range of values comprised between 93 and 105 (see Table 1), with 61% of municipalities characterized by a *TotQoL* below the average (= 100) (Fig. 2a).

By analyzing the different dimensions, the results were the following:

- The EcQoL (91-130) is characterized by a wide variation range (St. Dev. = 5.9) with a max value that is considerably spaced from the average (Table 1), but with 53% of municipalities characterized by a value of EcQoL below the average (Fig. 2a). This means that these values, although high, affect very few municipalities in relation to the general condition that appears to be below the regional average or otherwise around the mean.
- The *SocQoL* (88-113) is characterized by a less wide variation range (St. Dev.= 4.1) with min and max that are almost equally distanced (Table 1), with 60% of municipalities characterized by a *SocQoL* below the average (Fig. 2a).
- The *EnvQoL* (73-109) is characterized by a slightly wider variation range than the *SocQoL* (St. Dev. = 4.5), but with a min that is considerably spaced from the average (Table 1); 56% of municipalities are characterized by an *EnvQoL* below the average (Fig. 2a).

Table 1. Descriptive statistics of *EcQoL*, *SocQoL, EnvQoL* and *TotQoL*

	EcQoL	*SocQoL*	*EnQoL*	*TotQoL*
Min	91	88	73	93
Max	130	113	109	105
Mean	100	100	100	100
St Dev	5.9	4.1	4.5	2.5

Looking at the territories of the two provinces (Potenza and Matera), there is a considerable difference, with a percentage of municipalities with *TotQol* respectively of 69% and 35% below the regional average (Fig. 2b and c); this difference is maintained even if you examine the three dimensions individually (Fig. 2b and c). In fact, while the province of Potenza is characterized by a prevalence of municipalities with a low quality of life, the province of Matera has a prevalence of municipalities with a quality of life above the regional average (100% of municipalities for the economic dimension) with the exception of the environmental dimension (Fig. 2b and c).

Maps show the geographical distribution of the index and its components (Fig. 2d, e, f and g).

Applying Moran's I that assumes values between -1 and +1, (and the relevant z-score and p-values– a measure of statistical reliability), in the three considered dimensions, higher values than zero were found (z-score> 2.58 and p-value <0.01 with a significance level of 99%) (Table 2); the dimension with the highest spatial autocorrelation is *EnvQoL*, followed by *EcQoL* and *SocQoL*.

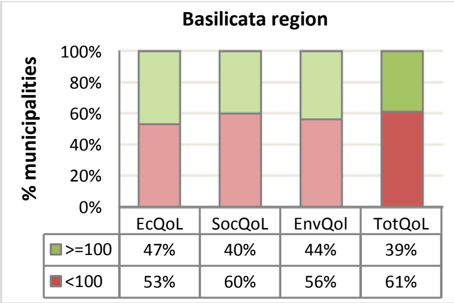
Table 2. Moran's Index for *EcQoL*, *SocQoL*, *EnvQoL* e *TotQoL*

	Moran's I	z-score	p-value
EcQoL	0.184203	3.929312	0.000085
SocQoL	0.174758	3.646187	0.000266
EnvQoL	0.267113	5.674260	0.000000

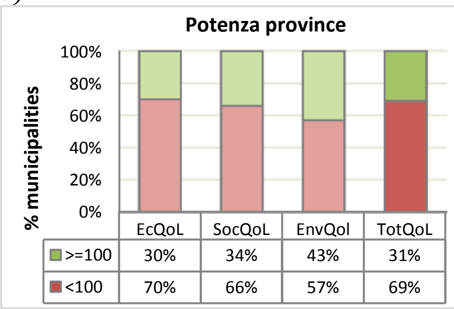
The Anselin Local Moran and the Getis-Ord Gi * enabled to obtain negative and positive clusters (Fig. 3), by setting a precise significance level. The Getis-Ord Gi* compared to Anselin Local Moran leads to the identification of clusters located in the same positions but affecting more municipalities (cold spots and hot spots).

