Chapter 12

The Corridor Island: A New Space to Redesign the Landscape of Tenerife

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Additional information is available at the end of the chapter

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Abstract

The urbanization processes in the island of Tenerife in the last 50 years have left a very fragmented landscape. Due to the growing and constant process of construction-infrastructures-construction, the abiotic and biotic space is being reduced but still more the productive space of the primary sector. The reaction to the threat, especially the "natural" space—abiotic and biotic—was protection. The result is that half of the island has some protection figure, but the other half does not. To this "unprotected" half, I call the risk island and concentrate the stress or tension, because it is where economic activities and habitat are developed and combined. For its management, in spite of existing an island territorial planning, it is the municipalities that have the competences in urban planning, always under the norms of superior administrative rank. Therefore, there are 31 different models, one per municipality. We have to focus on the corridor island understood as the unsealed soil. This is the area where we should intervene, redesigning the new spaces, to connect organically and in balance the two islands.

Keywords: urban sprawl, soil sealing, urban planning, risk island, corridor island, geo-design, landscape

1. Introduction

Tenerife is divided into two distinct areas: the protected island and the unprotected island. I could even say, the static island and the dynamic island. The first, where time stops, the pace becomes slower, where it hardly changes, the island preferred, the island imagined, the island visited. The second is the opposite. It is the dynamic island, inhabited, transformed, but at the same time the least valued, desired or visited.

This general, complex hypothesis, where many components and variables intersect, starts with a partial hypothesis that centers this article: The Island unprotected is the one that has a higher risk for the conservation of its landscape. This section has a wide and fractionated space corridor that connects both "islands". Here, it will be the biggest change. Therefore, it is where we must act redesigning it in the key of landscaping.

The whole island is actually regulated territorially and urbanistically through the instruments of the planning system of the Canary Islands that has recently been modified in Law 14/2014 [1]. It is made up of territorial and environmental planning, which includes general and sectoral planning guidelines, and island planning and urban planning of municipal scope. In spite of this, I consider and enhance the epithet of the unprotected island.

here are two key concepts in this phase of the research: one is the urban sprawl, and the other is soil sealing. The first one, urban sprawl or suburban sprawl [2–7], is characterized by spaces composed of low-density [8], unstructured, and amorphous, which generate problems related to the increase in the temporal and spatial distances between the family residence and the different destination centers (work, education, leisure, etc.). The dispersed space entails, among other aspects, dependence on the private vehicle, and with it, it generates spaces of exclusion [9]. They imply a high cost for the construction, management, and maintenance of infrastructures and services, usually of a public nature. Richard Ingersoll uses the term sprawl scape [10] or landscape of dispersion, where urbanization processes have built a landscape, in which "oil stains" multiply around highways and roundabouts [11].

According to the European Environment Agency (EEA), "Urban sprawl is commonly used to describe physically expanding urban areas" and "have described sprawl as the physical pattern of low-density expansion of large urban areas, under market conditions, mainly into the surrounding agricultural areas" [12]. "Urban sprawl is visually perceptible" [6]. "A landscape suffers from urban sprawl if is permeated by urban development or solitary building" [6]. On the other hand, it is the concept of "soil sealing" that is defined as the covering of the ground by a waterproof material and is considered as one of the main causes of degradation of the soil in the European Union (EU) (European Commission). The european environment agency has defined soil sealing as "the covering of soil due to urbanization and infrastructure construction, such that soil is no longer able to perform the range of functions associated with it. Soil sealing is not adverse *per se*, rather it is the irreversibility in practical terms of sealing the soil and the consequent loss of soil functions" [13]. "Soil sealing" is one of the main factors of the studies on the risks of "land degradation (LD)" next to the salinity of the soil or the erosion. Soil sealing is associated with the fragmentation of landscapes or the risks of fires [14].

Previously, in 2002, the EEA [15] published the results of a meeting in Copenhagen in 2001, entitled "Proceedings of the Technical Workshop on Indicators for Soil Sealing" which were raised at the European level of multiple proposals for indicators to measure the soil sealing, change in the land use, motorization for the measurement of the soil loss, etc. This was the result of projects developed in different members.

The concept of soil sealing is currently redefined and also the way of how to tackle them from different techniques. It has gone from being a merely physical analysis to a complex analysis and global, that affects whole ecosystems. In this sense, recently, a review of the concept of soil sealing has been published, trying to unify the methodological criteria applied to the concept of scale [16].

The analysis, spatial entity, and complexity are underway from models of raster data with satellite and aerial images of a very high resolution (VHR) [17].

According to the document of work published by the European Commission in 2012 (from the study commissioned by the European Commission to Prokop [18] and other studies and data provided by a group of experts from the member states which advised in 2011 to the commission services), the surface total of soil sealing in 2006 is estimated to 100,000 km^2 or to 2.3% of the territory of the EU, with a half of 200 m^2 by citizen. On the island of Tenerife, I think that the percentage exceeds the European average. To an insular, limited, and finite space, it is a great concern.

If the model of low density, both built urban land and the dispersed space in rustic soil, requires more connectors in the form of infrastructure, the level of "soil sealing" will increase dangerously. If the solution is to search for compactness, I believe that it will generate more destruction than construction. It would have to find other ways of integration, especially in the peri-urban areas, and in relation to the development and defense of the agricultural productive space, as developed in the Agrarian Park of Llobregat, Barcelona, Spain [19], or many actions of awareness and education in the peri-urban agricultural landscape, as developed the village of El Tablero on the island of Tenerife [20]. These initiatives, among others, mark the trend to follow in these spaces. The connectivity between the urban and the rest of the territory must be connected through corridors characterized by primary production, integrated dispersed buildings and camouflaged with the environment and natural spaces, even if they are not protected (Landscape "Island of Tenerife" award 2010 by the Council of Tenerife and the European Network of Local and Regional Authorities for the implementation of the European Landscape Convention RECEP ENELC [21]. http://laserasdeeltablero.blogspot.com.es/).

Now, create a more sustainable city model? According to experts, after analyzing and comparing different urban systems, the model that conforms to the principle of urban efficiency and livability is the city compact in its morphology, complex in their organization, efficient metabolically, and cohesive socially [22].

In terms general it dispersion urban in the island of Tenerife tends to be a problem important to form nuclei and cities compact, which not makes but increase the difficulty in it planning territorial and in it management urban. It is for this reason that we need to make a diagnosis of the scope of the insular dispersion and georeferenced spaces that tend to be the concentration or the compactness of the soil. Their progress clearly limited biodiversity, because scattered space environments tend to abandon early activities, mainly agricultural activities, to become in the waiting space. Often the changes happen over very long periods of time. This process implies that landscapes deteriorate because they do not have a specific function.

To demonstrate these hypotheses, it is necessary to first size up the problem at the island level and build the necessary reference frameworks: island, risk island, and corridor island. They are in this article, my goals.

1.1. Island, risk island, and corridor island

General system theory understands interconnected space. It produces connections that affect the whole. When we work on a local problem, we often try to look for boundaries, which often cut the system. It is necessary to extract the organizational patterns in the complexity of the system, but is limited, because these are possibly dependent on others that form or even that

is formed in our limits and that is transferred to the environment. When we work the whole of a finite space, at least from the terrestrial point of view, as it is an island, we come closer to systemic conclusions, but certainly, not even the islands are saved to other global interconnections that break or bridge the limits terrestrial.

Working on the concept of compactness, dispersion, connectivity, or green corridor on an island-wide scale is a challenge and involves an important effort in selecting, editing, and combining data, often scattered and without uniform criteria. If it is achieved, the overall analysis capacity and its diagnoses reinforce territorial planning and the measures to be taken into account.

The concepts of island, risk island (Ri), and corridor island (Ci) are mere abstractions that allow me to dissect large sets and subject them to different pressures. The island cushions the processes of pressure among its abiotic, biotic, and cultural spaces. If we reduce the total insular space, to the space that really supports the tension of the changes, all its pressure indicators will increase. Their results would allow us to evaluate the risk more. Pressure-reducing valves are the corridors that connect the substantial organs of equilibrium (abiotic and biotic) with the green mosaic of the risk island—agricultural space, livestock, abiotic and unprotected biotic, urban green, etc. (Ci).

