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Editorial correspondence
Laboratory of Land Use Mobility and Environment
DICEA - Department of Civil, Architectural and Environmental Engineering
University of Naples "Federico II"
Piazzale Tecchio, 80
80125 Naples
web: www.tema.unina.it
e-mail: redazione.tema@unina.it

The cover image shows the Irpinia hills at sunset, highlighting the enhancement of two renewable energy sources: sun and wind.
The photo was taken by Giuseppe Mazzeo in August 2022, in S. Andrea di Conza, Avellino, Italy.

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Landscape and the city

A new vision for enhancing sustainability issues

Donatella Cialdea [a*], Antonio Leone [b], Vito Muscio [c]

[a] L.a.co.s.t.a. Laboratory
Università degli Studi del Molise, Campobasso, Italy
e-mail: cialdea@unimol.it
ORCID: https://orcid.org/0000-0001-9310-2732
* Corresponding author

[b] School of Civil Engineering
Università del Salento, Lecce, Italy
e-mail: antonio.leone@unisalento.it
ORCID: https://orcid.org/0000-0002-7893-4650

[c] L.a.co.s.t.a. Laboratory
Università degli Studi del Molise, Campobasso, Italy
e-mail: lab.lacosta@unimol.it

Abstract

In recent times, there has been an increasing number of initiatives for developing green and agricultural areas connected to urban ones. This is certainly very positive, from many points of view, both social as well as environmental. This work presents a study regarding an Agricultural Park proposal. It is located in an urban context, which involves a populous district of the Bari Municipality (Apulia Region, Southern Italy). The role of Nature Based Solutions was further considered: they are inspired and supported by nature and could help to build land robustness increasing soil permeability and, as a result, decreasing the risk of hydraulic hazards. For this purpose, the Digital Terrain Model was utilised: obtained by the LIDAR survey, it was employed in order to create the hydrographic micro-network, giving us details of runoff paths. Consequently, agricultural activity, by increasing soil permeability, will contribute to reducing hazards. This methodology has allowed for the creation of different areas to be allocated to agricultural activity; this process started with the localisation of hydraulic micro-network and became part of the "new" landscape. Landscape management, through Agricultural Park creation, therefore turns into a catalyst for local development, due to its agriculture relevance and its ability to absorb anthropic pressures.

Keywords

Urban agriculture; Ecosystem services; Urban regeneration.

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1. Introduction

1.1 Background

This paper investigates the evolution of the relationship between urbanised and agricultural areas in the contemporary city, from the perspective of the urban planner who, today more than ever, is entrusted with the task of evaluating landscape and environmental implications.

Nowadays, increasing research is being carried out into planning activities linked to the creation of agricultural parks in urban areas, above all for reducing urban pressure on the surrounding context.

Especially in European countries, many investigations have concerned the urban demand for rural goods and services, with a view to restructuring agricultural activities in a multifunctional way, adapting them to socio-economic changes and development opportunities.

Secondly, the well-being deriving from increasing the sustainability of open spaces is often analysed. In fact, there are a growing number of scientific papers on urban open green space and many of them try to answer the question of what the main environmental benefits produced by urban open green spaces are. (Mehdi Rakhshandehroo, et al., 2017; Gaviglio et al., 2021)

Many applications have been made in recent years, in various countries which also have different urban conditions. (Jong-Il & Jin-Wook, 2017; Zasada et al., 2017, 2018; Pölling & Mergenthaler, 2017).

They investigate multiple aspects, often very different from each other: much attention is paid to the positive aspects that derive from them, especially as regards the cultural "value" of the landscape (linked to its historical value). In this field, methodologies related to spatial and perceptual analyses are studied, with specific in-depth analysis of their application to agricultural parks (Tóth & Supuka, 2013; Lange et al., 2015).

According to current scientific evidence, the parts of the city linked to the tradition of land cultivation create a specific type of urban-agricultural landscape and at the same time constitute a strong historical memory of past activities.

The underlying problem is the need for reconnecting urban-rural relationships. The studies in the landscape planning field have demonstrated the opportunity of using more complex approaches by stating the integration of different aspects (Zasada, 2011; Beichler et al., 2014; Cooke et al., 2015; García-Martín et al., 2016; McCracken et al., 2015; Fanfani, 2018; Zasada et al., 2019).

The issue is certainly complex. The innovativeness of this work, which is consequent to a wide range of other applications carried out by the authors in recent years (Leone, 2019a, 2019b; Leone et al., 2020; Pelorosso et al., 2018a, 2018b; Cervelli et al. , 2017; Cialdea, 2020a,b), consists in having developed a methodology useful for the precise localisation of potential agricultural areas according to the nature of the land and the presence of water, which can be used to proper management of green areas (urban green and agricultural green).

1.2 Current approaches analysis

The study of mechanisms connecting agri-environmental and landscape policies involves territorial management aspects that can feed the socio-economic development of rural areas, even when they are close to or inside urban areas.

Agriculture is therefore a focus element for the achievement of sustainable development goals, but also a harbinger of a new relationship with the city. In recent years, the so-called "agro-urban" project has found ample space in research, combining the efforts of the planning disciplines and the disciplines that most closely deal with environmental and agricultural policies.

The interdependence of agriculture, development and the environment for the purposes of global sustainability is widely reflected in the system of "Sustainable Development Goals" (SDGs).

