

REGIONAL SCIENCE ASSOCIATION  
37H EUROPEAN CONGRESS  
ROME, ITALY  
26-29 August 1997

**INTEGRATED GREEN NETWORKS  
IN CITIES AND TOWNS  
IN THE ITALIAN APENNINES**

Bernardino Romano  
University of L'Aquila  
Department of Architectur and Planning  
Montelucio di Roio - 67100 L'Aquila

**ABSTRACT**

This work is part of the MURST 40% research on Methods and instruments for territorial and city planning in communities of low density and high environmental value in mountain areas.

The outcome of this research was the drawing up of methodological criteria to deal with the recovery of rural areas located between medium and small urban areas and some of the large, recently created, regional and national parks in the central Apennines.

These territories contain historical centers and historical, cultural, environmental and landscape elements of considerable interest, though in a state of abandon.

The aim of this work is to identify the elements that condition the new potential territorial roles of rural areas in order to aid recovery through links with nearby urban areas and parks.

One of our main areas of study concentrated on how elements which make up rural areas (historical centers, agricultural areas, historical footways) could be organised into networks and systems. In our opinion a comprehensive and effective recovery of the territorial functions of these marginal areas in the Apennines can only be achieved by means of integrated action.

**INTRODUCTION**

The research presented in this paper concerns methodological criteria for the recovery of rural areas near towns and cities in the central Apennines. These areas contain historical, cultural, environmental and landscape elements of considerable interest as well as numerous historical centers and reminders of past links with the city such as ex-farmland, pastures, religious and civic buildings, landscapes modified by centuries of human activity and historical rural footways for social and economic trade.

Environmental policies put in to effect by the Italian Government at the beginning of the 1990s saw the creation of a large number of national parks which also resulted in change for these rural areas. The majority of these, mostly mountainous, rural areas are located between large protected areas

and more densely populated valleys and hence the theme of territorial recovery of the countryside surrounding the city has been taken up again and has stimulated new research into the linking up of rural centers with urban structures.

This theme is of great interest to the central Apennines as national and regional parks stretch over approximately two hundred kilometres from the Sibillini, Laga-Gran Sasso and Sirente-Velino Parks to the National Park of the Abruzzo (fig. 1). In fact although the subject-matter of this paper is developed along general lines numerous examples concerning central and northern Abruzzo and especially the hinterland of L'Aquila, a medium sized city of approximately 53,000 inhabitants (Istat, 1991) are discussed in more detail.

The aim of this work, as was mentioned earlier is to identify the elements that condition the new potential territorial roles: this step is essential if new territorial patterns are to be drawn up.

One of our main areas of study concentrated on how the elements which make up the rural areas ( historical centers, agricultural areas, historical footways) could be organised into networks and systems. In our opinion a comprehensive and effective recovery of the territorial functions of these marginal areas can only be achieved by means of integrated action.

The large protected areas in central Italy are additional elements that can be inserted into rural networks and aid in their recovery.

## **THE FIELD OF STUDY**

The medium sized city and rural areas  
of the central Apennines

This research undertaken concerns rural areas located between urban concentrations in the Apennine valleys and some of the large, recently created, national and regional parks.

The widespread urbanisation of the last twenty years has changed the dynamics and face of Apennine cities quite considerably though some cities still manage to blend in with their environmental surroundings. This is undoubtedly connected to the restricted size of these urban areas; cities like L'Aquila, Teramo, Popoli or Sulmona, for example, stretch over a maximum of two to three kilometres and cover 800 -1200 hectares (these figures also include their industrial areas).

Villages in the urban hinterland are extremely small and the larger cities are separated by 40-50 kilometres of mountain area, the environmental importance of which increases with the distance from the city (Fig.2).

L'Aquila, the regional capital, is situated between the National Park of Gran Sasso d'Italia-Monti della Laga and the regional park Sirente-Velino, two protected areas covering 140,000 and 60,000 hectares respectively. However between the city itself and these two large parks there are rural and semi-natural areas which cover at least 5,000 - 7,000 hectares (Fig. 3).