How is deconstruction formed? It is a sequence of systematic reductions from a whole, the island. We exclude spatially those less compromised components and those that have no pressure, either because they are protected by some figure or because they are already part of the waterproof space. The first exclusion is made up of spaces declared and protected by the current law as protected natural areas. In most of them with values of abiotic and biotic character. These spaces are the vital organs of diversity and biodiversity. They have no discussion. The spatial result of this reduction is the risk island. Often colloquially, politically and mediated, 50% of the island is protected, to which I have always expressed a second phrase in an interrogative key, and the other 50%, what? If we consider that the island is made up of multiple landscapes, I understand the landscape as a social product, that is until the abiotic spaces have been used by man in different phases of history, and accepting their consideration of protection, my concern is in the form of planning and ordering the rest of that 50%.

Given the data I provide in this work, the concern is more than evident. It is urgent to make decisions in other directions that bring us closer to the protected vital organs. The unprotected and pressed envelope is a threat to itself, but also to vital organs and therefore to the island corpus. Why does this happen? There are several causes, as always, economic, social, political, cultural, I would not know which is more influential, is not my object here, but what has caused, is a spatial change in land uses that as a result leaves us waterproof space–construction + infrastructures–very important, a reduced agricultural space and a space urban and projected disproportionate.

From this conclusion and spatial deconstruction, which pierces the risk island we have the corridor island, the island permeable, connector and balancer. Corridor island is where new renovation strategies should be designed. These must be conceived from the concept of landscape. With this, I do not say that you do not have to act in the excluded part of the corridor island, on the contrary, it must act in all areas, but you have to do it in truth and with a collective look, at all, of the Island.

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2. Objectives

This work has two objectives:

1. Design and construct new units of spatial references, perhaps a unit of landscape.
2. Measure territorial problems at scales more realistic, as are the urban sprawl and the soil sealing.

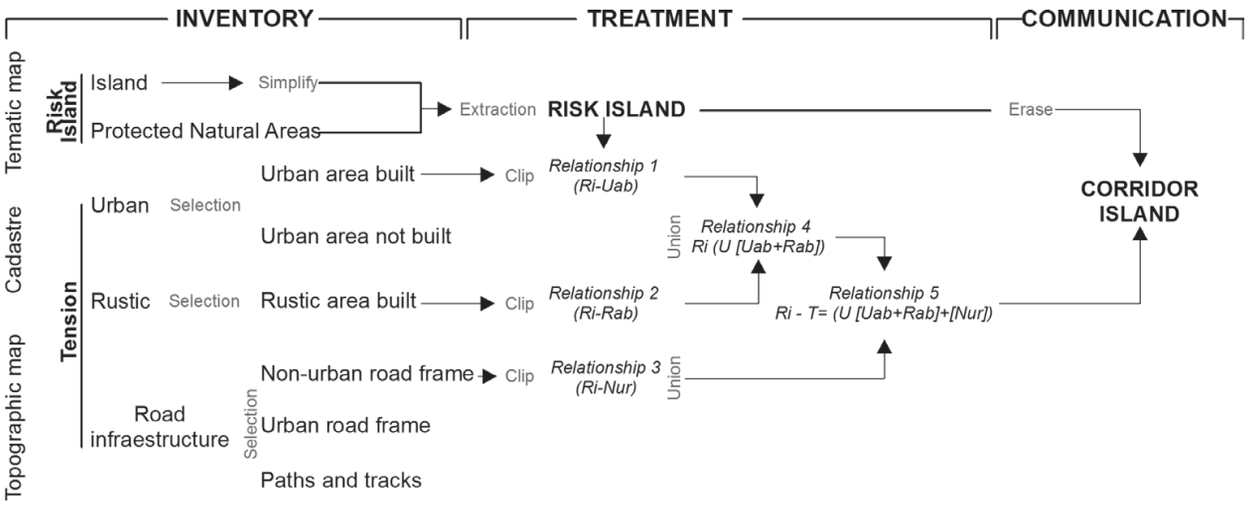
3. Methodology

Corredor Island is a process of deconstruction. It is the result of successive spatial reductions. The level of deconstruction is marked by the number of components involved in the process. It will be more intense and detailed as we incorporate more components.

In short, the island (I) is reduced, extracting protected natural areas (PNA). Its result is the risk island (Ri). If we introduce the pressure or tension components (T), the built urban space (Uab), the built rural space (Rab), the non-urban road network (Nur), we obtain the first model of Corredor Island (Ci).

$$I - PNA \;=\; Ri - T\left[U\left\{(Uab) + (Rab) + (Nur)\right\}\right] \;=\; Ci \tag{1}$$

The methodological process is developed through the three moments or levels of information [23], at the time of problem definition and data selection (analysis and synthesis), inventory level; at the time of simplification and interpretation of results (combinations and relationships), level of treatment; at the moment of communication of the results, level of communication (**Scheme 1**).



Scheme 1. Methodology.

For its development we use three different and basic cartographic sources: thematic cartography, that by means of the selection and treatment of the components of insular delimitation and of protected natural spaces we construct the risk island. This map is provided by the regional company GRAFCAN S.A. Cadastral and topographical cartography are the sources from which we extract and treat the components for the construction of the existing tension within the risk island. The cadastral provided by the General Directorate of Cadastre of Spain and the topographic ones by the company GRAFCAN S.A.

In order to identify the constructed parts (understood as spaces destined to houses, industries, commerce … or to constructions destined to the agricultural use), in the urban space as in the non-urban it has been necessary to exclude elements registered cadastrally. The result of this exclusion makes it possible to define constructed soil surfaces and to establish patterns. Exclusions differ according to the rustic or urban nature. In both cases, the excluded elements are classified into three groups: (1) orchards and plots; (2) water infrastructures; and (3) sports areas.

The non-urban road frame (Nur) is composed of the sum of motorways, roads, tracks and urban structural way. Urban routes (Ur) are formed by the fabric of streets of the villages. The roads and trails frame (Pat) consists of soft, non-sealed and permeable routes.

In this article we will focus in the first group: them frames road not urban, i.e., the network general and structural of the island of Tenerife paved. Will be in a second phase of this research where complete the synthesis of them way urban and the edition of them roads and the paths, although, priori, these latest not contribute to them processes of sealed, although if to them of dispersion.

3.1. Inventory level

3.1.1. Components of the risk island (Ri)

The Island (I) and the protected natural areas (PNA) are simple data layers, which has intervened. In the first dissolving the separation administrative and eliminating those polygons referred to islets and rocks that surround the perimeter coastal. As a result, remains only the part "continental" of the island. The objective is the simplification. Keep those elements multiplies the number of polygons and not provide data substantial to the target, as are very small, not are inhabited or processed by any activity. In the second (PNA), has intervened, only and for the same reason, in the islets and rocks of the coastal perimeter.

3.1.2. Components of the tension (T)

Its pressure or tension (T) on the risk island is in the process of sealing of soil [15], or in the waterproofing and destruction of the space biotic and productive primary. The variables influencing this process are: the built space and infrastructure. This problem is even more acute if there is an expansive and dispersed, model which creates a heterogeneous and irregular

landscape [24], apparently interesting from the perspective of landscape, but enormously complex and difficult order [25].

The space built. It is the most complex and important stress variable. The cadastral information is divided in urban nature and rustic nature. To do this, it relies on legal ground–urban or rural class division. The patterns of organization of the space built in floor urban and flooring rustic are very significant and explain them models of settlement.

The urban area built (Uab) and urban area not built (Uanb) and rustic area built (Rab) are three variables of synthesis built starting from the data space and alphanumeric of Cadastre. Its construction was performed using multiple selections. This process is detailed in the headings of criteria.

Road structure. It is the other variable of pressure or tension (T), which possibly expands and channeled the built space. The analysis is constructed from synthesize, on the one hand, the wefts non-urban road (Nur); for another, the way urban (Ur); and third, the paths and roads frame (Pat). This synthesis is the result of the process of extraction and fusion of the road with polygonal geometry of the different sheets of the topographic map of the island scale 1:5000.