The 2030 Agenda for Sustainable Development (United Nations, 2015a) states these goals, to be achieved by 2030. They pursue aims of the previous "Millennium Development Goals" (MDGs) (United Nations, 2015b),

and represent common objectives on a set of important issues such as fighting poverty or climate change. The definition of "common objectives" means the total involvement of all countries on a global scale, in order to bring the planet onto a sustainability path. In June 1992, in the *Summit* in Rio de Janeiro, Brazil, over 178 countries adopted the "Agenda 21", a plan to build a global *partnership* for sustainable development to improve human life and to protect the environment. In June 2012, Member States adopted the final document "The future we want" (United Nations, 2012) in which they decided to start a development process; a series of sustainable development objectives to be added to the MDGs and to establish the United Nations Political Forum on sustainable development. In January 2015, the General Assembly started the negotiation process on the post 2015 development agenda. The process culminated in the subsequent adoption of the 2030 agenda for sustainable development, with 17 SDGs. The Division for Sustainable Development Goals at the United Nations Department of Economic and Social Affairs (UNDESA) currently offers substantial support and capacity building for the SDGs and related thematic issues, including water, energy, climate, oceans, urbanisation, transport, science and technology, as defined in the "Global Sustainable Development Report" (GSDR) (United Nations, 2019).

Among these 17 SDGs, number 11 aims at "Making cities and human settlements inclusive, safe, resilient and sustainable". Many cities around the world are facing demanding challenges in managing rapid urbanisation from ensuring adequate housing and infrastructure to support population growth, coping with the environmental impact of widespread urban sprawl, to reducing vulnerability to natural disasters.

Over the past few decades, the world has experienced unprecedented urban growth. In 2015, approximately 4 billion people - around 54% of the world population - lived in cities and that number is expected to increase to around 5 billion people by 2030. Urbanisation has brought enormous challenges, including an increasing number of slum dwellers, increased air pollution, inadequate basic infrastructure and services and unplanned urban sprawl. As stated in the Goal 11 Report, already in May 2017, 149 countries were developing urban policies. From 2000 to 2015, in all countries, the expansion of urban areas outstripped the growth of urban populations. As a result, cities are becoming less dense as they grow, with unplanned urban sprawl challenging the more sustainable urban development models. Goal No. 11 deals with the issue of urban sustainability. Cities play an essential role in achieving the Sustainable Development Goals: half of the world's population and three-quarters of the European population live in urban areas.

The presence of green and public spaces, the protection of cultural and natural heritage, the redevelopment of degraded areas, the relation with peri-urban and rural areas are all essential elements for the whole community.

The extent and complexity of the topic of urban sustainability needs integrated planning and management capacity. The orientation of some targets to the consequences of climate change and the urgent need to mitigate their consequences, especially those related to water, is absolutely vital. Last but certainly not least, is the desire to strengthen the positive economic, social and environmental ties between the city and the countryside, two worlds that in many Italian cities never appear as a dense and compact core, since the only the outermost belt tends to decline to rurality, being the one which does not remain involved in the planning processes. In fact, there are numerous cases in which it is possible to discover a strong mixture between these two worlds that elevates the city itself to a status of agricultural city, just think of the case of Rome considered the largest agricultural municipality in Europe or the "Parco Sud di Milano", an Agricultural Park that appears to be the main green attraction of Milan (Migliorini & Scaltriti, 2012; Sorace, 2001; Bechini & Castoldi, 2009).

The issue of the relationship between urbanised and agricultural areas has been addressed for a long time in various countries which present - albeit in different forms - the duality of this relationship. To overcome this dualism, it is necessary for the two worlds to interact with each other and, given that they are territorial systems, this is realised through the flows of mass and energy. It is therefore necessary for the city and the countryside to establish a mutual exchange of ecological services.

This is the fundamental role of the Agricultural Park connected to the city: directing and managing these interactions.
Regarding to what was outlined by the AGRI Committee - Urban and Peri-urban Agriculture of the European Parliament (Piorr et al., 2018), which analyses some interesting cases in Europe, the agricultural park can be considered the vector of connections between different systems, physical and economic, of the city and the agricultural land that surrounds it.
The primary objective is to ensure the liveability of urban areas, especially when they include disused areas and attention must also be focused on the need to recover abandoned landscapes (Fayet et al., 2022). Also in Italy, the aforementioned experiments have paved the way for multiple applications also in urban areas (Castoldi & Bechini, 2006; Pacini et al., 2009; La Rosa et. al, 2014).

1.3 Aim of the study

The literature - with texts and articles relating to principles and samples - constitutes the backbone of the article and is constantly examined during drafting.
This paper undertakes a research path by combining considerations related to theoretical issues and to practical interventions, carried out on areas devoted to agricultural uses. The main goal is to point out the empirical approach, based on hydraulic asset verification, in order to give agricultural activities a role in reducing the hydraulic hazard.
The relationship between countryside and the city has been addressed, by proposing the application of a methodology for green space design in a seaside city. The research aimed at developing a methodology able to combine the development of agricultural areas and the protection of the territory. The first step was the collection of land use data (analysed in the most recent transformations). The investigation then focused on the aspects of soil defence and hydrogeological issues, and this is reported in this paper.
The traditional solution is the creation of an urban drainage network. This is a type of "a posteriori" solution, which takes place when the damage connected to the risk of floods has already occurred. It therefore acts on the effects and not on the causes. The present work aims to demonstrate that it is much more profitable to intervene "a priori" on the hydrological pressure, reducing the soil sealing.
Nature Based Solutions (NBS) express this need well. The EU Commission defines NBS as "Solutions that are inspired and supported by nature, which are cost-effective, simultaneously provide environmental, social and economic benefits and help build resilience. Such solutions bring more, and more diverse, nature and natural features and processes into cities, landscapes and seascapes, through locally adapted, resource-efficient and systemic interventions" (EEA, 2021).
The use of NBS is constantly increasing due to their high efficacy; for example, Pelorosso et al. (2018a) showed how a few green structures can significantly reduce the hydrological load on the urban drainage network of Bari. These are green-based techniques, which contribute to creating positive effects, for example for extreme temperature regulation and for the increase in biodiversity.
A particular category of NBS are the SuDs (Sustainable Drainage Systems), green arrangements designed to reduce the potential impact of new and existing urbanisation related to rainwater surface runoff (Woods Ballard et al., 2015). The SuDs outlook is to replicate the drainage models of natural systems, using cost-effective solutions with low environmental impact to drain water and release it slowly into the environment (Recanatesi et al., 2017). In addition, runoff absorption allows water filtering and purification and, therefore, improves its quality, as well as enriching groundwater storage.
The purpose of the research, ultimately, was oriented to the localization of different areas to be allocated to agricultural activities, starting from a technical definition of water collection and providing new varied agricultural activities.