Sulmona, in Valle Peligna, is similar to L'Aquila in that it is situated between two parks, the Maiella National Park and the Abruzzo National Park which cover 80,000 and 40,000 hectares respectively and between the city itself and these two protected areas there are rural areas as well as areas of great environmental value, such as the Monte Genzana Nature Reserve.

Many components of these rural areas such as the historical centers (dating back to the thirteenth and fourteenth centuries and often containing buildings of great architectonic value), the countryside modified by centuries of human activity and historical footways, have been impoverished by the growth of the cities. Footways were of importance for communication and trade in the Abruzzo up

until the Unification, as 256 villages out of 322 were not linked up by roads (Mioni 1976). By studying the layout of these footways a series of centers that obviously once had important roles have come to light. Most of these centers no longer exist, as changing criteria have created new centers.

Rural areas have seen a depopulation especially those centers with poor access to main urban areas which has led to the lowering of services and conditions of abandon and decline, certainly not been helped by the proliferation of second homes. However the cultural and environmental aspects of rural areas, mentioned earlier, lend a certain attraction prospective and being within easy reach of the city, 30 minutes to an hour in the case of L'Aquila, they could become green urban areas.

The development of territorial roles along differing lines, conditioned by the development of the city, led to the hypothesis of functional recovery of rural, environmental structures and of the communities that surround them.

The role of rural areas should not just be limited to tourism. In fact their proximity to these vast protected areas (Rolli & Romano 1996) with their obvious tourist potential could aggravate the existing conditions of decline in rural centers if the situation is not properly dealt with.

## **TERRITORIAL PROBLEMS AND PRESENT CIRCUMSTANCES**

It is clear from the above that there are two roads to recovery for the rural foothill areas in the Central Apennines; the future of centers near urban areas lies with their links to the daily life of the main center whilst the future of marginal areas is linked to the role their historical centers could play in becoming functional centers for parks.

The recovery of centers located within parks is particularly important for the central Apennines and for some of the protected areas to the south where there are a large number of settlements (Fig.4).

The present conditions of rural areas have emerged from research carried out on the effects of planning from 1970 - 1990.

The political line of thought at that time was that aid given to boost the agricultural economy would be the best way to prevent the abandon of the mountain areas. The result of this line of thinking was law 3.12.1971, n.1102 on the development of mountain areas and as a result thousands of millions of Italian liras were spent in relaunching mountain economy with little success.

The master plan for the city of L'Aquila, a medium sized mountain city with a population of 53,000 (Istat 1991) had already noted in 1975 a depopulation of the numerous mountain centers located around the city and to resolve the problem had stated: *"...the protection of the mountains and the promotion of farming and forestry (...) will guarantee the presence of man on the territory and the master plan will take the steps necessary to ensure that tourism becomes a real factor in the development and growth of local communities(...)*

*Planning permission for new housing and services has been granted on the basis of evaluations of backlogged requests and present requirements.*

*The majority of the new construction, approximately 80% (31,000 rooms out of a total of 54,000), is predicted to be based in the small villageous around L'Aquila.*

*This general policy, motivated by social, economic and territorial factors together with environmental and urban considerations is in line with the objective of building a multi-centered environment " (L'Aquila City Council, 1975b).*

This ruling did not however bring the results that were hoped for; the decline in population of L'Aquila's rural hinterland continued and between 1971 and 1991 marginal areas lost more than 9,000 inhabitants whilst the population of urban areas increased by 10,000.

Only rural centers within 15 minutes of the city by car maintained their populations levels. From 1971 up until the present the area covered by housing has risen from 300 ha to over 1200 ha which is equivalent to over 1000mq per new inhabitant. The 1975 master plan was implemented in this period and was a powerful tool for expansion.

An increase in urbanised space was also registered in rural centers that had seen a decline in population levels. The increase in urbanised area per lost inhabitant varied from 500 to 2600 m<sup>2</sup> and the increase of building volume per lost inhabitant, from approximately 200 to 1500 cubic metres in some of the centers analysed (Tables 1 and 2). A large number of the new volumes built in these marginal centers, with and without planning permission, were mainly second homes for ex-residents. Many rural centers must also face the problem of abandon. The number and state of abandoned buildings within a given village varies, however it is mainly those houses that have been restored and that are used as second homes, that have had a negative effect on the aspect and functional characteristics of the center.