In general, for the *EcQoL* and *SocQoL* you may experience a partial overlap of the clusters. In particular, for the *SocQoL* it is possible to identify the hot spots in the regional centres (Potenza and Matera); for the *EcQoL* the hot spots are identified in Matera and along the Ionian coast. The environmental dimension affects some areas situated in the southern part of the region. For *EnvQoL,* cold spots are delineated in the most industrialized areas (Potenza, Vulture, Matera and Metapontum), and hot spots in the southernmost part of the region (Fig. 3b, d, and f).

The Anselin Local Moran I can be detected when the spatial outliers for economic dimension in the municipalities of Potenza (high-low) and Lauria (high-low) and the *SocQoL* in the municipalities of Venosa (high-low) and Cancellara (low-high) (Fig. 3a, c and e).



a)



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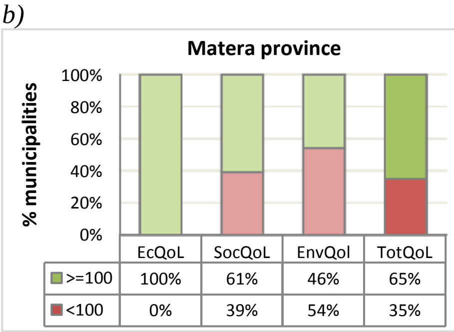

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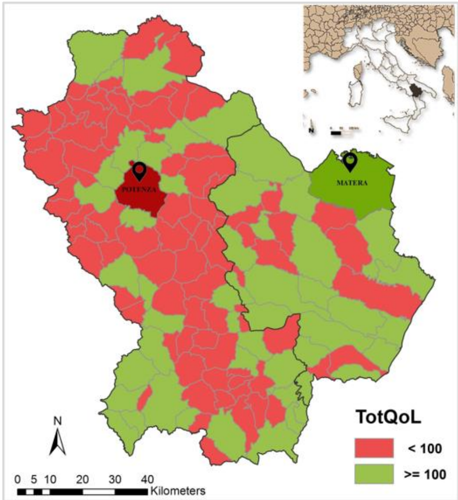

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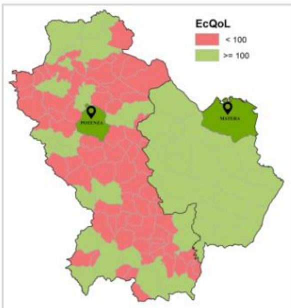

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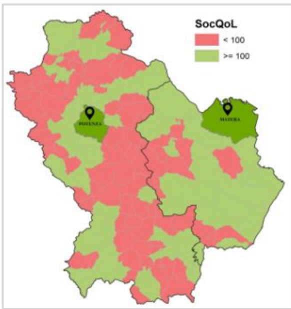

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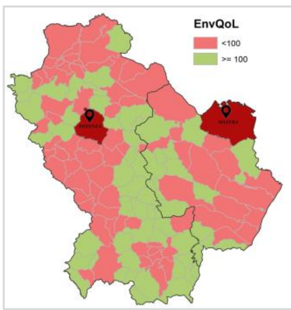

g)

