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IMPLEMENTING THE ENVIRONMENTAL DIMENSION OF THE EU'S URBAN AGENDA 2014-2020 THE STRATEGY FOR SUSTAINABLE DEVELOPMENT IN THE MEDIUM-SIZED CITIES OF WESTERN SICILY

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ABSTRACT

This work illustrates the planning experience carried out by five municipalities of Western Sicily (Italy) in the framework of the EU's urban agenda 2014-2020. The planning process has led to the definition of a Strategy for Sustainable Urban Development (SSUD), whose general objectives are strengthening territorial cohesion and to increase accessibility to the local resources. The SSUD action plan, being funded with around 70 millions euro, gives specific importance to sustainable mobility as a mean through which such objectives can be better achieved and reciprocally integrated.

After a brief description of the territory targeted by the SSUD (section 1), the paper focuses on the greenway concept within the broader debate on sustainable mobility. In section 3, a series of evidences are provided to identify the demand and potential for the development of sustainable mobility infrastructures in the five cities. In the fourth section, after describing the expected results of the action plan in the field of sustainable transport, it is suggested why in this area a greenway is the better solution to increase accessibility to a broad range of natural resources and functions (natural sites, landscapes, cultural heritage, urban functions).

KEYWORDS:

EU's Urban Agenda; Sustainable Mobility; Greenways

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欧盟2014-2020年城市议程 环境内容的实施 西西里岛西部中型城市的可 持续发展战略

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摘要

本研究介绍了西西里岛（意大利）西部地区的五个自治市在欧盟2014-2020年城市议程的框架下进行规划的经验。作为该规划过程的成果，定义了一项可持续城市发展战略（SSUD），其总体目标是加强地域的凝聚力，以及提升当地资源的使用无障碍程度。该SSUD行动计划的经费投入为约7000万欧元，体现了可持续出行作为有助于更好地实现上述目标并使它们相互集成的一种手段的特殊重要性。

在简短描述SSUD针对的地域目标（第1章）后，文章通过对可持续出行的广泛讨论，着重介绍了绿色通道概念。第3章提供了一系列论据，确定了这五个城市在可持续出行基础设施开发方面的需求和潜力。第4章先是描述了在可持续交通领域行动计划的预期结果，然后又讨论了为什么对于这些具体的地域而言，绿色通道是提高大范围的资源和功能（自然遗址、景观、文化遗产，城市功能等）的使用无障碍程度的最佳解决方案。

关键词:

欧盟城市议程；可持续出行，绿色通道

1 INTRODUCTION

The territory of Italy presents a clear polycentric structure and medium-sized cities are spread across the whole country (Bonaverò et al., 1999). The reason for this type of spatial organisation lies in the country's long history but also, as in other European contexts, in the capacity of medium-sized cities to offer a range of accessible services, environmental qualities and other amenities that often make these places more attractive to citizens respect to the largest urban agglomerations (ESPON, 2014; Hristova et al., 2015; Servillo et al., 2017). In this context, Sicily is one of the Italian regions with a more polycentric territorial organisation: this is witnessed, on the one side, by the number of medium-sized cities spread across the regional territory (30 towns with a population between 30,000 and 100,000 inhabitants); on the other, for the role that urban proximity plays in creating functional synergies in certain part of the region. This is particularly the case of Western Sicily, where in a range of 90 kilometres of coastline there are five medium-sized cities (Trapani, Erice, Marsala, Mazara del Vallo, Castelvetro), home of around 250,000 inhabitants, which share relevant resources for sustainable development: infrastructures, such as an international airport, commercial ports and marinas; natural sites of community importance and distinctive landscapes; cultural amenities of international relevance (i.e. Erice old town, Selinunte archaeological site).