There has been no homogeneity in the restoration of historical centers and new constructions usually have no bearing on their surroundings. In fact they are usually one family residences, built by the owners themselves to their own requirements using cheap materials.

This, however, is one of the consequences of the planning regulations laid down by the 1975 master plan: no typological indications were incorporated into the regulation mechanism, only maximum indexes and locations. The absence of precise regulation on forms, colours and the use of materials for external finishing has resulted in decidedly negative visual effects in the majority of cases.

Many historical centers are very picturesque when viewed from a distance or from the outside whilst the centers themselves have seen great alterations; many of the normal social spaces, such as the central square, are now totally unrecognisable. The superimposition of new constructions in historical zones, the movement of the population towards new housing areas and the need for vehicle access have robbed these original urban spaces of their form, identity and role and have resulted in the creation of irrational and unrecognisable spaces. These new spaces often have a variety of functions which are at times conflicting.

These changes within the urban tissue together with the reduction of essential public services (commercial, educational, administrative) have meant a loss of identity for the center which is felt foremost by the remaining inhabitants.

These areas lack established parking areas and roadways due to the limited traffic.

The location of rural centers, between agricultural areas and semi-natural areas, has not led to the creation of grounds for games and sport for example. This would have also been unjustified given the low number of young people within the population.

The territory surrounding rural centers is mainly used for agriculture and is in an alarming state of abandon. Cultivated areas are reduced to a minimum whilst ruderal vegetation is covering a growing number of areas.

## **METHODOLOGICAL CRITERIA AND EFFECTIVE COURSES OF ACTION**

Spontaneous development in the rural areas of the Apennines does not seem very probable; social and economical recovery will depend on external stimuli .

Left to their own devices historical centers within the Parks might become holiday homes; regulations (Regione Piemonte 1996) would protect listed buildings though this would not stop the permanent residential population from all but disappearing. The presence of tourists for two months in a year is not enough to support local trade and social and public services. Permanent populations are the only

solution for an effective and integral recovery of the rural centers. The setting up of a network of links between the city, the rural areas and their centers and the neighbouring protected areas would be a means of achieving this aim. The linear elements in such a system would be the old roadways and footways linking the city to rural and natural areas. Each component in the system would have its role to play and though the roles of the city and natural protected areas are obvious, the roles of the rural areas and their centers are still under discussion.

L'Aquila, for example, could become a green city if linked up to green urban areas, semi-natural rural areas and parks by means of old footways and the city would enjoy a higher quality of urban life thanks to the variety of large open spaces (Fig.5). Green links, as international experience on Greenways (Ahern 1994), has demonstrated, are either components of the environmental network such as rivers or components of the more densely populated urban network such as the historical center. L'Aquila's congested city center could be used, once vehicles have been banned, as a passageway between marginal green areas. L'Aquila is also unique in being the only city to act as a national stopping place for excursionists on the "Sentiero Italia" which covers the Alps and the Apennines.

Action is necessary in those rural areas in a state of decline if they are to be used as connecting corridors between cities and large national parks as abandon obviously reflects on the environmental quality of the area. Economical incentives could be given to those areas that can still be used for agriculture which also helps maintain the existing landscape. However most rural areas in a state of abandon could be used for replanting valuable forests; local species such as *Quercus* sp., *Acer* sp., *Carpinus* sp., *Ostrya carpinifolia*, *Fraxinus* sp. and many other shrub species (and not the classical conifers which are actually foreign to most of the Apennines). Reforestation would not only increase the amount of forested area but would also help restore animal habitats in places that could become ecological corridors between adjacent protected areas (Romano 1996).

Footpaths linking the city to the rural areas and the rural areas to the parks would have to be environmentally restored, especially those closest to the city which are generally in the worst state of decline. Footpaths along rivers and streams as well as those within the urban center that run through historical parts or green spaces should be pedonalised and be planted with vegetation.