The article is organised as follows: the introduction (Section 1) describes the main issues of the paper, including the literature review; the next section (Section 2) introduces the methodology steps adopted to assess the study area context; the empirical findings are presented in "Results" and "Discussion" (Section 3 and Section 4); and, finally, concluding remarks are summarised in the "Conclusion" section (Section 5), geared towards stimulating future research.

2. Material and Methods

2.1 Study area

The case-study is located in the Apulia Region, South of Italy (Fig.1).

The proposed methodology involves the South-East coastal area of its capital, Bari, called "Bari South Coast" (BSC). This territory is therefore significant with respect to the study aims: it is an important part of the city, destined for a strong urban development, but, at the same time, there are many semi-natural spaces, a consistent agricultural activity and various rural buildings, which can contribute to creating a complex and resilient landscape. These are the prerequisites to support sustainability enhancement.

Fig.1 part a) illustrates the localization in the national context and the Apulia Region, through an image of its Landscape Plan: it reports the analysis of rural morphologies. In particular, the area in question (circled in red) shows a highly heterogeneous agriculture in an area defined as a "transition landscape" with "landlocked sections" of houses with characteristics of dispersed settlements. It is important to underline that the Apulia Region is equipped with recent generation vast area planning tools. In 2015 Region approved the first Landscape Plan in Italy, following the requirements of the Code of Cultural Heritage and Landscape (Repubblica Italiana, 2004; Regione Puglia, 2015). Among other things, the Landscape Plan provides for the realization of Agricultural Parks, intended not as yet another entity, but as an informal meeting place and common growth of local citizens and farmers.

The following image refers to the Bari Masterplan. There appears the clear desire to enhance this part of the coastal strip - which is the only "not occluded" part - as an environmental and landscape resource: "The particular condition of isolation, separateness and poor accessibility, due to the breakdown of the Adriatic railway line, has preserved this territory from settlement pressure, at the same time gradually confining its spaces to residual agricultural uses and, more often, to abandonment and degradation"(Comune di Bari, 2010).

As the recent research on Italian metropolitan cities highlights, this tool has also produced a propulsive effect, evidenced by the proliferation of the ability of municipalities to create territorial development by putting public and private resources into the system and activating a broad partnership, especially for projects that invested degraded areas of cities. It states that the "Terra di Bari" Metropolis has more souls within it, that of the tertiary sector, that of the food and manufacturing industry and that traditionally linked to agriculture": consequently, development tools must necessarily understand the permanence of the agricultural matrix, especially in areas where there is a risk of losing it (PCM, 2017).

Moreover, the recent national report on land consumption (SNPA, 2020) highlights how the city of Bari records a significant growth in artificial surfaces, with values among the highest for regional capitals: in particular, in the analysis of the increases between 2018 and 2019 the city has the highest density of consumption (it is 32.8 hectares consumed, corresponding to 28.19 m^2 of new land consumed per hectare). The value of marginal land use (as the ratio between net land consumption and new residents between one year and the next) also denotes an alarming situation, with values clearly higher than the national average.

In relation to the spread of still alive phenomena of soil aggression, is important to resort to operations on the regional territory to recover areas with an "uncertain definition", combining aspects of environmental protection.

The historical shortages of urban green spaces are also constantly recorded by national surveys: "Among the large municipalities, even in the presence of consistent absolute values (in Rome the m^2 of urban green areas are over 45.6 million, in Milan 22.8 million, Turin 19.5, Bologna and Naples 11.1 million) per capita endowments are compressed by the high demographic size: on average 19.3 m^2 per inhabitant are available compared to 47.1 m^2 in medium and small-sized capitals; among the other large cities, the cities of Genoa, Bari and Taranto are below the national average, with less than 9 m^2 of urban green space each (ISTAT, 2016; ISPRA, 2020).