3.2. Level of treatment

3.2.1. Relationship level 1

Risk island (Ri). It is generated by the combination of the island components (I) and protected natural areas (PNA). The operation space made is its removal.

$$I - PNA = Ri \tag{2}$$

Tension (T). It is built by multiple relationships between the components (level 2, 3 and 4).

$$T\left[U\left\{(Uab) + (Rab) + (Nur)\right\}\right] \tag{3}$$

3.2.2. Relationship level 2

Risk island (Ri) with the urban area built (Uab)

$$Ri - Uab \tag{4}$$

Risk island (Ri) with the rustic area built (Rab)

$$Ri - Rab \tag{5}$$

Risk island (Ri) with the non-urban road frame (Nur)

$$Ri - Nur \tag{6}$$

3.2.3. Relationship level 3

Risk island (Ri) and the sum of the urban built environment and rustic (*U [Uab + Rab]*).

$$Ri - (U\,[Uab + Rab]) \tag{7}$$

3.2.4. Relationship level 4

Risk island (Ri) and the soil sealing component. (*T*) = *U* [*Uab* + *Rab*] + [*Nur*]

$$Ri - (T) \;=\; U\,[Uab + Rab] + [Nur] \tag{8}$$

3.3. Level of communication

It is the synthesis of the previous levels.

Corridor island (Ci) is obtained from the elimination in the risk island (Ri) all the space occupied by the tension (T).

$$Ci \;=\; Ri - T \tag{9}$$

4. Results

4.1. Inventory level

4.1.1. Components of the risk island (Ri)

4.1.1.1. Island (I)

The island of Tenerife has a surface area of 2034.7 km^2. It is the largest of the Canary Islands. Administratively it is divided into 31 municipalities. The surface range of municipalities is 201 km^2. The smallest municipality is the Puerto de la Cruz with 8.8 km^2, and the largest, La Orotava, with 210 km^2. In this municipality is located the Teide National Park (ISTAC from data of the National Institute of Statistics -INE-). The superficial media by municipality is 65 km^2 (**Table 1**). Population, Tenerife, is also the largest, with 42.3%, representing 889,936 residents in the year 2014 (**Table 2**).

The pressure that exerts the number of inhabitants in the island is important (**Table 2**), but if to these you add the population floating, i.e., the number of tourists that overnight in the island, the pressure is multiplies. This fact affects the distribution of the settlement and its management

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Frequency	31
Minimum Area	8.8 km^2
Maximum Area	210 km^2
Accumulated Sum	2034 km^2
Average	65.6 km^2

Table 1. Statistics of surface by municipality.

	Inhabitants	**%**	**km^2**	**Inhab/km^2**
Canary islands	2104.815	100	7446.95	282.64
Tenerife	889.936	42.3	2034.38	437.44
Gran Canaria	851.157	40.4	1560.10	545.57
Lanzarote	141.940	6.7	845.94	167.78
Fuerteventura	106.930	5.1	1659.74	64.42
La Palma	83.456	4	708.32	117.82
La Gomera	20.721	1	369.76	56.03
El Hierro	10.675	0.5	268.71	39.72

Table 2. Population statistics of the Canary islands (2014).

model. The resident population is organized in concentrated urban settlements and scattered settlements, on the other hand, the tourist population, mainly choose tourist places (**Table 3**). Paradoxically, these tourist places are more efficient in the consumption of soil and more oriented toward a polycentric structure and high density. As urban backbone, are walks, streets or avenues where green space has an occupation and outstanding value, which next to the gardens and pools of accommodation infrastructures comprise scenically rich from the point of view of the landscape. This fact, at least admits a reflection: these spaces are attractive for travelers, but also for the residents, there is an ideal of paradise, then, why our model of organization of the settlement is so distant from that model?

	N° tourists	**N° overnight stays**	**Average length of stay (days/tourist)**	**Occupancy rates**
Tenerife	5148.453	39,540.119	7.68	67.14%

Table 3. Statistics of tourism receptive of the island of Tenerife (2014) (source: Area of employment, economic development, trade and foreign policy. Council of Tenerife).

4.1.1.2. Protected natural areas (PNA)

From 1987 to 2016 the legal history of protected areas in the Canaries is written as a succession of changes brought about by human pressure on the fragile and rich natural ecosystem of the Islands and adaptations to different national and regional laws of territorial organization. Part of a need for delimitation and conservation promoted in 1987 to a relativization of this delimitation or conservation, while as objective one, the draft law on the land of the Canaries (2016), promulgates that "management of the Canary Network Protected Natural Areas must meet the objectives of conservation, socio-economic development and sustainable use." Objective three states that the "socioeconomic development of the populations settled in protected areas, especially in rural parks and protected landscapes, will have a special consideration in the planning of them." It follows that the current delimitation (**Figure 1**) may change over the next few years. Possibly, the restrictions that the protected island, as defined in this work, exerts on the rest, the risk island, tend to break and modify those limits and uses. Clearly, the problem we present in this work is currently having a great impact and it is key to provide figures of this tension and with urgency.

The current result is that the island of Tenerife goes from having in 1987 a total of 32 protected natural spaces to 43, at present and its distribution by categories increases by 3–8. This represents 1098 km^2 (**Figure 1**).

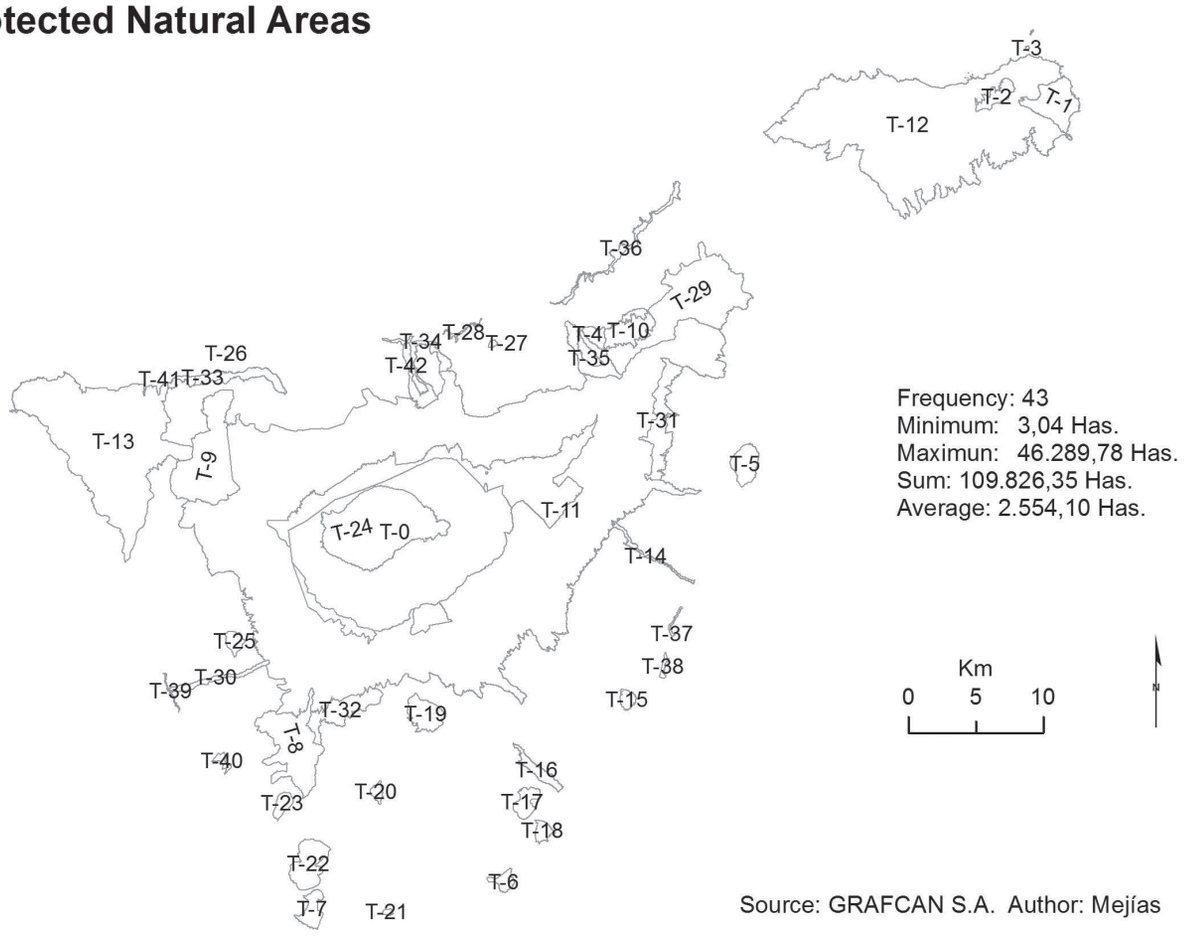

Figure 1. Distribution and description of protected natural areas (2016).