The use of footpaths from rural centers to the historical center should interfere as little as possible with the normal flow of traffic and footpaths be specifically marked as they have been in some European cities. An effective green network can only be obtained if there is continuity within the system (city, rural areas and parks) for both pedestrians and cyclists.

The above are our proposals for the recovery of rural areas through links with the city and natural parks; we now come however to the question of recovery of the rural centers located within these rural areas. Recent research (Bonamico & Tamburini 1996, Romano 1995b) has indicated the need to identify the potential to be activated in order to establish a "modern" role for a given abandoned center. By modern role we intend a functional role within the social dynamics of the surrounding territory or a role which gives meaning to the abandoned centers existence.

This paper examines the single elements that define a modern role and then produces an application of the theories proposed.

The elements necessary to define the territorial role of a rural center are only partly covered by the theory of urban hierarchy (Cori et al.1993). Identifying the level of services, for example, in those centers in a state of decline, would be of no help in identifying the principal roles in many cases due to the lack of even the most basic of services (Piroddi et al. 1989).

So the definition of potential role of the rural center must be established using other parameters.

Historical role: the historical evolution of a center gives clear indications of the functions which were at the root of its origin. These can also be deduced by observing the centers geographical position and its relationship with the surrounding area. Most of the villages in the central Apennines were built for defence (Properzi 1988) and to exploit the areas natural resources (cultivation of the land, sheep farming and forestation, though to a lesser degree).

When the economical benefits can no longer support a permanent population the very existence of these places is put on the line. This situation is further aggravated by changing social requirements.

Rural centers can maintain their historical role if they are connected to some form of production of particular value for example art and craft, the cultivation of rare crops with a high commercial value or potentially intensive. Old farming methods, in other cases might have a possible tourist attraction, surrounding countryside and environment permitting.

Environmental resources: The quality and quantity of the environmental resources around the centers under consideration will condition the eventual role of the center. These resources are usually of a cultural (monuments, historical, artistic or archaeological elements, traditions, landscape elements) or natural nature (forests, mountains, lakes, rivers, natural monuments, large protected areas) and naturally include access networks to these resources (paths and stopping points).

Obviously the use of these resources is linked to tourist demand, the more resources, the more tourists. Centers like Courmayeur or Chamonix can survive and prosper thanks to the presence of Mont Blanc; Venice and Florence can attract an international tourist trade thanks to their urban monuments; the same is not possible, however in the Apennines. Single cultural or natural elements do not attract international tourism; the Apennines would have to sell “environmental systems” (systems made up of centers and cultural and natural resources linked up by historical footpaths) to the tourist market. Obviously the centers near the most interesting resources are at an advantage and the situation would change somewhat when considering systems in proximity to protected areas as we will see later.

Relationships with other rural and urban settlements: when trying to establish a potential territorial role for a rural center, its links with similar centers or with a larger urban center or with a large artery of urban and regional services must be taken into account. On this basis two types of rural center can be distinguished that differ in use:

a) settlements which to all effects have been abandoned and are only used for summer residence and lack most services (which is reasonable in the light of their role and population size).

b) settlements which have maintained their population level because residents commute to the main city and farming on a small scale (a second job for most) has counterbalanced abandon. The quality of social life is appreciable and there are basic services. The stability of the village’s position is helped further by the higher quality of life and lower housing costs than can be found in the urban center.

There are three distinct possibilities for finding new functional roles for the centers in category (a) which are the ones that interest us:

1. they can become residential quarters for the main city by improving access (new faster and more effective link-up systems). This is a possible solution for those places within a reasonable distance of the city.

2. they can become residential and service areas for other centers such as type b where there is a demand for new buildings/homes. This demand can be met by the restoration of abandoned buildings in the smaller rural center. A fast link-up system is required here as well.

3. they can become residential and service areas for other rural centers. This would be the case if the

rural center in question had a central location or was easily accessible. The number of inhabitants in such a system would permit a reasonable level of services that would be concentrated in the central village but which could also be distributed in part in the other centers. In this way the system offers a whole range of services that an individual center alone would not be able to support.