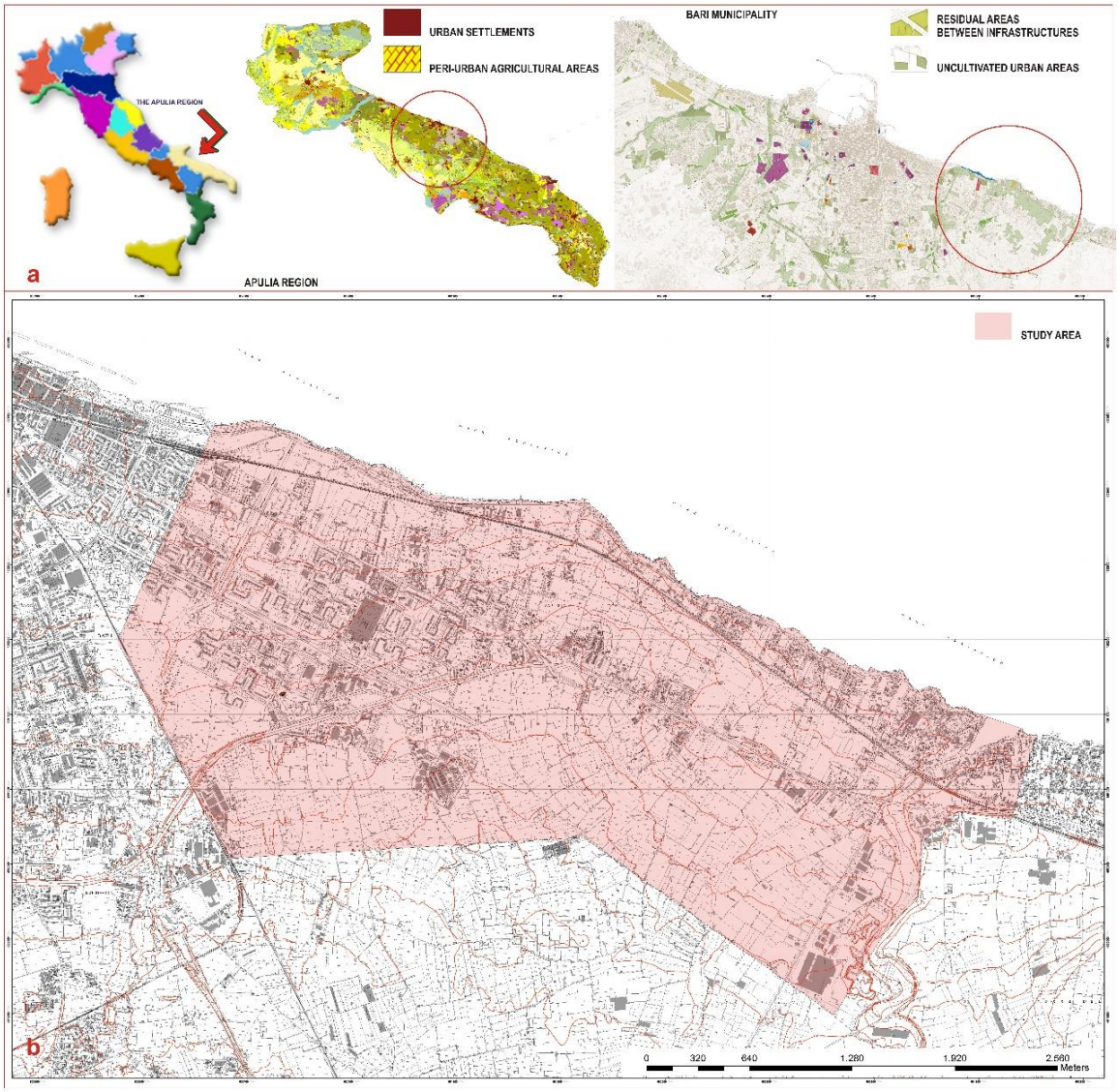

Fig.1 Location of the sample area. *Part a:* Italy, Apulia Region and the Bari South Coast area; *Part b:* The sample area survey vision (Source: *Part a:* Landscape Plan Rural Areas Typologies, 2015; Bari Masterplan Rural Land Map, 2010. *Part b*: Technical Map Bari Municipality, Authors' own elaboration, 2021)

Fig.1 in part b. shows the case-study area, defined for the research aims. Given this context, the creation of new green spaces is particularly relevant, especially making all green spaces functional, from urban interstices to the agriculture surrounding the city. This is the main aim of the Agricultural Park envisaged by the Landscape Plan, which is expressed through the City-Countryside Pact: the physical and cultural place where the urban and rural environment contribute to the single goal of sustainable development.

2.2 Theoretical Methodology Approach

The green standard is vital to increasing urban living standards, providing the operational tool for green design. Nowadays, innovating urban projects with environmental issues, through green networks, is essential (Santamouris, 2013; Matzarakis, 2021; Cialdea, 2018, 2020a). Giving value (in terms of environmental processes) to green areas means the standard dimensions currently used need to be rethought.

In Italy, the "green areas' standard" was introduced in 1968, following intense politically-charged debate. After more than 50 years, there is a need to review the bases of this regulation because society's needs have changed. The general topic of the environment must be treated in dynamic and proactive, not conservative, terms and above all from a landscape viewpoint (Cialdea, 2020b, 2021). Hence the importance of ecosystem services, in order to pursue environmental sustainability through the use of soil and its resources (Leone, 2019a, 2019b; Pelorosso et al., 2018a, 2018b).

Landscape derives from the interaction between nature and culture, not just aesthetics and perception (Council of Europe, 2000a, 2000b; Repubblica Italiana, 2004). At the same time, the city is considered a complex and dynamic system, whose continuous evolution is defined by the inhabitants' needs, interacting with places and generating landscapes. The traditional urban plan shows its limits, emphasising the physical role of its different zones and is not always able to involve the landscape aspects and promote the increase of environmental value.

This paper tries to reverse course, starting from landscape resources and citizens' needs. This approach follows the new procedure advocated by numerous researchers (Rothwell et al., 2015; Sharma et al., 2016; Cervelli et al., 2017): the "flexible plan" is able to adapt to needs as they arise.

Elements involved in the Multifunctional Agricultural Park (MAP) proposal, outlined in this paper, are:

1. *Urban and peri-urban green areas*. Agricultural systems and urban greenery are not just amenities and leisure places, but vital organs (city's heart and lungs) whose functionality must be rediscovered. They should become a climatic extreme mitigation factor, both limiting flooding due to greater urban permeability and addressing the urban heat island (Leone et al., 2020).
2. *Green and agricultural production*. The main Agricultural Park's aim is to prevent agricultural production from being dispersed in "anonymous" markets. The concept of the agricultural product in its own right must be overcome; it is necessary to think about the food product as a supply chain result, in a process that is not only productive but with the right governance has the added value to create a quality landscape. More than solutions as vertical woods - elitist systems greatly dependent on external resources, such as water or energy - a complex network of multifunctional, adaptive and integrated activities could be a right solution.
3. *Rural buildings*. Their recovery is functional to this new socio-ecological model. They can be considered a resource for the new agricultural development and contribute to the park's multifunctionality.