Fig. 2. *QoL* at regional and provincial level

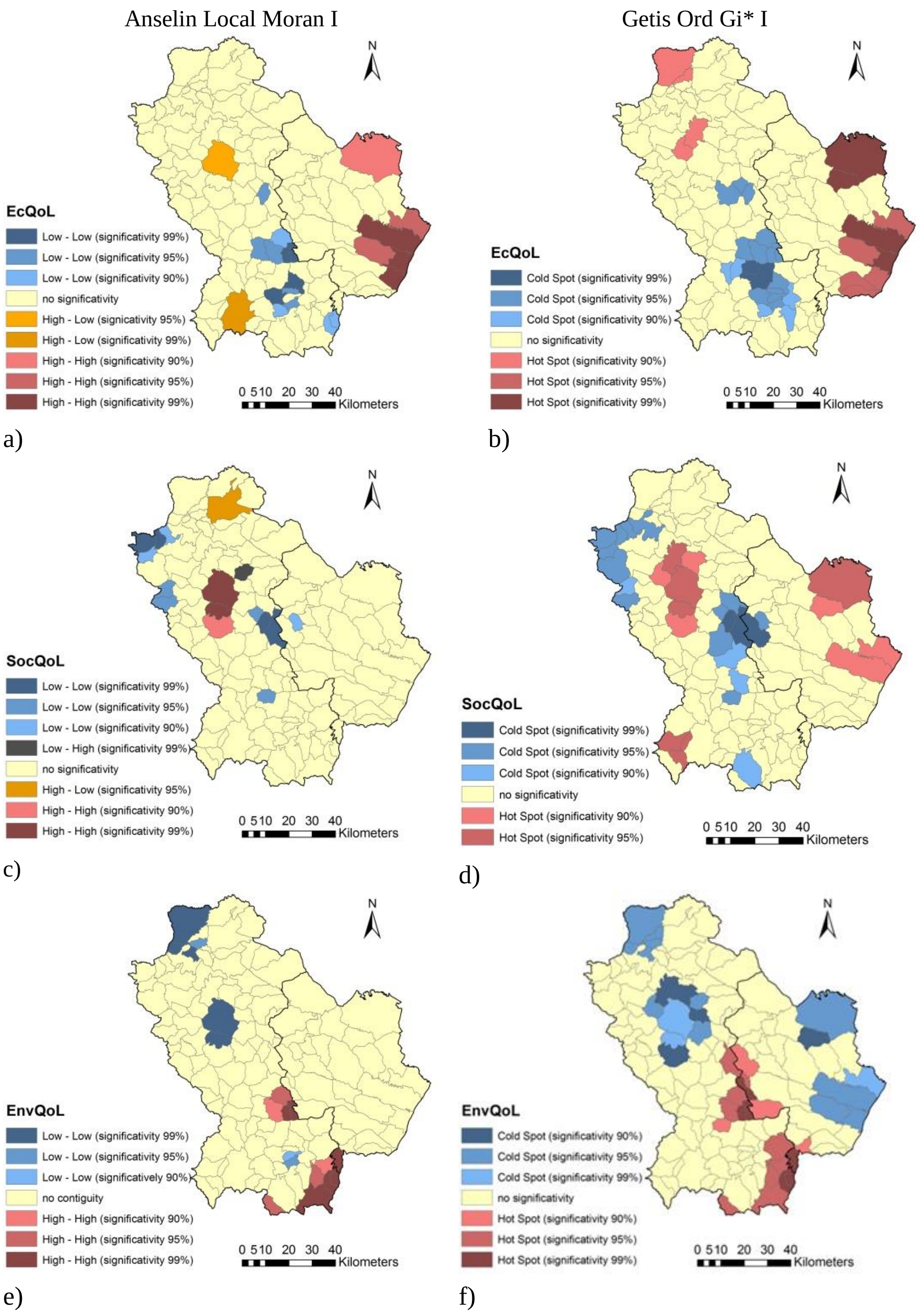

Fig. 3. Anselin Local Moran I and Getis-Ord Gi* I of *EcQoL*, *SocQoL* and *EnvQoL*

4 Discussion

First of all, the analysis of the data reveals a significant difference between the two provinces, partly related to the morphological diversity of the territory: the province of Potenza is characterized by a mainly mountainous (Apennines) and hilly territory (clay soils in 45.13% of the region, subject to erosion resulting in landslides), while the flat part (8% of the region) is concentrated in the province of Matera along the Ionian coast. Considering that the regional population is mostly concentrated in large centres, the distribution in percentage is the following: 56% live in the 12 largest towns in the region, 27% live in medium-sized centres, namely those between 5,000 and 9,999 inhabitants, and the remaining 17% live in small towns, which are mostly concentrated in the province of Potenza (82 municipalities out of 100 are below 5,000 inhabitants, of which 52 below 2,000 inhabitants).

Furthermore the analysis allows to delineate areas that offer ecosystem, natural, landscape and cultural resources with a direct impact on the welfare of people: they are highest in the suburbs and minimum in the central agglomerations. On the other hand, in some areas vulnerability conditions still persist as a result of risk factors (related to landslides and seismicity of the area), which affect, for example, the quality of road infrastructure, thus aggravating the socio-economic situation (there is a series of cold spots in the central portion, in north-western and southern areas of the region – Fig. 3a, b, c, and d).