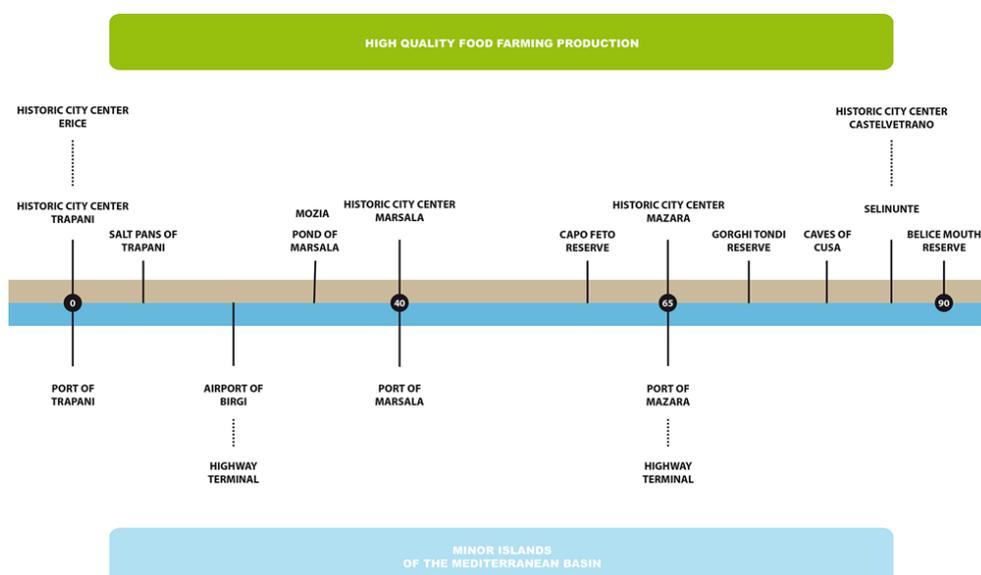


Fig. 1 The distribution of urban and environmental resources along the coastline of western Sicily (Source: authors)

In the framework of the 2014-2020 EU's programming cycle, in 2016 the above mentioned five municipalities started a cooperation process to carry on a joint Strategy for Sustainable Urban Development (SSUD), responding to the following overall objectives: (a) promoting territorial cohesion and increased functional synergies among the cities; (b) to increase accessibility to the urban and environmental resources; (c) improving the availability and efficiency of local services, particularly in the fields of sustainable mobility and social inclusion. The strategy, being funded with around 70 million euro from the European Regional Development Fund (ERDF), will be implemented through an action plan with a specific focus on the urban waterfronts, places still characterised by unsolved environmental problems, but where the three above mentioned objectives can be achieved with a larger impact in terms of sustainability, urban regeneration and local development. This paper aims to explain the methodology followed to quantify the SSUD targets in the field of sustainable mobility and to identify a greenway as an instrument to combine environmental and local development goals within the urban areas.

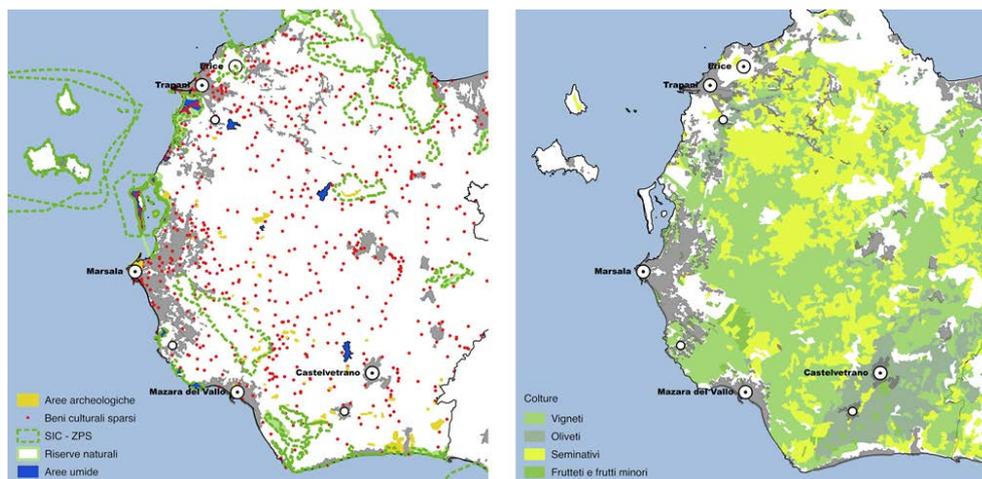


Fig. 2 Natural resources, cultural heritage (left) and farming land coverage (right) (Source: authors)