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4.1.2. Components of the tension (T)

4.1.2.1. The space built

- Urban area builds (Uab). The land registry organizes the information on different items. Spatially, fragmented each cadastral reference into as many parts as divisions, including volumetric differences. In this way, the island of Tenerife deals space built in urban land between 140,954 cadastral references, and these in turn are divided in such a way that the number of polygons associated with cadastral references goes to 490,915. The sum total of the space built in urban land is from 34.11 km^2. The spatial distribution of the cadastral references is quite heterogeneous, because you can concentrate on an only polygon or reach distributed in 694. These ends respond to two models different. The first refers to the single-family constructions, the last responds to fragmented hotel establishments. But these are the minimum and maximum extremes. It is common to find, as it indicates the average–3.5–poor division. This fact indicates clearly the model of dispersion and of low density. The surface average built urban space is 242 m^2. The percentage of soil sealing is 1.67% (**Figure 2**).

- Urban area not built (Uanb). Excluded for not being built urban space adds 100 km^2, three times more than the space strengthened by building. The cadastral reference number is 146,344 and just has partitions, 1.3 divisions by reference. The average surface of each cadastral reference is 687 m^2. No doubt are plots very large and homogeneous to the not be subdivided (**Figure 2**).

- Rustic area builds (Rab). There are 6.75 km^2 of space built on rustic land. If count the rustic not built but valued, where incorporated fields for soccer, golf, tennis, or floors considered as courtyards or next area to building (which tend to be orchards in production), etc., the footprint is 16.85 km^2, nearly three times built in rural and half of the urban built space. If we add both figures rustic, the space in risk of construction is of 23.6 km^2. If we speak of "soil sealing," the data must be of 6.75 km^2. The number of built-up cadastral references is 43.475 and the average area of is 155 m^2. These dimensions are not buildings oriented farming or animal husbandry activities linked to the productive rustic features. If talk of the subdivisions within each of them references can specify that the media in of 2.16 divisions what explains them 94,061 polygons. The percentage of soil sealing is of 0.33% (**Figure 3**).

4.1.2.2. Road structure

The terrestrial communications network is complex. It's formed by motorways, dual carriageways, different roads and road urban. These make up the most important soil sealing. But they related other tissues consisting of roads and paths. Together we talk about 20,200 km. Are that support more than 4,556,240,521 vehicles in the year 2014, distributed in them 1157.50 km of roads not urban, what supposed an IMD average of 10.784 vehicles/day (Daily average intensity (IMD) is the most commonly used to characterize any magnitude. It is defined as the total number of vehicles spanning a section in a year divided by 365 days).

- Non-urban road (Nur). The surface that seals is of 17.80 km^2. Motorways sealed 1.80 km^2 in its few 113 km. The roads of different categories along with the rest of roads that make up the main structure of the nuclei of population total 16 km^2, divided in its impressive 6055 km. If I

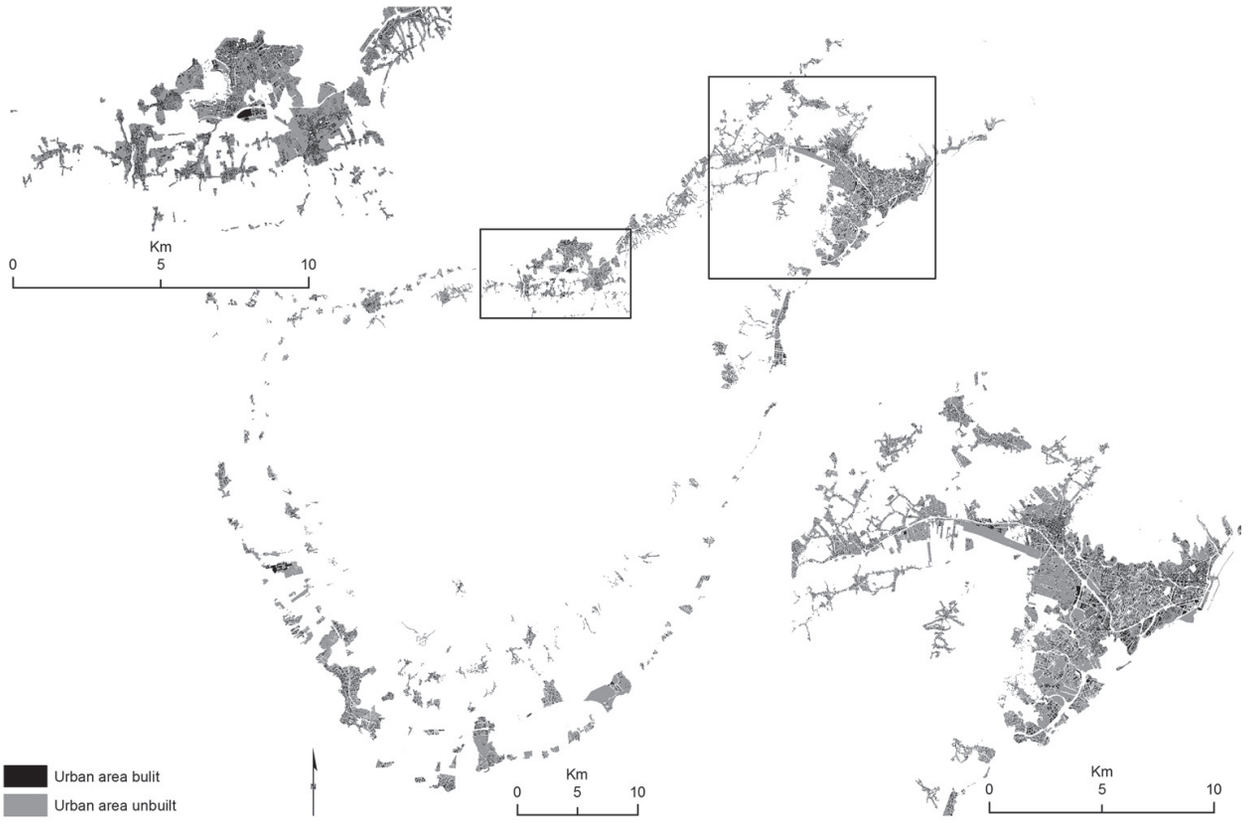

Figure 2. Distribution of urban area built (Uab) and unbuilt (Uanb).