The role of a single center or a system of centers can be determined on the basis of the presence of the elements cited above. The rural center can thus be used for varying “urban functions” such as permanent residency, additional productive activity, tourist residency or other types of temporary residency (university students, workers from other cities).

Each rural center in the Apennines will therefore have a variety roles and urban functions. The importance of each role within a given center will vary; one center might have more tourist potential and less productive potential and permanent residency than another and vice versa. The qualitative and quantitative recovery of buildings in a state of decline in these centers and the urban layout of the center will be conditioned by the functions which have the most dominant role and to a lesser degree by secondary functions.

The presence of protected areas of national importance alters the picture for single centers quite considerably and not only for the financial resources connected to the park; under normal conditions a rural center with nothing special to offer would attract few tourists but the proximity of a large park enhances its tourist attraction quite dramatically. Centers within a park or on the outskirts usually become management and administration headquarters and house cultural centers, museums and visitor and information centers.

As part of our research the criteria mentioned above were applied to a number of rural centers located between the city of L’Aquila and the two great protected areas (Fig.2). The roles and relative potential urban functions in terms of permanent residency, back-up for productive activity, tourist residency or other types of temporary residency were evaluated for each of the centers analysed. These functions were put into a hierarchy for each center. The tendency of each center to occupy single functions was expressed in a value from 1 to 4 (1 for a maximum tendency and 4 for a minimum tendency).

The percentage of restorable buildings to house the functions with a variable tendency is given by the following:

Tendency	Percentage of restorable buildings
1.....	60%
2.....	25%
3.....	10%
4.....	5%
	-----
	100%

A comprehensive restoration of the abandoned buildings was assumed and a number of accomodation facilities (the number of which did not exceed the number of restorable buildings) were not taken into consideration.

New buildings in and around the city center were excluded on the grounds of the economical upkeep of restored buildings, bar some exceptional cases. Using these criteria we estimate the restoration of 118,000 cu. m of abandoned buildings. Analysis revealed that these buildings, located in rural centers, are ruins or in extreme conditions of abandon or unoccupied and uninhabitable. The owners

of these properties have obviously little interest in their maintenance and it could be assumed that they would be predisposed to sell to public or private companies wishing to restore them.

Available volumes of abandoned buildings in each center were divided up on the basis of the support of the functions identified. Each urban function was given a dimensional standard for restoration. This standard takes into account the average needs of the users of a building for a given function.

The standards for use were as follows:

<i>Urban function</i>	<i>Standard use</i>
Permanent residency	100 cu. m per inhabitant
Productive	200 cu. m per inhabitant
Temporary residency	70 cu. m per inhabitant
Tourist residency	60 cu. m per inhabitant

The population size after restoration was obtained for each rural center.

The equation used was the following:

Assuming the weights (p) of the single urban functions as

$$p(1) = 1 \quad p(2) = 2 \quad p(3) = 3 \quad p(4) = 4$$

the urban functions (r) as:

r(1) = permanent residency

r(2) = temporary residency

r(3) = tourist residency

r(4) = productive

the corresponding standards as:

s(1) = 100 cu.m for inhabitant

s(2) = 70 cu.m for inhabitant

s(3) = 60 cu.m for inhabitant

s(4) = 200 cu.m for inhabitant

and defining the total volume of potential recovery then the total maximum population is given by the equation:

$$\text{max. no. of inhabitants} = \frac{V_1}{s_1 p_1} + \frac{V_2}{s_2 p_2} + \frac{V_3}{s_3 p_3} + \frac{V_4}{s_4 p_4} + \text{present pop.}$$

The total volume available was converted into potential residential units, without calculating the volumes for new installations separately, in order to obtain a means of measuring the level of services on the basis of the population size.

This approximation was made because not all of the services can be located within the building to restore; historical buildings are usually of limited dimensions and space distributed in such a way as to be often impractical for the service itself for example exhibition space or public shows.