2 CONCEPTUAL FRAMEWORK

Over the last two decades, the sustainable mobility paradigm have dominated the planning debate, to the point that cities all over the world are committed to promote environment-friendly transport policies (Banister, 2008; Grieco & Hurry, 2012). Changes in the social behaviours, also, implicate the emergence of new ways people relate with the places and environment, with the consequence of creating a demand for new types of infrastructures and new challenges to urban planning and design (Bertolini, 2017; Hickman et al., 2013). These new demands for sustainable mobility can be addressed in an holistic way by reconceptualizing the concept of "green infrastructures". With ancient roots and analogies with the concepts of "parkway" and "green belt" in the landscape ecology literature (Fabos, 1995), green infrastructures can be interpreted as a set of interconnected natural spaces that, while preserving the values and functions of a natural ecosystem, provides also wider benefits to human population (Benedict & McMahon, 2006). Such renewed scenario requires a completely different approach to planning and design of mobility networks. Particularly, transport networks have to be conceived through multifunctional criteria, going beyond the administrative barriers and by reconsidering the landscapes and natural areas as sources for the provision of ecosystem services (Lovell & Taylor, 2013). From this conceptual perspective, slow-mobility infrastructures can be easily accommodated within the existing natural networks, achieving both the objectives of ensuring better accessibility to places and contributing to regenerate the environment (Steiner, 2010). Within the urban areas, greenways (that are part of the green infrastructure concept) can contribute to achieve a wide range of sustainable development goals, as for instance: (a) providing alternative transportation opportunities, reducing congestion and pollution; (b) mitigating the conflicts between built and natural environments, enabling people to enter in contact with nature (Gill et al., 2007; Gobster, 1995); (c) increasing social interactions in the open spaces (Kazmierczak & James, 2007; Shafer et al., 2000). Furthermore, greenways are recognised as an instrument to increase the resilience of urban environments, contributing to face issues such as storm-water management, seasonal flooding, and the 'heat island' effects (Chon & Shafer, 2009). Cycle pathways play a crucial role in the implementation of the greenway concept within urban areas, given their compatibility with the environment and the response they can give to the growing demand for safe and sustainable means of transport within the cities. It has been demonstrated (Hankey et al., 2012) that in urban areas bicycle traffic can be considerably increased by the presence of well designed bicycle facilities (+37%) and even more from the presence of off-street bicycle facilities (+32%). Consequently, the provision of integrated networks of walking and cycling pathways can provide a great impact on the overall urban mobility and on the home-work trips particularly (Buehler & Pucher, 2012). Moreover, there are evidence that a rise in the bike/pedestrian movements can be frequently associated to an increase in the use of public transport, especially where the "grey" infrastructures

are effectively interconnected with the "green" ones (Forman et al., 2003). Ensuring the creation of green infrastructures within urban areas, however, can be pursued only through a long-term sustainable development strategy, being implemented through integrated action plans able to affect different domains and policy-sectors (Ahern, 1995; Socco et al., 2007). It is with this conceptual framework on the background that the greenway concept has been embedded within the Strategy for Sustainable Urban Development of Western Sicily. Bike pathways, particularly, have been identified as an instrument to combine a wide range of local development objectives, including urban regeneration in the coastal neighborhoods, a reduction of motorised trips by residents and a better access to the tourist destinations.

3 SETTING THE DEMAND FOR SUSTAINABLE MOBILITY

The mobility component of the SSUD have been supported by an exploratory study of the mobility flows within and among urban areas of Western Sicily. By applying a consolidated methodology, the analysis has taken into account the following variables: (a) the amount of movement between each urban area, (b) for which purposes these movements are generated, and (c) the related "modal split". By taking into account the least available data (ISTAT, 2011), we made an Origin-Destination Matrix (OD) for a sample of daily 'home-work' and 'home-study' trips within the five municipalities under consideration. As it is well known in the literature (Cascetta et al., 1993; Lo et al., 1996; Bierlaire, 2002; Wong et al., 2010), this approach uses procedures for processing categorical data, showing the frequency with which the subjects of a given class of origin are present in a given class of destination. In the case under analysis, the cross-section is constituted by 94,975 individuals, which generate 41,908 movements for study reasons and 53,066 for work reasons. Regarding the inter-municipality trips, the main flows are concentrated from Erice to Trapani and vice versa, two towns that are strictly interconnected from a spatial and functional points of view. Being the seat of the province, the city of Trapani is the largest pole of attraction also for the other municipalities, while Marsala ranks as the first urban area in terms of internal movements (Tab.1).

