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Links between Landscape Management and Environmental Risk Assessment: Considerations from the Italian Context

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***Abstract*—**Issues relating to the destructive phenomena that can damage people and goods have returned to the centre of debate in Italy with the increase in catastrophic episodes in recent years in a country which is highly vulnerable to hydrological risk. Environmental factors and geological and geomorphological territorial characteristics play an important role in determining the level of vulnerability and the natural tendency to risk. However, a territory has also been subjected to the requirements of and transformations of society and this brings other relevant factors. The reasons for the increase in destructive phenomena are often to be found in the territorial development models adopted. Stewardship of the landscape and management of risk are related issues.

This study aims to summarize the most relevant elements about this connection and at the same time to clarify the role of environmental risk assessment as a tool to aid in the sustainable management of landscape. Finally, the study reflects on how regional and urban planners deal with environmental risk and which aspects should be monitored in order to adopt responsible and useful interventions.

***Keywords*—**Assessment, landscape, risk, planning.

I. Introduction

RISK mitigation represents one of the greatest challenges facing today's local planning for conditions of sustainable development. Growing critical incidents linked to the occurrence of "extreme" climatic conditions have highlighted the unsolved problem of territorial vulnerability and the level of risk with which a large portion of the population has to co-exist. The problem, which only recently became apparent, has deep roots, the main one stemming from the alteration of the landscape and related gaps within planning activities. Whilst there is no doubt that the geological features, the acclivity and general topological traits of places affect their levels of security, it is also true that the choices related to the management of the territory are the real discriminant factor in terms of impacts [8]. The settlement development that characterized the second half of the twentieth century and in particular the Italian housing boom of the 70s and 80s largely occurred in a disorderly and scattered fashion, and with little regard to environmental conditions. Urban expansion into the traditional country has ignored existing hydrographic networks, pushing the built in areas of natural river pertinence, placing infrastructure and construction without consideration of the natural lie of the land. If the landscapes in the past were the result of a deep and balanced connection between population activities and environment, the result of a slow mutual adaptation, the new scenarios are the outcome of urban expansion beyond traditional boundaries; they are often placed in contradiction, more or less deliberately, with existing natural processes. Planning is an activity which serves public interest. It has a significant and lasting impact on the conditions and opportunities of an area's inhabitants, and by its nature involves an interaction between planners and decision makers. In this sense, the lack of planning, the implementation of a bad planning, and a lack of consistency between land management tools have played an important role in this risk, the effects of which we measure today. In particular, we can identify six points that amplified local vulnerability.

A. The Sprawling of the City

Despite the social costs that it requires for its maintenance, the low density model has become the prevalent settlement model, and one legitimized by urban plan [10], [18], [24]. Sprawl has become a worldwide phenomenon that manifests itself to varying degrees in the different countries. In Italy, built-up areas have grown exponentially over the years independently of population trends (Tables I, II). The growth in the number of houses in the country led to an increase of the soil waterproofing [2], [38]. As a result, there was an alteration of the ecological balance, the stability of the land, water systems, the ability to regulate climate and absorption of emissions, and the integrity of natural habitats. The spread has occurred mainly at the expense of the "greenbelt", the borders between town and country. Rural landscape was often damaged and has been lost along with the historical identity and unique characteristics of places [26]. In recent years, policies limiting the damage by encouraging higher density residential areas should have been adopted by local governments but unfortunately with little impact thus far.

B. Building Infractions and Amnesty

Italy, particularly since the end of the Second World War, experienced a massive urban transformation that has often seen a prevalence of unplanned activities and the emergence of widespread building code violations. The violations largely consisted in the construction of residential buildings either without building permits or in contradiction to the issued

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building permit (Table III). These phenomena have contributed heavily to impoverishment and territorial decay. After World War II in particular, the widespread and unstoppable proliferation of planning contraventions in large cities and on the coasts of the South has not only upset the character of the traditional historic landscape but also increased the exposure to risk [43], [5]. In particular, the transition from the first transgressions born of necessity in the 1950s, to the violations of speculation in 1970s has signified a turning point. While transgressions of necessity were motivated by the search for any kind of affordable shelter, those of speculation sought to exploit, without hesitation, every opportunity offering a return on capital investment [35]. Repeated legitimizing of illegal construction through the practice of the "condono" (amnesy) (1985, 1994 and 2003), which has officially endorsed the mismatch between the status quo and planning rules, has also fueled the culture of illegality. The belief that any abuse sooner or later would have been legalised, has downsized the significance and meaning of planning in some contexts. This phenomenon has caused significant under-financing of public services. In fact, new residential construction implied an increase of a resident population for whom no new public services and infrastructure were built. Moreover, there are other negative consequences resulting from failure to enforce building codes. For example, in natural disasters in the United States and elsewhere, excessive building damage has been attributed to shoddy construction that is not in compliance with building codes [8], [9].