In particular, the municipality of Potenza (hub) outlines a traditional monocentric and polarized structure of the province, meaning a relatively large dominant centre surrounded by a general economically stagnant condition. In fact, at the hub you can record an increase in population, which moves in order to have access to commercial and public interest services that have a higher concentration in the urban centre, where wider demographic dimensions guarantee market demand and adequate catchment. Matera's hub, instead, shows a much more uniform situation in the province but a more balanced offer of services, thus indicating a functional relationship between different municipalities.

By comparing the national classification of Inland Areas based on their peripherality from essential services [32], the variables identified for calculating the QoL allow a more complete and accurate reading of the sub-regional territory. Different areas can actually have a positive or negative connotation in relation to the general context, depending on the dimension concerned. The factors considered, in fact, allow to discriminate in a more precise manner the imbalances on the territory, highlighting, for example, the areas that have developed autonomously, in terms of many important services, even though - or maybe simply because – they are distant from the hubs. An example is the hot spot of municipalities along the Ionian coast, whose *QoL* conditions are above the regional average, although they are distant from the two regional centres and their areas are classified as peripheral in the national classification (Fig. 3a and b).

Moreover, Inland Areas include not only weaknesses, as the hot spots related to the environmental dimension characterize territories that may be less "attractive" in relation to the level of services offered (Fig. 3e and f); they also involve strengths, related

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to their still unexploited potentials (this is the case of the areas of great natural value that could offer important opportunities for tourism, recreation and gastronomy). This reinforces the strategy targeted towards interventions aimed at improving services, at least with the aim of ensuring sufficient life opportunities to maintain and attract population for territory stewardship.

In fact, results confirm that there is a difference in the population rate between 18 and 35 years[2] equal to +1.47% (*EcQoL*) and +0.62 (*SocQoL*), respectively, of hot spots compared to cold spots; it follows that socio-economic characteristics are the main factor influencing the residential choices (compared for example to issues, such as environmental health) of that population segment which must "ensure" a reversal of demographic trends.

5 Conclusions

The methodological framework developed is an important tool to support the actions already undertaken and those that still need to be undertaken, with a view to smoothing out regional imbalances and promoting social inclusion, with special reference to EU funds managed by the regions (Rural Development Programme 2014-2020) and resources targeted specifically by the Stability laws of 2014 and 2015 [33].

The results facilitate decision-making: global QoL provides an overall idea, a measure of the gap in quality of life of each territory with respect to the regional average. In addition, the observation of the index components enables the definition of more specific guidelines on which to focus the attention and the available resources to foster a balanced growth of the three dimensions of sustainable development. The non-compensatory nature of index components ensures the possibility of identifying peculiarities (both positive and negative), and rewarding the areas characterized by a balance of all indicators, assuming that these indicators/dimensions are not substitutable.

The results reveal a level of quality of life that tends to decrease from the centres to the internal areas, with the possibility to distinguish clusters under marginal conditions from clusters under favourable conditions. In addition to morphological and demographic characteristics of the territory, the presence of basic and leisure services turns out to be differentiated. On average, the populations of municipalities in inland areas take more time and resources than urban municipalities to access different services offered (hospitals and health care facilities, cultural, sports and recreational opportunities), where there is a greater presence of those services. It is particularly interesting to point out that the two provinces are not homogeneous: Potenza's hub has a territorial structure that tends to be more monocentric with respect to that of Matera, which is instead more aligned towards a polycentric territorial development

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[2] It has been empirically demonstrated that there is a positive relationship between the proportion of population and the factors related to quality of life, in particular the 18-35 age group, which is particularly sensitive to the level of quality of life [4] [34] [35]; therefore it represents a proxy for assessing the effectiveness of the proposed model.

model. At regional level, polycentrism implies the promotion of complementary and interdependent municipalities' networks that can ensure rural environment integration.

In order to encourage development opportunities, the authors consider it necessary to pay particular attention to the problems related to the presence and accessibility of services. The possibility of ensuring the coverage or capillarity of services would lead to reduce the migratory balance, troubling especially in more marginal areas. In a perspective of local development policy, the abandonment of these areas could undermine the maintenance of the territory reducing “non-market” services (ecosystem services).