DESTINATION/ ORIGIN	Erice	Trapani	Marsala	Mazara del Vallo	Castelvetrano	Total
Erice	5,633	5,162	123	12	14	10,946
Trapani	2,935	22,876	339	55	27	26,234
Marsala	99	1,067	26,503	484	107	28,263
Mazara del Vallo	5	310	413	16,524	660	17,914
Castelvetrano	5	237	83	237	11,053	11,616
Total	8,679	29,654	27,462	17,315	11,863	94,975

Tab. 1 Origin-destination matrix of systematic movements in the SSUD area (Source: ISTAT, 2011)

	INCOMING FOR STUDY (2011)	INCOMING FOR WORK (2011)	INCOMING FOR TOURISM (2015)
Erice	461,074	742,388	84,526
Trapani	996,811	2.295,652	208,294
Marsala	186,541	515,174	170,301
Mazara del Vallo	80,654	351,634	65,077
Castelvetrano	245,182	295,085	353,662
Total	1,970,262	4,199,933	881,860

Tab. 2 Incoming flows for movement reasons (Source: ISTAT, 2011)

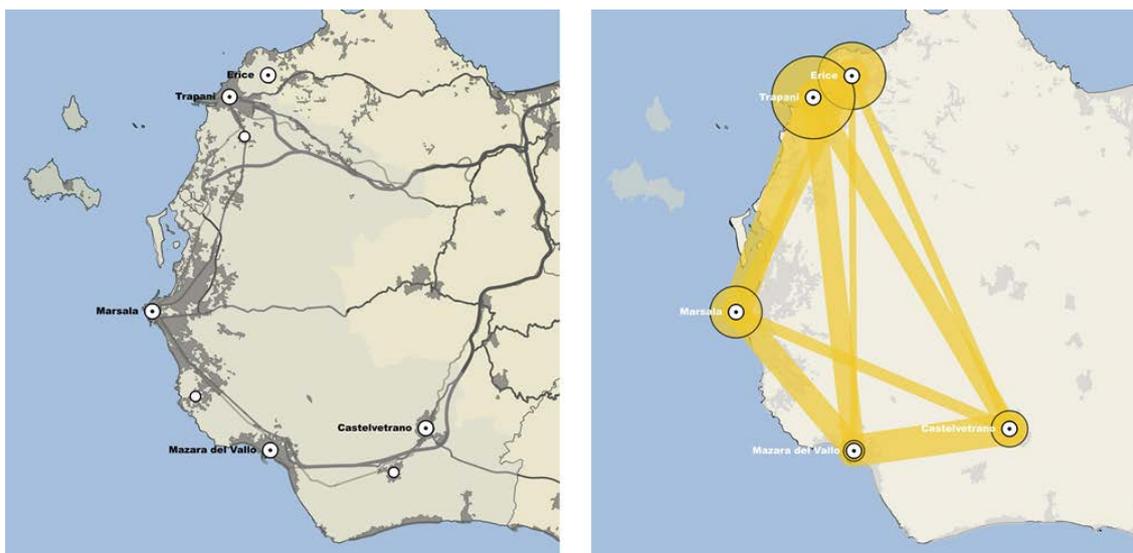


Fig. 3 Urbanisation, transport networks (left) and chart of the systematic movements among the five cities (right) (Source: Authors)

