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From Degradation to the Regeneration of Territorial Heritage. An Eco-Systemic Vision for the Promotion of the Natural, Urban and Landscape Capital of the Metropolitan City of Reggio Calabria

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Abstract: The results of the research conducted on the subject of regeneration of areas of land suffering degradation were presented, studied and analyzed to establish "families" of causes and effects, to forecast lines of action commensurate with the reversibility of the damage. The area in question is the Metropolitan City of Reggio Calabria covering the entire territory of the former province and including the Aspromonte National Park. The methods of direct observation and critical interpretation of the phenomena, in terms of extension and incidence, are aimed at advancing a protocol of interventions for the definition, evaluation and implementation of regeneration prospects through experimental pilot laboratories for University-Region coordination. Of particular interest was the role of prevention for areas that are used improperly with the consequent loss of habitat quality, limitations of the effectiveness of ecosystem services, for those environments that express values integrated from a cultural, naturalistic point of view, identity and are subject to risks of fragmentation that endanger ecological connectivity.

Keywords: ecosystem services; habitat quality; ecological connectivity; depopulation of inland areas; territorial heritage; reversibility of degradation

1. Introduction

The latest data on the soil erosion of the ISPRA report a "virtuous" Calabria with values that appear to show caution in transformations [1]. In reality the demographic decrease that affects the entire regional territory and the current economic stagnation due to severe forms of recession (maximum unemployment values for all ages and youth, aged population, migration, per capita income among the lowest) reduces any form of "anthropic pressure" to transformations and at the same time limits every action aimed at the maintenance, care and protection of the territory. So an indicator that may seem positive reveals a condition of progressive degradation of resources, identities, landscapes. The Metropolitan City of Reggio Calabria which, should be clarified immediately in order not to give rise to misunderstandings, concerns the entire territory of the 97 municipalities of the former province of 3210.37 km^2, with Reggio Calabria exceeding 180,000 inhabitants, Gioia Tauro with about 20,000 inhabitants and with the centers over 10 thousand of Palmi, Siderno, Taurianova, Rosarno, Villa San Giovanni, Locri, Melito di Porto Salvo, Polistena and Cittanova and with countless small towns under 1000 inhabitants for a total of 548,009 inhabitants (01/01/2019—ISTAT). A territory crossed by numerous rivers that has about 220 km of coastline from the Tyrrhenian to the Ionian and reaches peaks almost

2000 m high (Aspromonte 1956 m). Aptly this reality is self-preserved and envelops the entire National Park of Aspromonte, an immense core area with extraordinary but still unexpressed potential that presents, ever more exacerbated, all the decisiveness of an Apennine mountain area in a geographical reality that expresses the discomforts of a deep south area of Southern Italy. In this moment, the main risks for the territories of the Metropolitan City of Reggio Calabria come from a scarce anthropogenic presence in the territory, from a lack of defense, from a lack of interest in the values and resources that appear to be underused, if we exclude the coastal areas, where the pressure on transformation for second homes is still strong; we witness an immense urban heritage of abandoned villages where building units are put up for sale and abandoned fields and terraces, untreated woods (the surface of the forests of the Metropolitan city is about 102,000 Ha, equal to over 30% of the total area) are systematically set on fire to gain pastures invigorated through sprouting. Only in 2016, across the entire regional territory, there were 985 forest fires that covered a total area of 8037 hectares, of which 5302.3 wooded and 2734.8 not wooded [2].

Thus, soil erosion especially in inland mountain areas is limited to that related to improper and basically reversible uses, the need to provide effective forms of regeneration of correct land use for productive purposes and in full consistency with the presence of a national park and woods, river areas, coastal dune areas that represent a precious and still substantially preserved ecological network that structures the entire territory of the Metropolitan City.

Calabria, over time, has tried to stem the impact of settlements on natural and environmental systems, even introducing the concept of "physical integrity of the territories" and "promoting and protecting the landscape, the environment and agricultural activity, considering the soil as a common good and non-renewable resource that performs functions and produces ecosystem services, with the effects of prevention and mitigation of hydrogeological instability events and in line with mitigation strategies and adaptation to climate change" [3]. The legislation of some Regions has not, at times, overcome the concept of mere "containment of land degradation", at other times it has been relaunched by prescribing actions to regenerate existing urban fabrics in order to avoid new urbanisations. The ten-year commitment of urban planning to contain soil erosion has spread slowly into collective acquisitions of forms of awareness, when the scientific-planning debate has already been appropriately addressed, seeking methods and strategies for ecological compensation, regeneration of urban areas, re-naturalization of abandoned areas, recovery of agricultural heritage, with an aim towards environmental and functional qualification of the territory. Today we understand that the action of containment must be accompanied by the serious action of redesigning, rethinking the performance of the areas, to raise the quality of the areas in function of what they express with respect to the broad context of belonging [4]. The regional regulations offer exciting hints on the subject, firstly by expanding the concept of land depletion [5] with the inclusion of functions and uses such as mining, construction site areas, sports-recreational areas, which even if they do not imply waterproofing of the soil, induce the territory to lose its natural features (Piedmont Regional Law 3/2013). Widespread orientation can direct the transformations towards the already urbanised areas, with the identification by the municipalities of the settled area, outside which new recognition will have to be considered in exceptional cases defined by law (Bolzano Province). The common interest is to direct the transformations towards the degraded areas, underused or disused, to be redeveloped and regenerated starting from the recovery of the real estate and the existing urban fabric [6]. An urban regeneration that is sometimes explicitly oriented to reduce seismic vulnerability even with the completion and construction of new public works (Lazio LR 7/2017). Concepts of environmental ecological endowment are made up of all the spaces, works and interventions that contribute to combating climate change and its effects on human society and the environment and improving the quality of the urban environment, mitigating the effects of heating to counter the *heat island phenomenon* (Emilia Romagna LR 24/2017). The regeneration process is considered a strategy and tool that also favors a balanced distribution on the territory and the protection of the agricultural territory from transformations that would make it "non-agricultural", as in the case of Sardinia (LR 8/2015) which established measures for the