2.3 General framework and its application

Territorial resource ecosystem services, useful for our research aims, have been analysed.

The sample area is a complex territory, characterised by large agricultural spaces, in a very well-defined urban context, because - both west and south of the BSC area - there are large and densely populated neighbourhoods and the historic city centre is not more than a couple of kilometres away.

The strategic vision assumes adaptation and autopoiesis. They are the "beautiful" landscape keywords, to provide environmental protection and sustainable resource use. Tactical tools are also necessary to give concrete life to this strategic vision. The main local problem is the hydraulic risk. Agriculture could play a key role, as a connective tissue absorbing anthropic pressures. Active agriculture is necessary, attractive to citizens, with the now widespread practice of urban gardens, but, above all, with traditional crops, such as olive and almond. This production offers added value through its transformation and marketing on site.

Nature (green areas, waterways and the sea) is closely linked to the hinterland (the so-called "deep country") and connects ecological networks and agricultural systems.
In this context, the MAP can be interpreted as the connective tissue of the entire surrounding area, as magma in dialogue with the built environment. Moreover, it satisfies the aforementioned City-Countryside Pact envisaged by the Regional Landscape Plan, developing all the possible synergies that can create a complex and stratified landscape, in which city and countryside develop territorial identities in symbiosis.
Analysing land uses, the Municipal Agricultural System has been divided into three landscape systems, with different vocation, integrating each other: a) tree crops; b) arable land, which needs new paradigms; c) marginal lands, primarily those with the highest hydraulic risk, with a greater vocation for greening, which simultaneously contribute to the local ecological network and, furthermore, to soft mobility.
Land uses define the compositional characteristics of the rural landscape of the Bari territory, together with the various types of rural buildings, such as small "haystacks" as temporary shelters, but also large farms and numerous abandoned buildings. The planning strategy proposes agricultural revitalization, like the cultivation of olive trees and almond trees, the "historical" fruit of the Bari agriculture, which has important new markets because of its significant increase in consumption.
In both cases, the tool to be used is the supply chain agreement between production and marketing and, when possible, also processing phases and direct sales, involving all the existing structures that may be functional to this goal. The strategy consists in transforming these structures into functional resources for agricultural "short chain" development. Following the census, therefore, some of these buildings can be selected for reuse aimed at processing phases and direct sales of the MAP products. In this sense, the Landscape Plan prevision is very worthwhile; it provides the Landscape and Ecologically Equipped Areas (LEEA), for which the MAP proposal defines areas useful for agricultural products making and marketing, becoming meeting points for producers and consumers.
Another strategy is one of the municipality's two sewage treatment plants, located near the sample area. This plant treats wastewater of about 500,000 inhabitants per day, meaning 200 l per person per day and, therefore, the daily flow of 100,000 m3.
For several reasons, oriented to the circular economy, it can become a strategic resource:

1. the agriculture receives great benefits, both in terms of water irrigation use in summer, and for the possibility of reusing the purification sludge (another product of the depuration process) as a soil improver;
2. during the non-irrigation season, this water flow can be conveyed to the nearby Lama San Giorgio stream, in order to increase biodiversity and ecological network;
3. it is possible to recover the biogas from the anaerobic fermentation of the sludge. It can start a pole of biomass energy exploitation, such as the agricultural residues of the MAP, the algae beached on the coast and the organic fraction of domestic waste. Consequently, a LEEA can be created, a Biomass Centre, the collection of waste (neighbourhood organic waste, agricultural waste biomass and sewage sludge).

In this context, the relevant hydraulic hazard could be faced with traditional infrastructures (drainage network) but it could be increased with other integrated solutions, as will be proposed later.
In this paper, the role of Nature Based Solutions was further considered: they are inspired and supported by nature and could help to build land robustness increasing soil permeability and, thus, decreasing the hydraulic hazard posed.
For this purpose, the Digital Terrain Model (DTM, raster to 1 m) was utilised: the LiDAR is an active remote sensing system and uses medium power lasers from which it is possible to generate the digital elevation model. The hydrographic micro-network was carried out by the LIDAR survey. In consequence, it has been possible to have the detail of the runoff paths and, therefore, be able to identify where the hydraulic hazard originates (Fig.2).

3. Results

NBS are the green infrastructure useful to the mitigation of climatic extremes by increasing territory permeability through reservoirs and infiltration of rainwater runoff.

For this reason, they have been located where there is an accumulation of water flow, indicated in the Fig.2 map, in the spaces suitable for greening, considering the area's morphology and availability.