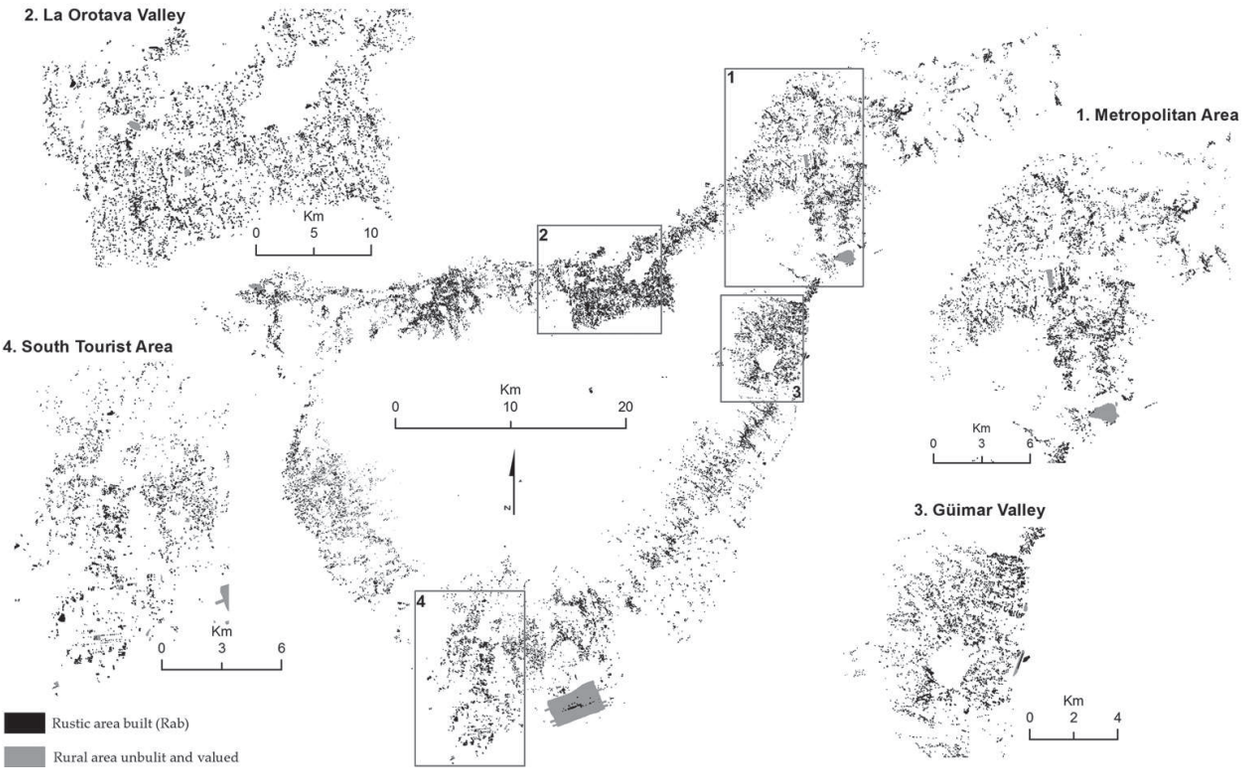

Figure 3. Distribution of the rustic area built (*Rab*) and unbuilt and valued.

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relate it to the population every inhabitant would be 144 km of track. The percentage of sealing of soil is of 0.87% (**Figure 4**).

- Paths and roads (Par). They do not enter into the analysis of sealed, but those that are close to concentrated nuclei or even to the scattered pieces, are tending to become in developing that part of the seal. These routes are which channeled the housing development irregular on the island of Tenerife. This structure shows the agrarian paleo-landscape of the island of Tenerife, symbol of its identity [26]. The accumulated length is 14,172 km. Its density throughout the island is 6.5 km/km^2.

4.1.2.3. Synthesis inventory level

The analysis of the inventoried components already shows, at insular level, the intensity of the fragmentation (**Table 4**) and the important percentage of soil sealing. (**Table 5**).

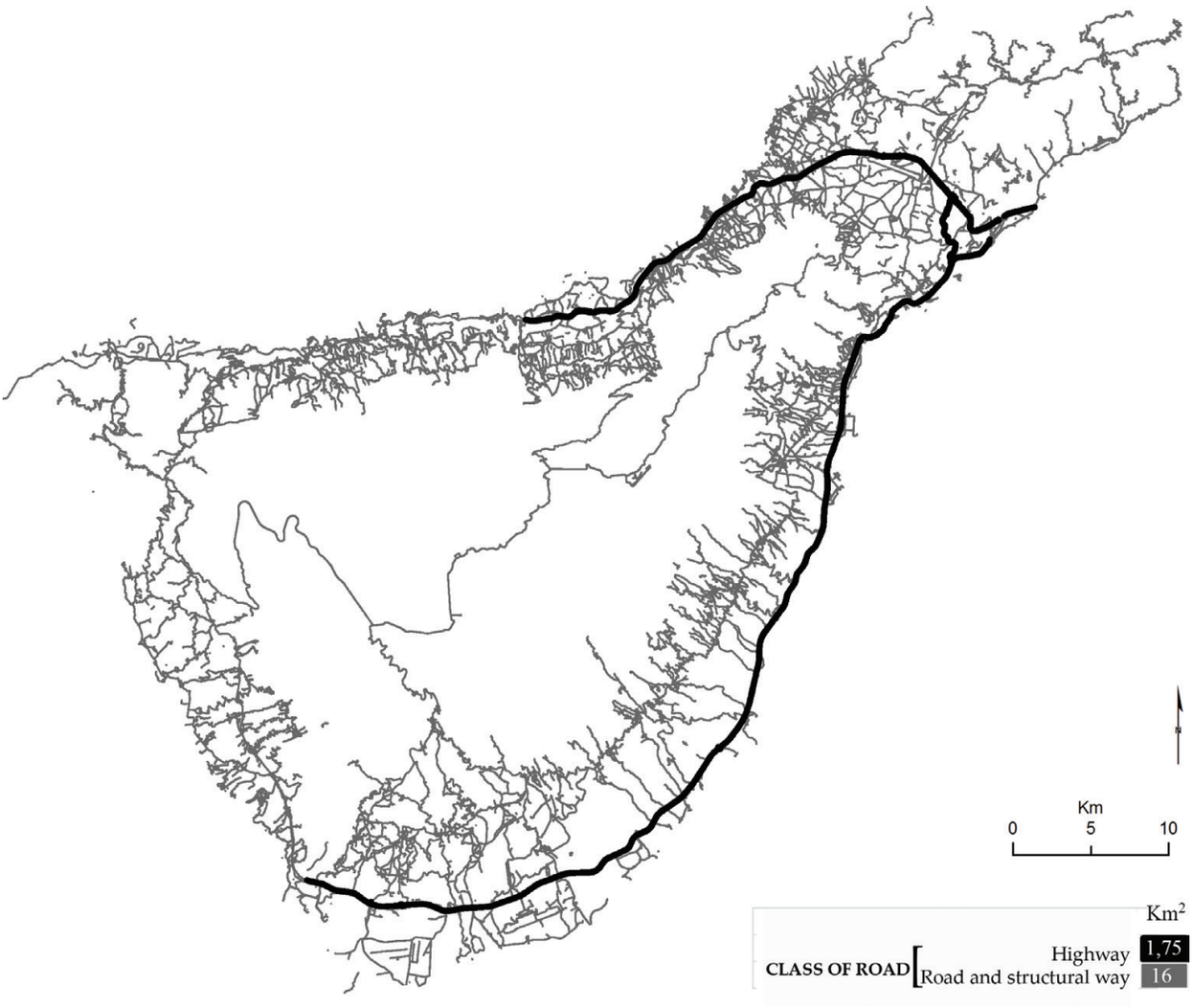

Figure 4. Distribution of the road structure.

Component	Code	Area	Length	Average (m^2)	Cadastral reference	Cadastral	Average polygon/ cadastral reference
		(km^2)	(km)		(frequency)	polygon	
Urban area built	*Uab*	34.11		242	140,954	490,915	3.48
Urban area not built	*Uanb*	100		687	146,344	196,287	1.34
Rustic area built	*Rab*	6.75		155	43,475	94,061	2.16
Rustic area not built	*Ranb*	16.85		1110	12,509	15,180	1.21
Non-urban road	*Nur*	17.8	6055				
Path and road	*Par*		14,172				
Total		**175.51**	**20,227**		**343,282**	**796,443**	**2.32**

Table 4. Synthesis of the fragmentation of the built space (inventory level).

Component	Code	Area	Soil sealing	Average soil sealing EU (%)
		(km^2)	(%)	
Urban area built	*Uab*	34.11	1.67	
Rustic area built	*Rab*	6.75	0.33	
Non-urban road	*Nur*	17.8	0.87	
Total		**58.66**	**2.87**	**2.3**

Table 5. Synthesis of soil sealing by components (inventory level).

4.2. Level of treatment

4.2.1. Relationships level 1

4.2.1.1. Risk island (Ri)

The risk island can be considered as a complex risk landscape unit. Here are determined by the processes of growth and restrictions on human activities. The projections of the territorial and urban planning are also concentrated in this space, hence the importance of these results and their magnification. If we calculate the pressure data, population, building and road frame on this new reduced spatial reference and real, and the results are triggered upward.

If we reduce the risk of transformation space 1046 km^2 and interact with the components that generate pressure diagnosis is more critical (**Figure 5**).