Alongside the movements for work and study reasons we took into consideration also the movements generated in the area by tourist activities. In fact, according to the data released by the Regional Tourism Observatory in 2016, from 2005 to 2015 the five cities are characterized by a considerable increase of tourist flows: +5% in terms of arrivals and +9,4% in terms of attendance, with an average permanence far above the regional level. As it is showed in Tab. 2, tourist flows are not always related to the demographic size of the cities, as in the case of Castelvetro, where 13 kilometers far from the city centre is located one of the most attractive archeological site of the region (Selinunte). This specific situation has implied for policy-makers to consider sustainable mobility not only as a way to ensure cleaner transports within the urban areas, but also as an instrument to diversify accessibility to the cultural/natural landmarks of the area. As it will be better explained in the following section, therefore, the proposed greenway is constituted by 'urban' and 'suburban' sections. The analysis of the current transport modal split within the five cities clearly represents the distance with what can be defined as a 'virtuous' model of mobility (Bhat, 1995). Like in other southern Italian regions, in fact, the most common means of transport in the area are the private cars: these are preferred by users in the 72% of cases, 58.9% of which as a driver. On average, only 2.9% of trips are made through urban or suburban buses, while trains are used by only 0.4% of the travellers. Although the favourable geographical conditions, bicycle is used on average only for the 0.6% of trips, one of the lowest rate in Italy among the medium-sized cities. On the other hand, surveys made in the cities suggest a great potential for a mobility system based on the bicycle. For instance, in an analysis carried out within the Urban Mobility Plan of Mazara del Vallo, it is argued that the spread of the bicycle as a means of movement might be highly improved only by providing an infrastructure that satisfies the minimum standards of safety and security. In spite of that, the extent of the bike lanes network is extremely poor, as they amount to only 4 kilometers spread over three urban areas (Erice, Trapani, Marsala).

4 THE GREENWAY AS A SOLUTION TO MEET URBAN MOBILITY AND LEISURE

The very low use of bicycle for home-work trips, on the one hand, and the potential users deriving from tourist/leisure activities on the other, clearly justify a significant improvement of bike pathways network in the area. The approach adopted is explicitly addressed to integrate a greenway approach with the promotion of intermodality, a factor that could facilitate the greenway usage to several types of user. This is especially true in the case of the Marsala-Trapani itinerary, both for the advantageous morphologic profile, and for the density of urban/environmental resources that can be found in proximity of the existing transport infrastructures. Given the above mentioned considerations, and the budget availability (around 5.8 millions of euro), the SSUD

action plan has estimated at 26 kilometres the length of new urban cycle pathways to be implemented within the five urban areas. Whether they will be supported by other mobility infrastructures – i.e. intermodal transport nodes – it is expected that the new pathways may lead to an increase of trips by bicycle from the current 0.5% up to 1.5% of the total. In terms of changed modal split, it is expected that the implementation of the mobility part of the strategy could lead to a reduction of around 7% of users of private vehicles for the systematic trips within the urban areas. In the SSUD of Western Sicily, however, urban cycle pathways are understood as part of a broader territorial network to foster sustainable development in the long term. In fact, the bike pathways being implemented within the urban areas are conceived as sections of a longer green infrastructure whose itinerary has been identified with the aim of creating a network among the resources showed in Fig. 1. Therefore, the bike pathways are divided into 'urban' and 'suburban' sections, whose length is 26 and 70 kilometers respectively. The urban sections are devoted, particularly, to increase the use of bicycle by citizens and to help the waterfront regeneration process. For the first aim, the action plan has allocated financial resources to the implementation of bike-bus-train interchange facilities, as well as the creation of bike sharing services in the city centres. In the suburban sections, the greenway aims to ensure better connections between the urban centres and between the tourist facilities and the cultural/natural sites spread over the territory. Furthermore, since the planned greenway frequently is joined to the railway line and intercepts stations, the strategy aims to promote bicycle-train intermodality. Consequently, infrastructures are conceived to meet demands from a broader range of potential users, such as people using bike for home-work trips, as well as others for leisure and tourist activities. From this perspective, the implementation of new bicycle pathways under the greenway concept within the SSUD of Western Sicily goes beyond the simple aim to improve sustainable mobility in the area. Rather, it is expected the new infrastructure may lead to a reshaping of territorial organisation, creating new grounds for an environment-led polycentric urban development.

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