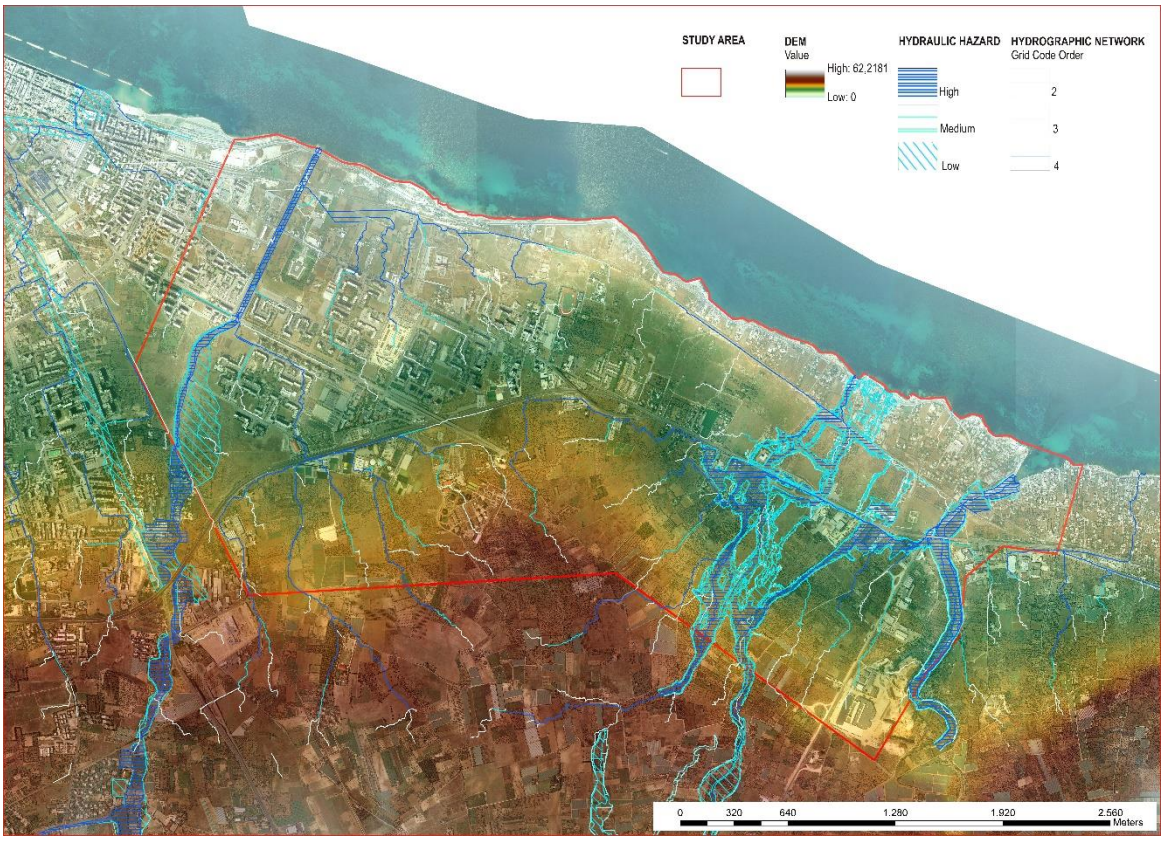

Fig.2 Sample area Analysis: Hydraulic hazard and risk (Sources: Apulia Region LIDAR Project, Hydraulic Management Plan, Comune di Bari, 2007. Authors' own elaboration, 2021)

As a result of flow characteristics analysis, two types of NBS emerge (Fig.3): the linear (especially large and grassy road bumps) and the areal (infiltration areas of the runoff).

Even rural land itself could contribute to the strategy. Two different agricultural area typologies have been identified:

1. The first one involves agricultural patches along the coastal strip, where the main vocation is horticultural cultivation: it will be oriented to social purposes - like leisure time, which has to be spread throughout the South Coast - and also to agricultural activities, already sufficiently developed.
2. The second one involves the innermost agricultural area, which can be considered as "deep countryside", as it has all the agro-environmental characteristics of the Bari countryside ("Conca di Bari"), despite being in the heart of the city. It is characterised by the cultivation of olive trees, in some cases even intensive, which often is associated or alternated with almond trees and is interspersed with fig and carob.

4. Discussion

The MAP, including the LEEA proposal, could contribute to landscape enhancing. The purpose of these initiatives is to ameliorate quality and BSC's short chain production. At the same time, LEEA will be a full circle operation, carrying out water reuse and the recovery of biomass (sludge) produced in the wastewater treatment plant, aiming at improving soil quality and producing renewable energy.

Suggested NBS could be considered an endogenous solution to the territory difficulties, like a form of recycling: defending soil through soil use.