An estimate for additional spaces was made for the support role for productive activity; the residential standard of reference, 100 cu. m per inhabitant (D.M. 2.4.1968, art.3) was doubled to take into account the spaces required for productive activity, be it a cottage craft or connected to

agriculturae.

Other standards used include: 100 cu. m per inhabitant in a permanent residence, 70 cu. m per inhabitant in temporary residence (a long period, university students, workers from other areas) and 60 cu. m per inhabitant for tourist residency (short periods).

Applying this equation to the building volumes of the individual centers gives indicative values of the temporary population, the permanent population and the maximum population (Table 3). The predicted potential permanent population was inserted into table 3 and the small settlements were grouped into territorial urban systems. Services for these systems should exploit the quick access routes.

So the present population level of 4000 inhabitants could rise to 5000 permanent residents or to 6,500 when including temporary residents.

## **CONCLUSION**

Identifying the potential roles of rural centers and then determining their urban role is not in itself enough to solve the problems inherent to the recovery. Undoubtedly the recognition of a territorial role is of great help to the planner as it is an element that activates self-recognition. By self-recognition we mean that the inhabitants of a given place continue to follow local traditions, use traditional materials and adopt local building styles, of their own accord and not just because of rules and regulations. An example of this can be seen in the Alto Adige where traditional building styles are still used; buildings in the center and south Apennines on the other hand, have undergone great alterations.

The identification of a territorial role must favour development in mountain centers in order to establish new social, cultural and recreational conditions. The lack of these together with a fall in productivity has resulted in an exodus of the youth to the city.

It is also necessary to restore the natural beauty of these centers, ruined by years of uncontrolled and spontaneous building. These constructions have profoundly altered the quality of life that is linked to the pleasantness of one's everyday surroundings (Vittorini, 1994). To re-convert these centers into mountain villages is one way of tackling the problem: this would consist in the medium and long term removal of those architectural features that try and fail miserably, to imitate foreign building styles.

The idea that these centers can exist on agriculture alone must be discarded; agriculture can survive (De Vecchis 1992) but in a minor economic capacity.

The "programmatic map of territorial roles" that could result from this study should have the end of establishing territorial patterns; it should have a strategic function as well as identify the type and level of services organised by systems and linked to the new possible roles.

The size of services should be proportional to the predicted populations. These services should be located in old buildings and not if possible in newly constructed ones.

This reorganisation of the rural tissue into a network must integrate with the other elements of the network such as landscape spaces, the pedestrian system, the city and parks as illustrated by the model presented in this paper.

## **ACKNOWLEDGEMENTS**

The author would like to thank Prof G.B. Las Calas and Prof G. Tamburini respectively National and local Coordinators of the Murst research cited at the beginning of this paper for the stimulus they

provided through many debates and discussions.

## REFERENCES

AHERN J. (1994), Greenways as Ecological Networks in Rural Areas, in COOK E.A., VAN LIER H.N. (EDs.) *Landscape planning and Ecological Networks*, Elsevier Science, Netherlands.

BONAMICO S., TAMBURINI G. (EDs) (1996), *Centri antichi minori d'Abruzzo*, Gangemi Ed., Roma.

COMUNE DELL'AQUILA (1975a), *PRG Norme Tecniche di attuazione*, L'Aquila.

COMUNE DELL'AQUILA (1975b), *L'Aquila PRG 1975*, L'Aquila.

CORI B. *et alii* (1993) *Geografia urbana*, Utet, Torino.

DE VECCHIS G. (1992) *La montagna italiana*, Kappa ed., Roma.

ISTAT (1993), *Popolazione e abitazioni*, XIII censimento ufficiale 1991, Roma.

MIONI A. (1976), *Le trasformazioni territoriali in Italia nella prima età industriale*, Marsilio Ed., Venezia.

PIRODDI E. *et alii* (1989), *Il recupero delle periferie urbane*, Atti del Convegno di Roma, maggio 1988, Roma.

PROPERZI P. (1988), Terre, castelli e borghi fortificati nell'evoluzione delle strutture territoriali abruzzesi, in AA.VV., *Abruzzo dei castelli*, Brescia, 12-69.