protection of rural areas, such as the criteria for consolidating the volumes of agricultural holdings and attributes to municipal planning instruments for the purpose of safeguarding agricultural areas from improper exploitation, and Tuscany with Regional Law 65 of 2014, which sets the objectives of "*conservation and management of the territorial heritage, promoting its enhancement in function with sustainable and sustainable local development*" and contrasts the degradation of land by promoting "*the development of the multifunctional potential of agricultural and forest areas*". The definitive efficacy of the concepts of territorial heritage are exemplary, understood as "*a common good constituting the regional collective identity*" and of "*quality of the rural territory*" expressed by the consolidation and strengthening of its multi-functionality, the reproduction of the landscape, the hydrogeological balance, also the economic well-being of the region", fundamental for a sustainable and lasting development, guaranteeing food quality and the environment.

In the overall objective of making cities and human settlements inclusive, safe, resistant and sustainable, the role that urban planning and spatial planning are required to play using new approaches and every available opportunity becomes fundamental. At this moment it seems possible to converge the objectives of governing transformations on the theme of metropolitan cities, integrated mobility, the revitalization of internal territories, pro-village initiatives, river and coastal contracts, towards the new development of the 2030 Agenda on the road to sustainability and resilience.

The reform that introduced metropolitan cities, which for now appears to be suspended pending further elucidation, presupposes a new way of understanding urban roles and the territory to which they belong; it is not by chance that words like competition, growth and words like cohesion, development have been replaced. The conceptual acquisitions on the theme of the enhancement of internal areas confirm that the metropolitan cities must assume an important role in favoring the vast territory and the suffering villages and Apennines towards the full attestation of a cultural, economic and social identity that contributes to the mass by valuing the whole system [7]. It means going beyond the dichotomous vision "pulp" and "bones" of the territory, which carries concepts of centrality and marginality, where the most frequent words are abandonment, old age, isolation, to recognise different ways of living and the richness of this great variety of living cultures that is connotative of our country [8].

In the particular case of the territory of the Metropolitan City of Reggio Calabria and even more so in the part of the Aspromonte National Park (which occupies almost two thirds of the territory of the former province) the territorial and landscape heritage has a cultural, naturalistic and environmental eco-systemic of immense richness [9], a value overshadowed by risky social undertone making the sense of belonging and the identity of the communities increasingly marginal.

2. Materials and Methods

The research took root in the activities carried out over more than three decades, documented by publications and research reports on closely related topics: the land consumption of the regional territory of Calabria between 1954 and 1984 and the map of environmental risk in Calabria [10,11], the naturalistic environmental framework plan of the Territorial Coordination Plan of Calabria [12], the studies for the settlement heritage of the Aspromonte National Park [13], the studies for the natural heritage of the Province of Reggio Calabria [14], the drafting of the Charter of Places of the Calabrian Region [15,16].

This integrated accumulation of knowledge has enabled a vision capable of going beyond the sectoral approach, which usually leads to a reading of the territory by "levels" and individual problems, to use the method of direct observation and interpretative identification of phenomena and Recurrent "degradation families" and then the precise quantification of the extension of the direct area and the causes of degradation for the development of an assessment of the possible effects on wide and derived areas. The aim is to raise these issues by putting forward hypotheses of causes and direct and induced effects to propose specific in-depth laboratories for each type of territorial degradation with the necessary skills (geologists, chemists, agronomists) to start interventions with a Regional and University direction that can constitute lines for pilot action towards the solution of the problems and

for the development of rules of behaviour and periodic monitoring, which would also be useful for every single local territorial reality.

The Aspromonte National Park, Design Core of the Metropolitan City of Reggio Calabria

The Metropolitan City of Reggio Calabria [17–22] presents a complex territorial system with different areas and contexts from the morphological, settlement and economic development point of view [23]. It is the only Italian and European metropolitan city that includes a national park, the Aspromonte National Park, of over 65,000 hectares, which is one of the five homogeneous territorial areas identified by the Statute of the metropolitan city. The other homogeneous areas are the Plain of Gioia Tauro, the Strait, the Locride and the Grecanica areas (Figure 1). The metropolitan city of the Strait has an intimate link between Mediterranean coastal environments and mountain landscapes, with the Apennine ridge that continues into the Peloritani of the Sicilian side.