4.2.2. Relationships level 2

Tension (*T*). Combinations or risk island-generating components of strain relations express the following results:

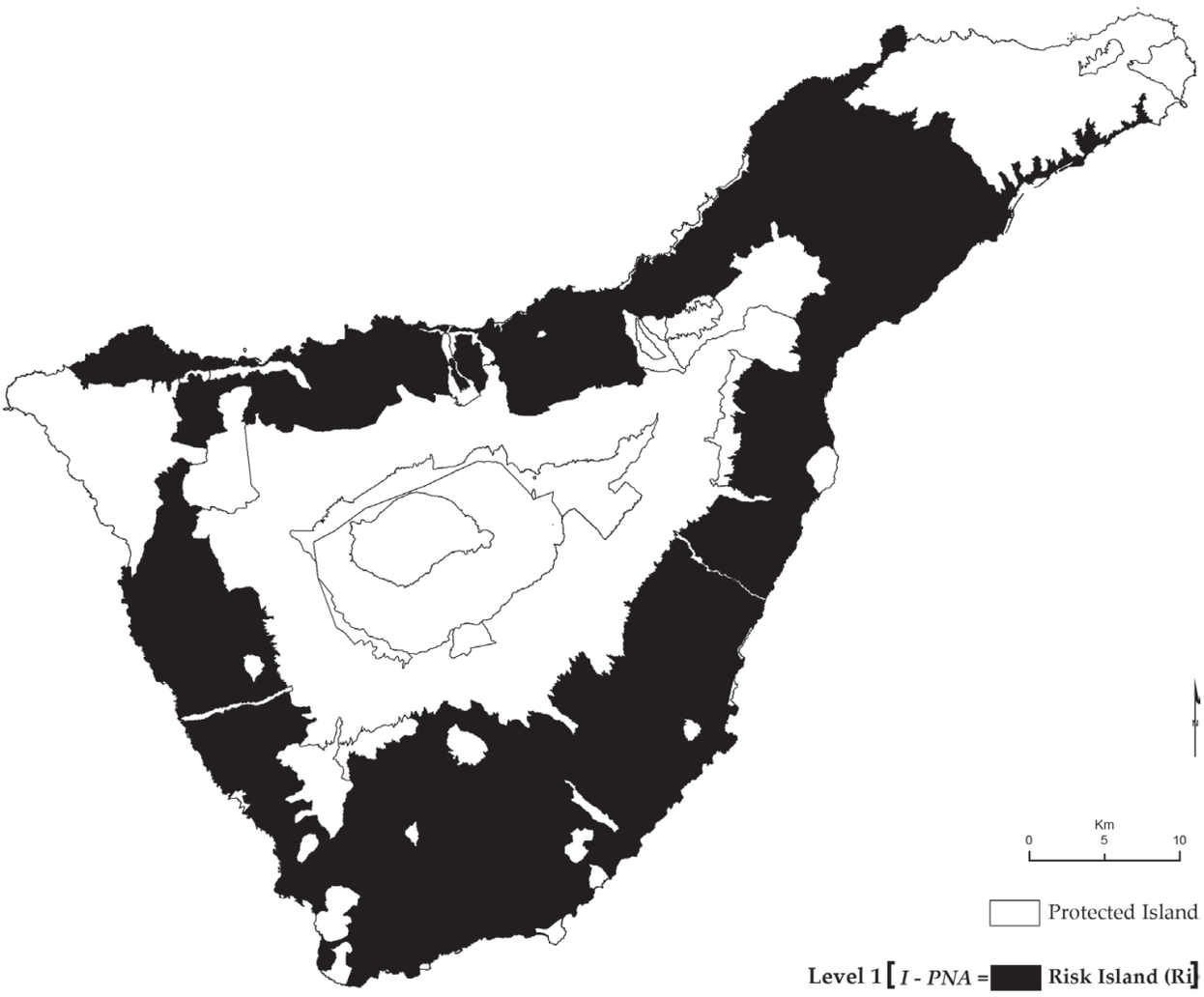

Figure 5. Risk island (*Ri*).

- Relationship of the risk island (*Ri*) with the urban area built (*Uab*)

The 100% the urban constructed land lies within the risk island. The sum of soil sealing is 34.11 km^2. This data represents the 3.26% of the risk island. If we compare it with the data from the EU of 2.3% of the total soil sealing, we are already talking of a tension in a single component. If we associate it with the absolute population is 38 m^2 per capita.

- Relationship of the risk island (*Ri*) with the rustic area built (*Rab*)

Risk island. The space built in rustic area is of 6.75 km^2. Within the risk Island are 6.36 km^2, representing 94.65%. The number of cadastral references is 40,133 and its media division–frequency–is 2.2 polygons/ reference. The average area of each reference is 82.27 m^2. The sealing of soil of this component is of 0.60% of the risk island. His relationship with the absolute population is 7.14 m^2 per capita.

Protected island. On the other hand, out of the risk island and within any of the categories of space natural protected exist 3373 references, the 5.35% of the constructions in rustic. The average surface of each reference is 67.03 m^2 and the number of divisions of each reference is 1.77.

- Relationship of the risk island (*Ri*) with the non-urban road frame (*Nur*)

Within the risk island is the highways total (100%) and 88.75% roads and structural way. In total 16 km^2. Each inhabitant of non-urban road is 18 m^2. The percentage of sealing of soil is of 1.52%.

4.2.3. Relationships level 3

- Relationship between the risk island (*Ri*) and the sum of the urban built environment and rustic (**Figure 6**). *U [Uab + Rab]*

The result is a built space partitioned by the island-risk, with a development of space built on rural land very intense, dispersed and fragmented, which in some cases (Orotava Valley, Güímar Valley or two rural parks–Anaga and Teno-) exceeds the risk island. Soil sealing by building is 40.83 km^2: the cadastral reference number is 181,087. The soil sealing represents 3.86% and its relationship with the population builds up 45.14 m^2 per capita.

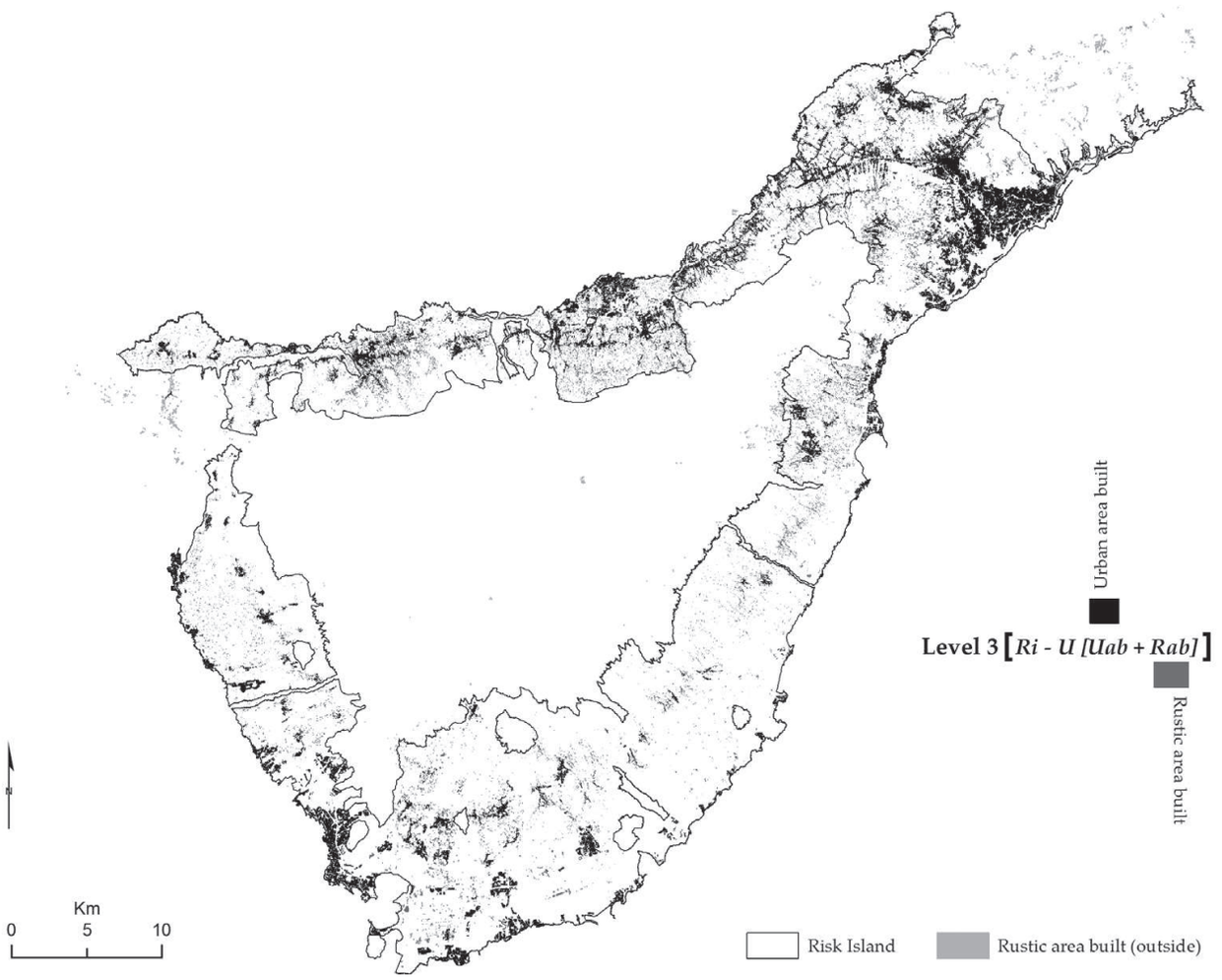

Figure 6. Distribution space built.