REGIONE PIEMONTE (1996), *Repertorio di indirizzi alla progettazione nelle aree a parco e riserva naturale*, Torino.

ROLLI G.L., ROMANO B. (1996), *Progetto parco, tutela e valorizzazione dell'ambiente nel comprensorio del Gran Sasso d'Italia*, Andromeda Ed., Teramo.

ROMANO B. (1990), Nuovi indirizzi per la pianificazione socioeconomica: il piano della Comunità Montana della Valle Roveto, in *Abruzzo Economia*, VI/19, L'Aquila.

ROMANO B. (1995b), National Park Policy and Mountain Depopulation: A Case Study in the Abruzzo Region of the Central Apennines, Italy, in: *Mountain Research and Development*, 15/2, 121-132, University of California, Davis U.S.A.

ROMANO B. (1996), *Oltre i parchi, la rete verde regionale*. DAU, Università dell'Aquila, p.80

(monografia) Andromeda Ed., Teramo.

VITTORINI M. (editor) (1994), *Studio per il parco del Gran Sasso d'Italia*, Regione Abruzzo, Comunità Montana zona B, Tecnocasa, L'Aquila

**Tab. 1 - Contradiction Building Increase Index (CBII)**

Center	Urban area  mq	Resident inhabitants		Building covered area - m <sup>2</sup>			Building volume - m <sup>3</sup>			Average height of buildings - m		Territorial building density m <sup>3</sup> /m <sup>2</sup>	CBII(*) (m <sup>3</sup> /inh.)
		1971	1991	Total	New buildings	% new build./tot	Total	New buildings	% new build./tot	New buildings	Ancient buildings		
Collebrincioni	272500	394	326	28633	13097	45,74	204740	89361	43,65	6,82	7,43	0,75	1314,1
Arischia	870000	1695	1402	92203	40972	44,44	658549	323727	49,16	7,90	6,54	0,76	1104,9
Filetto	110000	392	257	23407	10029	42,85	154078	63354	41,12	6,32	6,78	1,40	469,3
Camarda	410000	739	524	33406	11700	35,02	308477	95028	30,81	8,12	9,83	0,75	442,0
Roio Poggio	245000	776	252	49534	36164	73,01	420966	316643	75,22	8,76	7,80	1,72	604,3
Colle di Roio	175000	250	320	19225	10701	55,66	125919	70479	55,97	6,59	6,50	0,72	-1006,8
Roio Piano	210000	515	449	24149	8910	36,90	157259	60944	38,75	6,84	6,32	0,75	1522,3
Santa Rufina	100000			12861	6182	48,07	81750	39530	48,35	6,39	6,32	0,82	
Aragno	350000	484	395	28631	10154	35,47	176601	68893	39,01	6,78	5,83	0,50	774,1
Pescomaggiore	45000	118	66	10241	1818	17,75	57891	9788	16,91	5,38	5,71	1,29	188,2

CBII (m<sup>3</sup>/inh.) = Volume of new buildings/(Resident inhabitants 1991 - Resident inhabitants 1971)

**Tab. 2 - Contradiction Soil Urban Use Index (CSUUI)**

Centers	Total urban area (ha)	New urban area (1971-1991) (ha)	Resident inhabitants (1971)	Resident inhabitants (1991)	CSUUI* (ha/inh.)
ARAGNO	35,00	23,50	484	395	0,26
ARISCHIA	87,00	53,00	1695	1402	0,18
ASSERGI	54,25	33,25	681	472	0,16
CAMARDA	41,00	19,00	739	524	0,09
COLLEBRINCIONI	27,25	11,50	394	326	0,17
FILETTO	11,00	6,50	392	257	0,05
PESCOMAGGIORE	4,50	4,00	118	66	0,08
ROIO COLLE	17,50	13,00	250	320	-0,19
ROIO POGGIO	24,50	19,50	776	252	0,04
ROIO PIANO-S.RUFINA	31,00	21,00	515	449	0,32

CSUUI (ha/inh.) =  $\frac{\text{New urban area}}{\text{Resident inhabitants 1991} - \text{Resident inhabitants 1971}}$