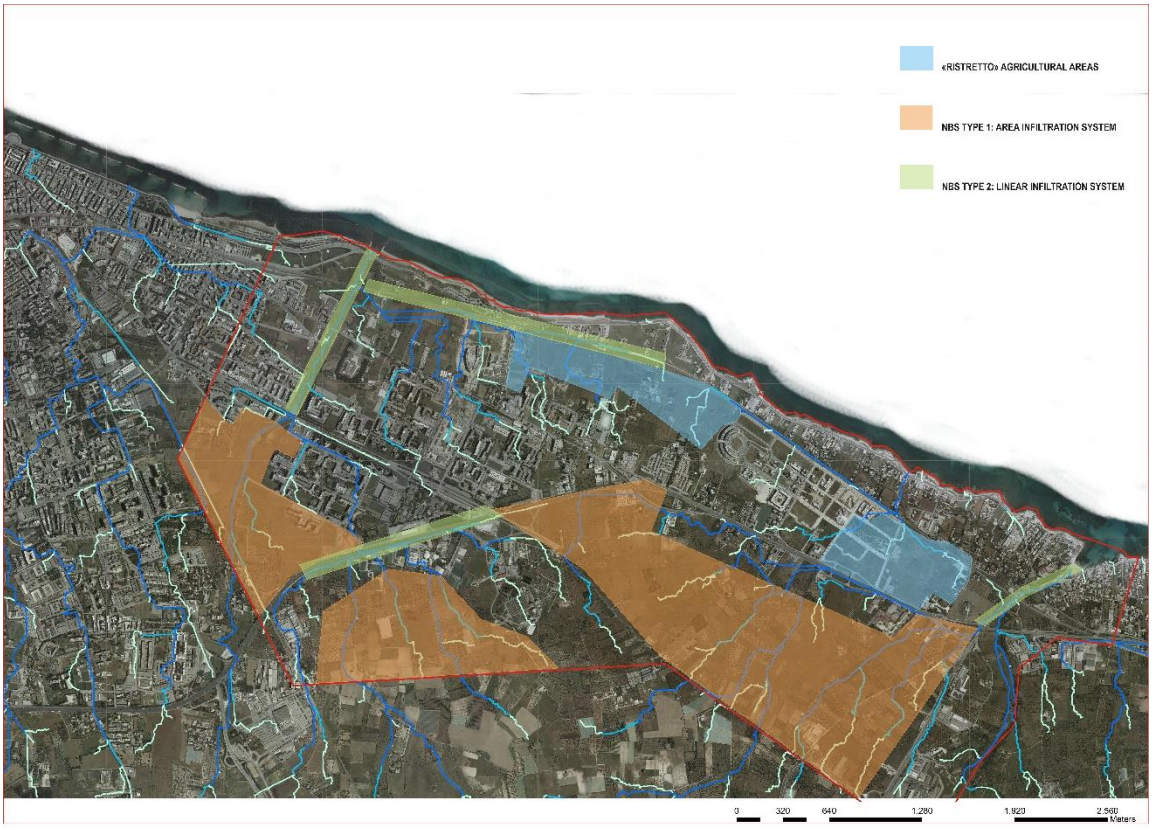

Fig.3 Sample area Project: The "Bari South Coast" Agricultural Park Proposal. (Source: Authors' own elaboration, 2021)

The proposed approach, in summary, found the following results:

1) The green system

The green area management guidelines, both in urban and agricultural contexts, have been defined in order to optimise ecosystem services. Beyond the traditional function of urban quality enhancement, greening is designed to increase land permeability and, therefore, reduce runoff and hydraulic hazard.

This strategy is implemented on two levels (Fig3):

- upstream, through conservative agriculture and large runoff accumulation areas, increasing land's capacity to store and infiltrate rainwater;
- downstream, in the more urbanised area, the greenery necessary for urban planning standards, also including NBS, for the control of residual runoff.

The Italian law - regulating public green spaces and parks - requires 9 m2 for each inhabitant. It dates back to 1968, when environmental issues had not yet emerged. Moreover, at that time, useful techniques to encourage ecosystem services didn't exist.

Now, fifty years later, this standard must be revised, adapting it to contemporary needs, in a sustainability way, and relating it to development mitigation processes.

The relationship between standard and hydraulic hazard is relevant: for example, Pelorosso, Gobattoni & Leone (2017, 2018a, 2018b) have defined greenery potential in quantitative terms, through NBS design.

These studies show that NBS are able to gain 2 to 40 m². It means that 1 m² of greening through NBS could generate a 2-40 m² sustainable area. Nevertheless, these green areas have many other functions: they mitigate the urban heat island, increase biodiversity, and assure socially valuable public spaces.

2) The agricultural system

As conceived, the MAP is an incubator and catalyst for agricultural development. The close integration with the city is a guarantee of economical sustainability. Citizens, in fact, are direct purchasers of the park's products and, therefore, they exercise control over product quality and marketing.

3) The rural system.

Some rural buildings can be equipped for agricultural products processing and marketing. Moreover, the East Bari large wastewater treatment plant is functional to agriculture. The domestic water utilised by every citizen - and related nutrients, together with the solids produced in the purification process - are a very important resource for agriculture, today "wasted" and discharged into the sea. Its importance is easily demonstrated. The water supply of Bari city is 200 l/per capita per day: considering an average irrigation requirement of 4 mm/day (corresponding to 4 l/m2/day), it follows that the supply of each citizen allows the irrigation of 50 m2, which satisfies the vegetable growing needs of about 2 citizens. The East Bari plant treats 500,000 inhabitants, so the relevance of the available resource is evident.

In conclusion, the MAP, the regional ecological network and the LEEA produce sustainability and stimulate endogenous resources. Furthermore, these steps can considerably improve urban planning tools from several points of view: they allow them to rationalise strategic environmental assessment, following the critical analysis of the present urban plan, in view of the greater sustainability.This strategy needs "light" governance, not a new authority: the existing administration (the management authority of Metropolitan City or one of its Municipalities) could start a Planning Office as an incubator for initiatives involving all other authorities.

It could set up agreements for the park and LEEA creation, for the wastewater treatment plant management and assist food supply chains. Tab.1 shows the "Bari South Coast" (BSC) area Framework: in Column 1 the general objectives of the Bari Municipality Planning Office are indicated. This study led us to define new main features and to identify related suggested tools, as they are respectively in Column 2 and Column 3 of the table.

5. Conclusions

Results demonstrate how to overturn the usual planning perspective: context is organised not belonging to urban settlements but to its landscape, following its endogenous features. This is a great novelty compared to planning activities over the last decades. Green is the main strategic factor of the whole socio-ecosystem: it is the heart, lungs and backbone of the new structure of Bari South Coast. Each landscape element has its own function, often multiple, which contributes to building a single, strong entity. Strategies - but also techniques - are necessary allowing both to optimise and improve rules and customs. This work is an example of mitigation and optimization techniques: it is possible to predict how and how much public spaces reduce soil sealing. Introducing this innovation in planning tools could guarantee management of the landscape, as envisaged by the European Landscape Convention. In conclusion, the main product of this research phase is the introduction of the technical approach useful for defining Agricultural Park localization, which can be an innovative contribution to investigations. The extension of this methodology to the entire urban area will constitute a benchmark for local authorities, who have a duty to safeguard the landscape and at the same time provide for agricultural economic maintenance and development. Landscape management, through the Agricultural Park creation, becomes a protagonist for local development, due to its agriculture relevance and also its ability to absorb anthropic pressures.

In this sense, the proposed method can also find application in other regional contexts as it proposes an active tool for the protection of the landscape that can be inserted within the individual municipal urban planning instruments. Future research efforts will be oriented to landscape policy design, with the aim of highlighting local peculiarities and simultaneously strengthening the interactions between agriculture and the city.