The presence of the Aspromonte National Park, included entirely in the metropolitan perimeter [24], represents a rare condition, characterised by the exceptional naturalistic, landscape and cultural heritage and by a rural and mountain settlement system that is overcoming the depopulation phase to experience events related to tourism fruition centered on cultural and landscape, historical and archaeological, enogastronomic and naturalistic aims. The internal centers of the park express a culture of places characterized by a rural world that is joined in a thousand different narratives, focusing on a common and, at the same time, peculiar common project. Its central position in the "vast" context of the metropolitan territory, which includes 37 municipalities, one third of those that make up the entire area, represents a key point in the metropolitan process of the city of Reggio Calabria.

The characteristics of the settlement of the territory of the Aspromonte Park allow the identification of macro cultural areas, based on the different and homologous matrices of identity and the functional relationships that are present in the territory of the park, which have created structured relationships between the centers and the areas themselves. The configuration of the metropolitan city territory is therefore closely linked to the presence of the Aspromonte massif. The rugged orography does not favor the settlement of inhabited centers and productive settlements and the centers in the most inaccessible and less accessible areas of the territory do not reach one thousand inhabitants.

The territorial system of the metropolitan city is characterized by the presence of a network of fragile infrastructure both in the connections with the vast territory, in the relations between the internal areas and the progressive abandonment of the internal centers with the typical settlement dynamics of the rural Apennine mountain world, to the advantage of coastal areas that are subject to strong settlement pressure. These considerations lead to a literary definition of the settlement system at the heart of the metropolitan city, belonging to the Park territory, functional to the project of the metropolitan city and decisive for the structuring of a polycentric territorial armor made up of bearing systems, supra-local systems and local systems that concern both the functional system of services and the network of accessibility.

The design themes that emerge clearly from the interpretations of the settlement system, show how it is also possible through a conscious and innovative use of resources, to enhance the prospects of functional integration, to overcome the current fragmentation of places and produce socio-economic-cultural benefits which are decidedly relevant for the metropolitan area in its entirety.

The methods and means for operating relate not only to the prospective of the metropolitan city, but also to the opportunities offered by the economies of the Aspromonte National Park. There are direct interventions by the Park Authority to improve the relationship between the settled environment and the natural territory that must guarantee the weight and role of pilot interventions to indicate design guidelines and generate reverberating effects in the sphere of the contiguous transformations of the vast metropolitan context. In this sense, the initiatives to enhance the ruins of ancient villages, geo-sites and architectural works scattered along the waterways must be interpreted, as must the direct promotion of civic museums, archaeological trails and nature trails.

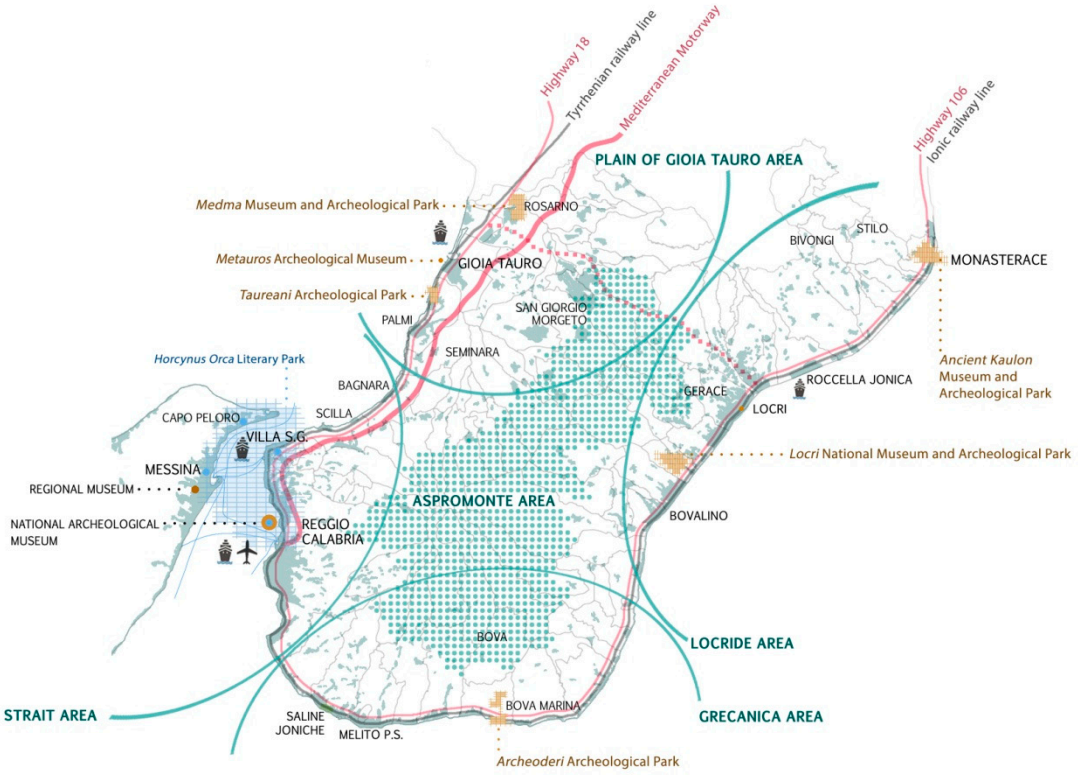

Figure 1. The homogeneous areas of Metropolitana City of Reggio Calabria. The central area, in green, is the National Park of Aspromonte.