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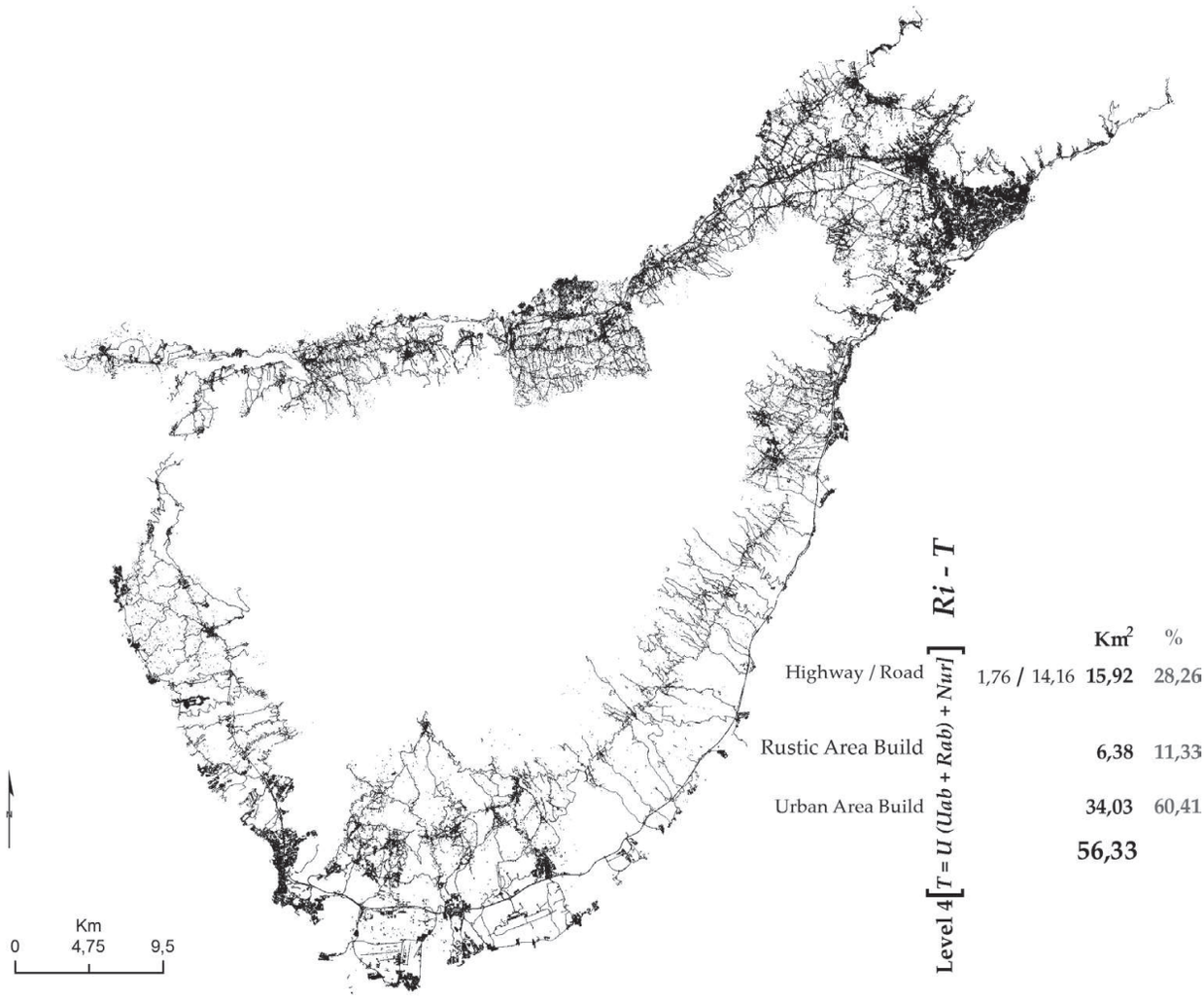


Figure 7. Distribution of the tension (pressure).

Component	Code	Area soil sealing (km²)	Average	Soil sealing	m² per capita	Average soil sealing EU (%)
			(m²)	(%)		
Urban area build	*Uab*	34.11	242	3.26	38.00	
Rustic area build	*Rab*	6.36	82.27	0.60	7.14	
Non-urban road	*Nur*	16		1.52	18.00	
Total		**56.33**		**5.38**	**63.29**	**2.3**

Table 6. Synthesis of soil sealing per component (treatment level).

4.2.4. Relationships level 4

- Relationship between the risk island (*Ri*) and the soil sealing component (**Figure 7**). *T = U[Uab + Rab] + [Nur]*

Tension on the risk island spatially focuses on urban construction and the intense network of roads and structural way, add 85% of the tension between the two. But at the same time the intensity of road network provides access to promote dispersion in non-urban land (11.33%). In any way the tension that generates the soil sealing in the risk island of Tenerife is of 56.33 km^2. This is 63.29 km^2 per capita. The percentage of sealing of soil is of 5.38% (**Table 6**).

4.3. Level of communication

Corridor island (*Ci*) (**Figure 8**).

The end result of this procedure leads to the corridor island. The remaining space on which rests the new tension. Our space unit of risk part with 1046 km^2. The value of the tension, represented by the soil sealing, is of 56.41 km^2. The corridor island features of 990.47 km^2. Those corridors are fragmented in 2200 polygons. These range from between 10 m^2 and 31 km^2.