Topics and strategies	General Aims	Suggested Tools
Environment & Landscape The BSC, placed in the urban context, could be representative of many other Italian contexts. it is crossed by the national railway along the coast, as in every Italian region along the Adriatic Sea. Thanks to its relocation further from the coast, a large agricultural area has been gained.	- Strict integration. - Reuse. - Recycle.	- Agreements with private operators (agricultural entrepreneurs, beach managers, tour operators) for the multifunctional enhancement of the coast. - Green Design oriented to ecosystem services, first of all the mitigation of hydraulic hazard through Nature Based Solutions. - Tool oriented to the hydraulic invariance maintenance, at the building settlements scale. - Tool oriented to wastewater and sludge recycle.
Agriculture & Multifunctional Agricultural Park (MAP) It is a connective tissue integrated into the city. In this way it expresses the City-Countryside Pact envisaged by the Apulia Region Landscape Plan. The MAP interprets the guidelines of the regional landscape plan through ecosystem services. The Ecological Network and the LEEA, developed through all territorial synergies are able to create a unicum, an identity-making landscape.	- Agricultural products enhancement, based on the food short chain. - Ecosystem services supply.	- The short supply chain creation, through technologies (Websites, APPs, etc.) able to set up purchasing groups, purchase reservations, visits to cultivated fields. - The food supply chain creation: "farm to fork" for all agricultural activities. - Outlets integrated network creation: in supermarkets, in open-air markets and in present abandoned buildings. - Improving the school role, in particular for the Agricultural Technical Institute in the neighbourhood. It could become: a) reference point for MAP activities; b) experience at some sample farms, as an example of the overall activity. - Managing the planned NBS aimed to reduce the hydraulic hazard. - Managing the Biomass Centre aimed at biogas and digestate production in the LEEA.
Urban & Rural Settlements BSC is to all intents and purposes a city, with a significant residential vocation, of great quality and economic value. There are also large green spaces, quality agriculture, sea and streams. The main issue is to address the problem of abandoned rural and industrial buildings.	- Mixitè (multiple urban and rural functions). - Focus on environmental sustainability and related techniques.	- Executive Urban Plans in compliance with the BSC's environmental vocation. - ITACA Protocol (established by the Apulia Region) aimed at the environmental quality in residential buildings and the climate change adaptation. - New building fabrics integrating residence, offices, retail trade, crafts. - Reuse scenarios for abandoned buildings, related to crafts, catering and processing of agricultural products. Consequent creation of the BSC's brand. - Connection to local consumers also through technologies (Internet Of Things for example) to promote activities and commerce, also thanks to the 5G network already available in Bari.
Infrastructures & Viability At present, a strongly integrated communication network exists, both in the East-West (city centre and S. Giorgio) and in the North-South area (sea and Japigia district).	- Increase the public transport offer, integrated with private automobile mobility. - Promote soft mobility for the coastal fruition, connecting the city and suburbs to the sea.	- Tramway on the present railway site. - Vehicle traffic axes, even if already adequate. - Road network enhancement along the South-North direction, both pedestrian and cycle path. - Bike paths: coastal and transversal network.

Tab.1 The "Bari South Coast" (BSC) area Framework

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Author's profile

Donatella Cialdea

Full Professor (Urban Planning) at the University of Molise since 1988. She is the Director of the Laboratory L.A.Co.S.T.A. (Laboratory for activities relating to Territorial and Environmental Development) at the University of Molise in order to prepare students and operators in the Geographical Information Systems field. Dean of the Faculty of Engineering from 2009 to 2012 and the Coordinator of the PhD Course in "Landscape Analysis and Valorisation". At present she is a Vice-President of the National Landscape Committee of the Italian Ministry of Cultural Heritage. She is also a Member of the Italian Steering Committee for River Contracts and a Member of the National Commission for the National Prize for River Contracts. She has been designed as the University of Molise Deputy for the UNISCAPE European Network of Universities (from 2015). She took part, as referee, for the publications of the ECLAS / UNISCAPE conference 2019. Professor Cialdea has been the Head and Principal Investigator of several International Scientific Projects funded by Competitive Calls at European and International levels, financed by the NPPA INTERREG/CARDSPHARE; by the INTERREG III A; by the Cooperlink International Project; by the National Council of Research C.N.R.) and of several National Scientific Projects funded by Competitive Calls at National level, financed by the National University Ministry and by the Molise Region, Italy. In leading up to these lines of research, Professor Cialdea has written extensively and critically about planning tools, management of spatial data, creation of metadata, creation and management of Geographical Information Systems, Web GIS of urban and extra-urban territory. Professor Cialdea has published 19 books and over two hundred refereed research papers about these and related topics.

Antonio Leone

Degree in Civil Engineering. Full professor of Planning and Environmental Evaluation at the University of Salento, School of Civil Engineering. Participant and responsible in several projects financed by the European Union within 5th and 7th Framework Programme, Interreg Research Program, COST-actions, LIFE programme and applied research programs (e.g. plans of Parks and Nature 2000 Sites). Member of Scientific International Committee for Metropolitan Strategic Master Plan "Terra di Bari" and AI SMART Project Interreg Greece-Italy. Author of over 180 papers and scientific articles on the main international journals related to the environment and landscape management and planning, for the most part of which he also carries out the activity of an anonymous reviewer.

Vito Muscio

Graduated in Geological Sciences. He has gained experience both in the field of applied geology and in the field of topographic and three-dimensional surveys. His professional and research production is oriented to the management of data in the GIS environment and to the creation of digital platforms concerning the enhancement of historic centres and the landscape. At present, he is Research Fellow in "Molise Region Landscape Analysis: Territorial data update" at University of Molise.