A second modality is linked to the directing role that the Park Authority can play in guiding the transformation of governments towards the continuous improvement of the quality of settlements, centers, hamlets and nuclei, also through incentives for the progressive achievement of quality for the established environment.

A third project orientation concerns the activities that the Park Authority can express for the formation of a *new culture of residing and living* that is more adherent and responsive to the Park condition, conceived in a metropolitan context of reference.

The body of intervention methods referred to allows the first hypotheses to be calculated according to project themes: the *park's management areas*, for the promotion and enhancement of the park's centrality settlement system and the promotion and enhancement of the inhabited centers due to their great potential that can play complementary roles to the centrality system; *the material connection networks* for the valorization and multi-functional integration of the various existing types; *the network of receptivity and reception*, for the rationalization, strengthening and promotion of a widespread, qualified and diversified receptivity and for the promotion of local systems that offer tourism; *the network of cultural and recreational infrastructures*, for the promotion of projects for the enhancement of cultural structures and for the creation of didactic-scientific laboratories and of an integrated system offering leisure activities; *quality of the settlement environment and safety of park sites* for the promotion of projects aimed at progressively achieving quality for the settled environment, and integrated projects supporting high rural areas and the reevaluation of environmental interventions.

All this leads to transforming the settlement system into attractive poles providing economies that form new social and cultural aggregative models that contribute to raising the quality level of the entire metropolitan context [25].

It is here that the processes open up towards new geographies that challenge new issues: environmental, cultural-identity, strategic-infrastructural, which focus on the redevelopment of the territory and of the infrastructural network, on the reorganization of services and public space, on the need for physical and cultural accessibility of places and occasions, for reconnecting the different

urban parts and the territory through an integrated project that cannot be separated from a serious reconnaissance, reading and regeneration of places that have lost meaning, functions and memory over time.

3. Results

3.1. Areas of Degradation Classified According to the Reversibility of Their Condition

The outcome of the research conducted on the regeneration of areas suffering land degradation, anticipated and analyzed by "families" of causes and effects, with a particular focus on the degradation of agricultural territory and the fragmentation of ecosystem services, providing for lines of action commensurate with the degrees of reversibility of the damage. The methods are based on an in-depth activity, carried out over decades of activity and intensified during the research, which can be considered ongoing, of direct observation of the phenomena experienced throughout the territory and facilitated by the aid of aerial photogrammetric survey systems employing drones for this purpose. The research is directly aimed at the quantitative, qualitative and critical understanding of the extent of the phenomena and its incidence in the environmental systems to which the interested areas belong in order to grasp the authentic sense of the questions for the definition and evaluation of the regeneration prospects. There is particular focus on the role of prevention aspects for those areas that are used improperly with consequent loss of quality of the habitats, with evident limitation of the effectiveness of ecosystem services, and to those contexts that express values integrated from a cultural, naturalistic, identity point of view and are subject to risks of fragmentation that endanger ecological connectivity.

3.1.1. Areas of Environmental and Social Degradation Affected by Productive Activities—Extractive, Manufacturing and Industrial—Inactive or Abandoned

Consider the different characteristics of land "waste" which apparently generate less serious consequences in the near and immediate context, not concerning the areas originally equipped to host productive activities and which, after a relatively short life cycle, have simply become inactive and therefore, due to a subsequent profound change in the economic and social fabric to which an inability to adapt and relaunch consistent with the abandoned vocations of the territory.

An emblematic case for the Metropolitan City of Reggio Calabria is the complex site of Saline Joniche, on the coast of the municipality of Montebello Jonico and articulated in the Liquichimica Biosintesi plant, in an industrial port and in the Great Repairs Workshop of the State Railways, today entirely in disuse.

The two ponds formed near the Liquichimica area due to the natural silting of the port are today a natural oasis used for resting by many migratory birds which, as a natural habitat guarantees the maintenance of biodiversity, a SIC area, whose protection lies not with the local council, but with the Metropolitan City (Figure 2).

This, like other production sites, now abandoned, do not have, officially, risks of contamination but would still require, in most cases, a priority reclamation of polluting substances and materials such as asbestos, which is still present as a building material.

A similar argument can be made for the areas of landfill or storage of processing waste, resulting from the continuation of important construction sites, or to demolition works by explosion such as those related to the modernisation of the Mediterranean Motorway section overlooking the Strait and disused tracts not yet regenerated.

These are large areas, therefore, that represent a factor of environmental and social degradation also because they interrupt the natural and urban scheme with surfaces and features that are physically inaccessible, as well as impeding potential processes of environmental protection and promotion and triggering new cultural strategies for and economic production and social innovation.