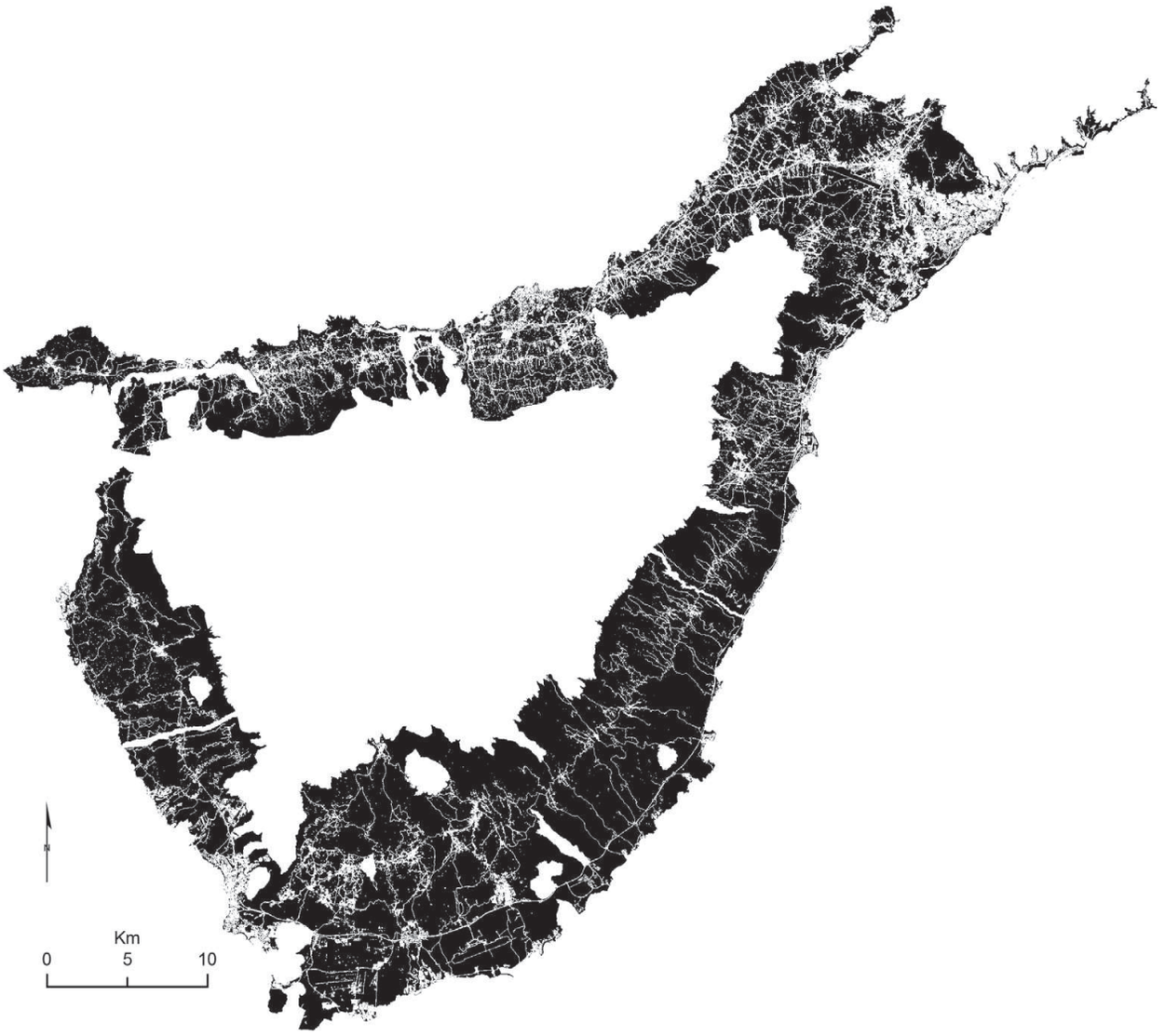
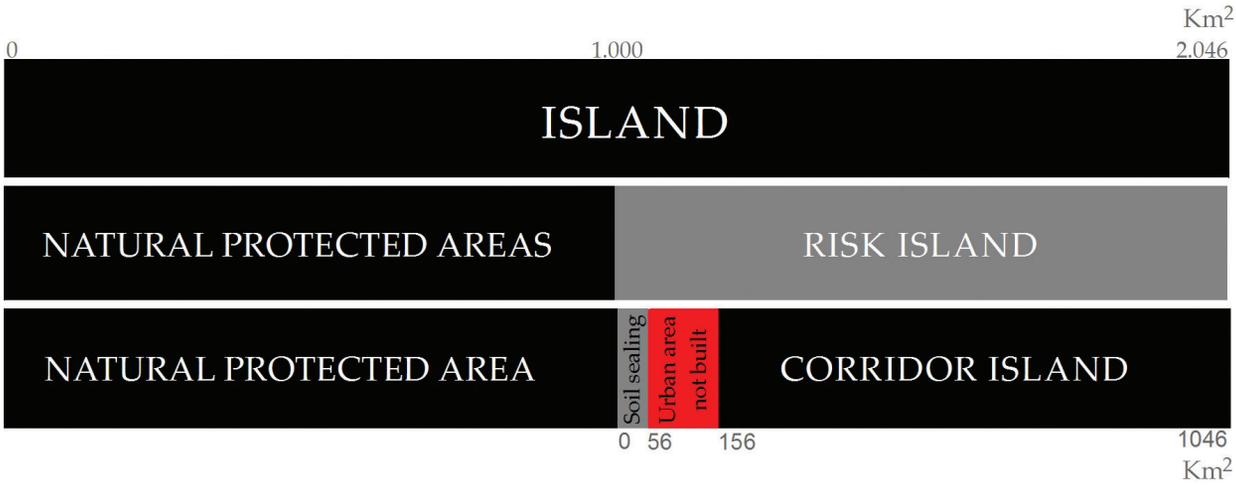


Figure 8. Corridor island.

http://dx.doi.org/10.5772/intechopen.72190



Scheme 2. Proportional distribution of the types of island.

The average is 0.45 km^2. This result demonstrates the importance of fragmentation. Also get the base space about which defines the complex strategies of intervention in this space (**Scheme 2**).

The key is now on characterizing the space corridor. This is divided into two main areas; on the one hand the cultural field represented by agricultural space and on the other the biotic field, both in contact, and the fruit of the activity or inactivity of the first. But also both in contact with the components that make up the stress, as defined in this article. What is the tendency of the polygons inter-road defined, how deals with territorial planning and the urban sprawl and the non-urban land management. These are issues that will deal of resolve in a next work starting from the delimitation of these units of reference obtained.

5. Conclusions

The island of Tenerife has a gross population density (ratio between absolute population and population) of 444.3 inhabitants/km^2, but a real population density, if we focus on its risk space is 850.79 inhabitants/km^2. This figure if we extrapolate it worldwide, Tenerife would occupy the position number 14 of the ranking. To this must be added the 14,100 daily tourists that coexist in the island, this supposes an increase of density in the risk island until the 864.28 Inhabitants/km^2.

In the island of Tenerife there are 43 protected areas between 3 and 46,000 hectares. Together they are 109,000 hectares. They are equivalent to 50% of the island territory. Almost 100% of the population residing or visiting the Island do not live in protected areas, that is, they are distributed within the other 50% of the total island. In spite of this, at the moment, it is being rethought from the present regional government, to modify the unique objective of conservation and delimitation of the protected spaces, incorporating and prioritizing the socioeconomic development for the resident population in those spaces.

The analysis of the space built in urban and rural soil diagnoses patterns of low density expansion models. The average surfaces of the built polygons are smaller in the rustic soil 155 m^2 than in the urban soil, 242 m^2. On the other hand, the reserve area that represents the unconstrained urban land triples that consolidated by the building. These data and their relationship with the insular surface indicate a percentage of soil sealing of 2%. According to the pressure levels determined by the study of soil sealing for the EU [17], Tenerife would be in the middle level only with this component.

The analysis of the space occupied by the non-urban road network indicates an important density, as well as the risk of unpaved roads and paths in the continuity of the dispersion. Only the asphalted road is counted as a component of soil sealing and this occupies 0.87% of the island.

If we add the values of the built-up space and the asphalted roadway, the total sealing result, on an island scale, is 2.87% of its territory. This result would be located in the medium-high border of the scale proposed by Prokop [18].

The risk island is a new spatial reference that should be used as a unit of analysis. It is more realistic because it is the transformable space. It must be the new space to design and apply landscape policies. On the island of Tenerife, it accounts for 50% of its territory.

The pressure or stress experienced by the risk island is evidenced by the occupation of the built urban space with respect to the sealing of the soil, as it is 1% higher than the EU average and would enter the high pressure level according to the Prokop scale [18].

The space built on rustic soil is more significant, representing 0.6% of the sealed floor and average surface area of 82 m^2 make them the clear dispersion and low density model. In the risk island is 95% of the total of this type of buildings; the remaining 5% is inside the protected island.

The non-urban and asphalted road network is almost entirely within the risk island, 100% of motorways and 89% of the main roads. They are 16 km^2 to which we would have to add the urban plot not calculated in this work.

In the absence of accounting for this data, currently under development, the total pressure on the unprotected island is 5.8%. This percentage would place it in the fourth place of the European ranking, only behind Malta, Holland and Belgium. Undoubtedly, this classification at the state level does not reflect regional particularities, but the status of insularity confers a specific status to the pressure exerted on a finite space. It would be interesting to analyze this problem in other EU insular spaces to compare urban growth models and their soil sealing coverage.

The rest of the island, the corridor, is a pressed, highly fragmented island. It is an island threatened by the building expansion through the network of roads not paved, that the planning instruments in force have not been able to curb. It is a space where the urban surface not built and even the space according to the classification of soil in force would duplicate the urban space and therefore the increase of pressure and sealing of soil of the corridor island.

The rest of the island, the corridor island, is a depressed island, very fragmented. It is an Island threatened by the building expansion through the network of unpaved roads, which

the planning instruments in force have not been able to stop. It is a space where the undeveloped urban area, and even the planned urban development, could duplicate the urban space, and with it, the demand for infrastructures that would only increase the sealing of the ground.

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