In fact, as shown by the analysis, municipalities of inland areas (mostly rural) are also those with a greater ecological and natural value but also with major landslide risks. The smallest municipalities (mainly concentrated in the province of Potenza) turn out to be the most sensitive and, therefore, would require more attention, for example, by promoting forms of association between municipalities (Dgls. 267/2000), as intended into the SNAI.

Although the methodology makes it possible to obtain significant results and a solid foundation of knowledge useful to determine specific and targeted policy instruments, it is believed that there is room for fine-tuning the indicators to be considered (e.g. qualitative indicators). It would be useful, furthermore, to carry out more detailed assessments both in space and time, the latter being useful for determining the growth/decline trends. In this sense, a limit may be represented by the availability of data.

Another important issue to be addressed in future studies is the possibility of linking the information acquired through the methodology applied in this study with the interventions implemented in previous years (with particular reference to the old rural development programs). At present, there is indeed no information relating to the actions already taken. Such a step would lead to even outline the possible paths to be pursued for future programs.

In conclusion, the proposed framework can present a useful tool in the current political context in the implementation of actions aimed at gradually reducing regional disparities in terms of quality of life, that follow these goals:

- address of interventions, which should take into account balanced growth of the (economic, social and environmental) dimensions of quality of life;
- ex-ante and ex-post effects evaluation of the carried out interventions, as a synthetic "measure" of achievements in terms of improving the quality of life;
- identification and, if necessary, redistribution of the areas that need priority interventions and resources.

adfa, p. 13, 2011.

Appendix

Dimensions	Thematic areas	Polarity	Indicators	Calculation method	Unit of measure	Data source	Reporting year
Economic dimension	Economic opportunities of the territory	+	Average Purchase Prices of Real estate (PPR)	-	€	Italian Real estate market monitor	2010-2014
		+	Bank Branches Number (BBN)	-	number	Bank of Italy	2015
Social dimension	Proximity to places of work/study	-	Mobility rate Domicile-Work/Study (MDWS)	(Number of individuals who move to another town/residents' number)*100	%	Elaboration on ISTAT data – Census population 2011	2011
		+	Proximity rate Domicile-Work/Study (PDWS)	(Number of individuals who employ <15 minutes to reach work/study/residents number)*100	%	Elaboration on ISTAT data – Census population 2011	2011
	Spread and proximity to health and educational facilities	-	Mileage Time to reach Hospital structures (MTH)	-	minutes	Our GIS processing - CTR	2015
		-	Mileage Time to reach Secondary schools (MTS)	-	minutes	Our GIS processing - CTR	2015
		+	Percentage of Education services (PEd)	(Number of schools/population densi-ty)*100	%	Our GIS processing - CTR	2015
	Proximity to non-decentralized services	-	Mileage Time to reach Administrative offices (MTA)	-	minutes	Our GIS processing - CTR	2015
	Cultural and recreational facilities	-	Mileage Time to reach Cultural activities (MTC)	-	minutes	Our GIS processing - CTR	2015
		-	Mileage Time to reach Green spaces (MTG)	-	minutes	Our GIS processing - CTR	2015
		+	Percentage of Sport facilities (PSp)	-	%	Our GIS processing - CTR	2015
		+	Percentage of Free Time facilities (PFT)	-	%	Our GIS processing - CTR	2015
	Broadband access	+	Percentage of Population coverage with Access to Internet between 2 Mbps e 20 Mbps (PAI)	Number of individuals with access to the Internet between 2 Mbps and 20 Mbps/resident number)*100	%	www.Infratelitalia.it	2015
Environmental dimension	Environmen-tal health	-	Inhabitant Equivalent Total (IET)	1 inhabitant equivalent = 60 grams od Bod5	inhabitants	ISTAT	2009
		+	Distance from Industrial areas (DI)	-	meters	Our GIS processing - CTR	2015
		+	Distance from Landfills (DL)	-	meters	Our GIS processing – CTR	2015
	Nature conservancy	+	Percentage of areas percentage with High Ecological-natural value (AHE)	(High ecological-natural are-as/municipal areas)*100	%	ISPRA	2010
	Risk factors	-	Landslide risk (LR)	Landslide risk areas (R1, R2, R3, R4)/municipal areas)*100	%	Basin Authority	2015
		-	Seismic risk (SR)	-	Classes	www.utsbasilicata.it	2012

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