An analogous reasoning can be made for the areas and features affected by mining that for reasons similar to those of production or for simple reasons of exhaustion are now abandoned.

Figure 2. The inactive plant of Saline, on the jonic coast. On the right the port filled with sand, on the left the two ponds, protected as SIC area.

The Cave Report edited by Legambiente 2017 describes a drop in active sites and an increase in those abandoned, more than triple, according to an incomplete survey given that Calabria, along with Friuli Venezia Giulia and Lazio, is one of three regions not monitoring extraction activities, failing to draw up, as a consequence, a census of abusive or abandoned sites and able to count only 237 active and 49 abandoned quarries [26]. The Calabria Region, with the L.R. 40/2009, provides for a contextual recovery of the extractive areas with coordination between the phases of excavation, reorganisation and landscape and environmental recovery of sites. At the moment an excavation license is requested, in fact, it is obligatory to plan the restoration of sites for the reconstruction of the topographic, geomorphological, hydraulic and vegetation structure of the areas involved in cultivation activity, suitable for accommodating the uses and pre-existing destinations programmed by current planning. The interventions essentially favor the reconstitution of the functionality of the ecosystems. In this case, however, checks are often not carried out, due also to a still incomplete regulatory framework, given that Regional Law on the matter refers to the implementation rules of the Regional Mining Plan without the latter having been approved or definitively drafted. Therefore, the task of the Region is to ensure that the owners of disused quarries provide for their environmental landscape restoration as required by the aforementioned regional law.

The Legambiente Report also shows good practices and virtuous examples, such as the management of underground mining activities with the simultaneous recovery of the areas, the recovery of disused quarries to create parks and host tourist activities according to formulas of collective-private and temporary hybrid use, the reduction of the extraction from quarry through the recovery of inert material stemming from abandoned buildings.

3.1.2. Areas That Have Lost the Effectiveness of Ecosystem Services

The phenomenon of the illegal construction typical of the Metropolitan City of Reggio Calabria is manifested in a *extensive* form above all, because, as for the whole regional territory, about 4 rooms are registered per resident for a population in constant contraction. The need to rely on abusive building, therefore, even if practiced following the crisis at an alarming rate, in Calabria, 46.6% of illegal buildings compared to those authorised [27] have discontinuous sections, often with large impermeable surfaces, which occur most commonly along the coastal strips where they can even reach

the sandy shoreline. It is estimated, in fact, that the consumption of land in the coastal strip has a 29.5% concentration within the 300 m distance of the coastline. Here, as in the more internal areas, where the phenomenon is more *diluted*, even if apparently less impacting on the balance of the territory, illegal building increases, in fact, the loss of effectiveness of ecosystem services due to the removal of natural areas and an increase in the fragmentation of land, also negatively influences the development prospects of sectors vital to the metropolitan economy, such as conscious tourism and quality agri-food production (Figure 3).

Figure 3. Greenhouses for intensive cultivation, on the jonic coast, increases the loss of effectiveness of ecosystem services and the fragmentation of land.

The correct functionality of the land [28] is also compromised by agro-silvo-pastoral activities inconsistent with the territory or whose nature is even illegal, such as, to mention the most striking case, the phenomenon of abusive pastures in some municipalities included in the homogeneous area of the Piana, whose destructive action was curbed by a complex and articulated plan, outlined and planned within the Inter-institutional Technical Table promoted and coordinated by the Prefecture of Reggio Calabria with the Aspromonte National Park that delivered an unprecedented result, despite its experimental character, when compared to a problem that has been manifesting for over forty years.

In addition to the phenomena of falling into the sphere of illegality, other activities, while not increasing the permeable surfaces, vary the coverage from natural or agricultural to artificial.

This is the case, for example, of construction site areas set up for large construction works—adjacent or near, at times, to productive agricultural areas and valuable landscapes—such as, for example, those preparatory works for the start of construction of the Bridge over the Strait, as the variant of the Cannitello-Villa San Giovanni railway line, or of the modernisation works of the Mediterranean Motorway or the Bovalino-Bagnara transversal artery connecting to the SS 106.

They are areas where for different reasons—works that have not achieved what was originally intended; a *connection* to the territory in the first case, or that the phase of environmental regeneration has not yet been completed in the second case, or, in the last case, *accompany* a construction site which has been interrupted for several years—they dominate the territory for long periods without having, at times, a forecast of dismantling and returning the land to its original destination.

The objective of integrating the protection of land functions into territorial planning could be pursued on two fronts; that of replenishing the land for the protection of agricultural and forest land that gives local authorities the possibility, as occurs in Poland, of demanding the removal of valuable arable land in the case of conversion of agricultural land so as to increase the fertility of other land or to reclaim degraded land elsewhere, and that of the identification of areas excluded from the construction of infrastructure in order to guarantee the subsistence of ecological networks, such as takes place in France and The Netherlands, with the delimitation of "blue and green landscape areas".

3.1.3. Areas with a Loss of Quality of Habitat, Ecosystem Services, with Erosion of Material or Immaterial Assets Linked to Incorrect Use or Accessibility

Of all forms, this is the type of degradation that, in the various forms, most characterises the territory of the metropolitan city.

The areas belonging to *sensitive* contexts belong to this family, preserving important naturalistic-environmental values, a cultural heritage with strong identity features due to secular processes of human settlement, territorial resources that can still be exploited for innovation and the strengthening of the economic fabric, as much as contrarily, they show a fragility linked to the morphological characteristics of the places, to the lack of infrastructures and basic services, to the problematic socio-economic conditions of the communities.

Parallel to the depopulation of inland areas, in fact, the metropolitan territory, like the regional one, is experiencing a gradual abandonment of agricultural and forestry activities. It is estimated, for example, that Calabria, between 2012 and 2018, lost crops capable of potentially producing about 40,000 quintals of fruit, mainly "antique varieties" (difficult to preserve and not very appreciated by the markets), with a serious loss of biodiversity, or that the production of woody raw materials—an ecosystem supply service guaranteed by natural forest surfaces—suffered, due to soil consumption, a 20% reduction in just six years, between 2012 and 2018.

Also the fragmentation and conformation of the agricultural soils that characterise the metropolitan territory and that do not allow an immediate productivity which is sufficiently profitable according to the traditional formula of mono-functional agriculture, has contributed, if only for economic reasons, to discouraging the formation of a new generation of entrepreneurs.

Although the phenomenon of abandonment may in some cases not determine serious consequences, if not those deriving from a negligence that can be circumscribed to the single areas, the slow but constant abandonment of agricultural and woodland soils has, however, seriously affected the action of systemic care of the territories that preserved the ecological and structural balance of the slopes, feeding the condition of hydrogeological risk and incidence of fires in the metropolitan area.

This specific issue was answered, in the past with good results, with a forest fire prevention plan implemented by the Aspromonte National Park Authority according to a "formula" developed for the defence of forest heritage and biodiversity of the Protected Area that entailed the involvement of the Volunteer and Civil Protection Associations, the Pastors, the Breeders and the direct Farmers, whose work complements the already operational inter-institutional system. The pastors in particular have been entrusted with the unpublished interpretation of the role of "eco-pastor" and of "guardians of aspromontan nature".

Both the internal areas of the metropolitan city, often invested by strategies and funds—such as, for example, the SNAI and the PSR—aimed at reducing the depopulation of the centers or preserving their natural and cultural characteristics, as well as the coastal strips, increased by infrastructure and services for the greater concentration of anthropic pressure, have experienced, at times, improper use of the building opportunities, often through *solutions* achieved over excessive amounts of time and achieved only once the initial needs had passed, and due to oversizing or incoherency with regards to the real demands of communities and territories.

This is also the case of the waterproofed surfaces of the numerous shopping centers scattered throughout the territory without any obvious relationship with the real anthropic presence which, in addition to *eroding* the adjacent commercial network to the detriment of local productivity, modifies the territory with large areas dedicated to buildings and parking areas characterised by short life-cycles, without being regenerated or used for new purposes, but simply re-proposed a few kilometres away, once the original function has been exhausted.

In addition, the structures supporting the Mediterranean motorway can be included, which has recently been modernised, moving to a different location, leaving behind uncontrolled decaying sites, such as service stations, already reduced, after only four years, to a state of ruin.

It is possible to refer then to all the widespread, disordered, spontaneous, sometimes abusive and rectified over the years, direct consequence of an uncontrolled and not always sustainable urban expansion that leads to occupation of the metropolitan land according to two main modalities. The first sees the exploitation of the spaces between the different territorial systems—river courses, coastlines, roads, etc.—which generates, in fact, a territorial fragmentation that reduces the surface of natural and semi-natural environments and an increase in their isolation, which is intensifying as we move from the heart towards the mid-coast and up to the coastal settlements. Therefore, the reduction cannot only refer to surfaces but also to ecological connectivity, resilience and the ability of habitats to provide ecosystem services without considering that fragmentation also damages agricultural activities, because it increases production costs and fuel consumption for processing.

The second follows a linear trend that follows the railway line and the two state roads, the 106 for the Ionian coast and the 18 for the Tyrrhenian one, and generates a continuous city [29] totally devoid of services in the points of greater distance from the major centers—so as to include coastal communities among the inland areas established by the SNAI—and which welcome a community of inhabitants forced into high commuting rates and dependence on private vehicles to reach workplaces, education and care, but also relationships and of cultural fruition.

In both cases these approaches of land use reflect negatively on the psycho-physical well-being of local communities and on the quality and value of the landscape, whose use, as well as cultural heritage, is often compromised in terms of accessibility and reachability as, at times, of correct interpretation.

We refer, for example, to the screens of second homes and tourist facilities that prevent, for long stretches not only the view, but physical access to the beach, or that inhibit the deposition of protected species' eggs, such as the caretta caretta turtle, or, the common beach structures built frequently on the coasts of the metropolitan city, or the generation of a dune landscape that would be so useful in countering coastal erosion (Figure 4).

It is already evident, with respect to the cases examined, how much more urgent and necessary it is to plan the *restoration and defragmentation of ecosystems and to favor ecological connections* [30] rather than giving priority to the management of new projects of large volume and building work. It is necessary, therefore, to plan a reconnection of the surviving spaces between them and the rivers, because they bring the ecological network back to the natural and functional radial pattern of the sea-mountain connection bands that have their core area in the Aspromonte National Park, due to new installations (public and collective permeable areas close to the riverbeds can also function as rolling tanks), the reconfiguration of intrusions (conversion of disused roads and railways) and the elimination of tampering (small demolitions or controlled deterioration actions) according to a process shared with communities that generally have more difficulty in accepting the conversion of the existing than the proposition of a new achievement [31].

Consider, once again, buildings, even legal ones, that intercept visions of particular value and invalidate the possibility of intercepting valuable landscapes or using architectural sites of documentary value, according to the way in which they were designed.

Figure 4. Groups of second houses built on the beach near the mouth of the river Mesima, on the Tyrrhenian coast, erode the dune landscape.

In the case of cultural assets as of any building that can foresee a re-use whose effects imply effects on the next context and community, it would be desirable not to rely on a traditional approach in which an expert chooses the solution between different alternatives, but to recognize that they can use the cognitive, economic and social resources distributed among more complementary actors. No longer an objectual, but relational approach, no longer a logic aimed at transforming the collective heritage merely into financial value, but in support of medium and long-term development, in the logic of investing in social capital and transforming problematic areas of the metropolitan city into opportunities for growth.

It is precisely in these cases where there is the possibility of affixing direct and indirect bonds to old sites and parts of the territory, endowing the superintendencies, if supported by the municipal administrations, with the ability to trigger correct regeneration processes, re-activation and involvement of the entire territory, starting from a new synthesis of cultural, social, economic-productive resources and offering the community a set of tools for using the territory.

Also the drafting of projects for participation in tenders aimed at the provision of quality public services and spaces, whether it involves a functional qualification of old containers within pre-existing materials, or regarding new projects, should aim to intercept real questions, propose new lifestyles, anticipate trends, feed the well-being of the citizens with public mobility or collective and sustainable health systems, accessibility to cultural, natural and landscape resources, to restore quality to habitats and increase ecosystem services, and vice-versa.

4. Discussion

To convert the conscience that invites us to rediscover a *common ethic* to regenerate the territories affected by improper uses and reshape the forms of the agrarian landscape into proactive energy, the research has assigned design directions to the three large families of problems identified, cataloged and measured the extent and severity of the degradation phenomena and described briefly in the previous paragraph.

We talk about realities ranging from abandonment and loss of territorial function and much more serious realities, to the limit of the recognition of environmental damage that are still far from being pursued and restored. The causes are of various types, and the research has classified them according

to their "reversibility" in order to trace new directions towards a rehabilitation of the territories. These are conditions that escape control and rules, indiscriminate excavations to extract lithoide material with maximum profit and no obligation to remodel; of under-utilised or disused industrial-craft warehouses with an area of relevance frequently used as a landfill for industrial waste, special waste; of immense shopping centers with their disproportionate abandoned or underused parking lots. There is talk of the urban wreck of housing projects never completed, because for years, decades, had been seized due to business failures, for agonised inheritance procedures. Sometimes, there are also public housing districts in this condition. In light of the "families" of risk of land depletion, it seems useful to retrace the main lines of action commensurate with the reversibility of the damage (Figure 5).

Figure 5. (**a**,**b**) Variant of the Cannitello-Villa San Giovanni railway line, preparatory work for the start of construction of the Bridge over the Strait, never built; (**c**) modernisation works of Bovalino-Bagnara, a transversal artery connecting the Mediterranean Motorway to the SS 106, never completed; (**d**,**e**) abusive or abandoned building near the Tyrrhenian coast; (**f**) Aspromonte wood processing inactive plant of the XIX century. The buildings have industrial archaeology restrictions imposed by superintendence; (**g**,**h**) a collapsed terrace due to the abandonment of crops, then recovered and recultivated; (**i**) abandoned spinning mill of the XIX century.

4.1. Regeneration of Sites That Need Surface Remediation and Depth Reclamation, Areas of Production (Craft, Industrial) Abandoned or Underused

The research identified, mapped and quantified the sites that present these problems, in a general classification that requires specific surveys for the development of land remediation programs and projects with the verification and control for types of pollutants and of the risks of diffusion to the aquifers and/or of propagation in the surrounding lands and downstream with respect to the areas used for the burying of wastes from processing products or for the presence of ruins or skeletons or deposits of materials at risk.

For the sole purpose of reclamation for the areas with sites containing asbestos, the 2016 Arpacal Report states that one roof in ten has an eternit roof. The Environmental Protection Plan, decontamination, disposal and reclamation for the purpose of defence against the dangers deriving

from asbestos prepared for the Regional Asbestos Plan for Calabria reports a contaminated area for the entire Region of approximately 65,000 m.

4.2. Re-Naturalisation of Sites that Have Lost Their Naturalness, Permeability and Biodiversity for Different Reasons

The research has identified innumerable areas, sometimes even of vast extensions, that present these conditions and that it is possible to trace back to codifiable and programmable types of intervention.

For these areas, the QTRP of Calabria provides for the "environmental and functional qualification of the territory through the enhancement of the territory's resources, protection, recovery, minor consumption of land, and therefore the recovery and enhancement of the landscape, of the environment and rural territory "as a productive component and at the same time as environmental protection as a prevention and overcoming of environmental risk situations, ensuring the coherence between landscape planning and territorial and urban planning strategies.

The lines of action promoted by the research are identifiable with interventions aimed at reducing the impermeable surfaces, with the demolition of the large concrete or paved squares with the restoration of the agrarian land and the remodelling of those places by creating terraces, compluvium lines and of displacement. Margins of innovation can be found in the possibility of experimentally creating water collection systems (ponds, reservoirs, cisterns) usable for irrigation purposes to extend the irrigated agricultural area.

4.3. Revitalisation, Enhancement, Reactivation of Abandoned Territories, Both Agricultural and Forestal, through Support Measures, Incentives and Facilities to Reduce the Phenomenon of Neglect and Degradation

For the purposes of the revitalisation of the agrarian territory specific support policies have now become urgent, even indirectly, towards replanting and reactivating crops. Other European countries implement measures to give new quality and productivity. Consider the rural landscape policy in France, which is achieving significant results with forms of progressive improvement linked to specific quality objectives to be achieved at specific times agreed between the local parties and departmental communities. Even Germany has activated a serious policy of limiting the consumption of land, with an indication of the objectives of reducing the new urbanisation of the land, to be achieved in specific time-frames, a subject that in Italy has been consummated without ever having produced an effective action or a measure of any kind.

In Calabria the value of agricultural soils is favored by the Regional Law 2017/31, with provisions to facilitate the access of young people to the primary sector and counter the abandonment and consumption of agricultural soils, which dictates the fundamental principles for the conservation of the soil as a common good and a non-renewable resource, decisive for the defence of the ecosystem and landscape characteristics, for the prevention of hydrogeological instability, for the enhancement of typical and quality agri-food products. In particular, provision is made for the granting in concession or lease of publicly owned land in favor of young farmers and social cooperatives with the restriction of agricultural use.

The incentives are foreseen by the various measures of the Calabria RDP 2014/2020 for the purpose of reducing the phenomenon of neglect and degradation, also pursuing transversal objectives of "environment and climate change", especially in the areas of the regional territory at risk of erosion.

The university, as part of the activities related to the Third Mission, is playing an advisory and guidance role for the support of local authorities called upon to respond to such serious problems also for the promotion of pacts linked to river and coast contracts, for the candidacy for funding programs for the recovery of the villages and for the fight against the phenomenon of abandonment and for study activities, knowledge, and intensifying the characteristics of the territory and its eco-systemic values. In particular, the Rural Development Plan (PSR) for the Calabria Region opportunities are being pursued in the context of measures for the reforestation of non-agricultural land, integrated management and environmental protection, prevention actions and restoration of potential forest damaged by fires

and natural disasters and for integrated management and protection of the environment and forest ecosystems. The University of Reggio Calabria with its fields of Architecture, Engineering, Agriculture and Law has been taking care of the implementation of services related to education, health, mobility, affirmation of the culture of legality and the support of actions in favor of agriculture and agri-food production and of conscious and sustainable tourism.

5. Conclusions

The numerous research passages, performed over the years according to different paths and favoring the renewed governance forms of the territory, today metropolitan, and therefore of vast area, have allowed the extension and the vastness of the problem of "quality waste" of the territories, for the development of a range of site-specific solutions while at the same time a "pilot" for similar contexts in which to advance verified answers effectively.

The degradation conditions affecting the Metropolitan City of Reggio Calabria, which is a Vast Area Authority whose extension coincides with the territory of the former Province (3210,37 sq km, over 150 inhabited centers, for a total of 548,009 inhabitants of which 180,000 are residents in the city of Reggio Calabria, once the capital of the province), makes this extremely diverse territory an ideal laboratory to tackle the issue of the conceptual transition between contrast to consumption and land waste towards forms of authentic regeneration of naturalistic values and systemic reflection. In such contexts, which express naturalistic, environmental and cultural identity excellence of the territory, it is possible to map phenomena of environmental degradation that create relapses also from a social and economic point of view, if only for the occurrence of forms of collective addiction to degradation. It is therefore possible to recognise the ideal field for a theoretical and applied experimentation directed towards overcoming the concept of "consumption" towards the authentic identification of the causes, of the direct and indirect incidence of the areas, but above all of the possible measures of intervention, even of the human and social dimensions, as the vision of a desired integral ecology.

Precisely in this sense the objective of the proposed research is to stimulate the observation of degradation phenomena by advancing hypotheses of causes and direct and induced effects so that specific laboratories relative to each family of territorial degradation express the necessary competences, even in a way transversal to the different cases. Due to direct Region-University coordination, where the latter can provide the activities of a Third Mission; a real support to the role of government of local authorities, which identifies those interventions useful to constitute lines of action not only to provide solutions to problems, but above that guide towards a code of behaviour and periodic monitoring, applicable with equal effectiveness from a vast scale to the single local territorial reality.

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