TABLE I
ESTIMATION OF SOIL CONSUMED AS A PERCENTAGE [23]

Soil consumption	% of the national surface area	KM^2
1950	2,9%	8700
1989	5,4%	16220
1996	5,9%	17750
1998	6,1%	18260
2006	6,8%	20350
2009	7,0%	21170
2012	7,3%	21890

TABLE II
SEALED AREA [23]

Areas	1946-1960	1994	1998-2000	2005-2007
North	2,86%	5,99%	6,39%	7,00%
Centre	2,20%	5,22%	5,26%	6,25%
South	1,99%	4,65%	4,74%	5,75%
Italy	2,38%	5,30%	5,50%	6,34%

TABLE III
BUILDING ABUSIVISM PERCENTAGE ON TOTAL BUILDINGS [29]

Area	1998	2000	2001	2002	2003
North West	6.5	10.6	10.7	9.6	10.1
North East	7.4	10.1	10.6	10.1	9.6
Centre	18.6	16.6	17.2	17.8	12.4
Other South and Sardinia	16.6	17.0	16.9	17.1	22.4
Puglia	12.8	11.5	11.1	12.4	12.4
Sicily	18.2	16.5	15.9	13.8	13.8
Campania	19.8	17.7	17.6	19.2	19.2
Italy: illegal buildings	34.000	28.900	28.300	30.800	40.000

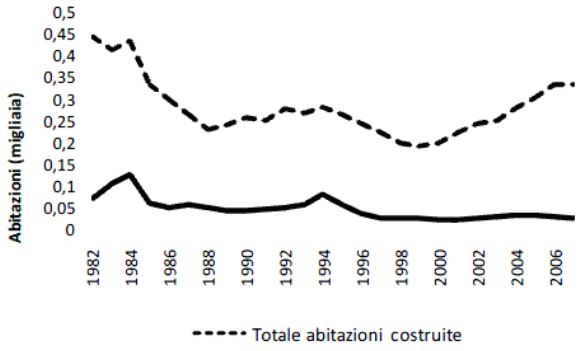

Fig. 1 Number of illegal buildings 1982-2007 [29]

C. The Lack of Environmental Sensitivity

Until the 1970s, the problem of land conservation was almost completely confined within the world of science. In the political and urban arena, access housing and services was considered the most relevant problem. The landscape has long been seen as mere aesthetic element and environmental risk a possibility to be tolerated within the natural order of things. Since the 1970s, the "environmental question" has gradually become a strategic issue on the political agenda. In a complex context of economic, political, and social relations, the environment has become both a matter of public debate and a "field of action" of governance. Though only in 1985 with the "Galasso" law landscape has acquired importance as a set of forms-process, when it was finally implemented at the legislative level the technical cultural path done in disciplinary field. By extending the landscape bond to whole types of areas of the territory identified by law has explicitly integrated environment in landscape planning by strengthening the institution. The "Galasso" law extends the environmental protection to areas of the territory identified ex lege (by law) so it has explicitly integrated environment in landscape planning by strengthening the institution. However, as proof of a fundamental ambiguity in the way of understanding the development of the territory and its relationship with environmental issues, in the same year in which the Galasso law was approved, the first building amnesty was granted [46]. As a result, retrospective planning was granted to unauthorised buildings upon the payment of a fee. However, the events of the landscape and the level vulnerability of territories are closely related. Frequently a significant problem of exposure to risk occurs where the landscape was highly altered in the past.

D. Market Power

On some instances, there was a clear intention of putting economic interests ahead of environmental protection, due to the pressure of the housing market. The intersection between land use and production of financial credits, building cycles and real estate finance has become increasingly tight. The potential transformation of the intended use of a land from agricultural to urban produces the granting of an exchangeable credit in the financial market, independent of actual demand for housing, business, and services. Land becomes pure

reproduction of capital [31], [11]. Faced with the shortage of public resources and the mirage of secure income against low investments, the land is often used as bargaining chip by local governments. They monetize the territory, following a mechanism that allows them to finance services to the citizens and infrastructure with the planning fees. However, at the same time this mechanism produces new residents, new businesses, and thus new demands for services, triggering a process that often has devastating effects on landscape. Although real estate has always conditioned, directly or indirectly, the decisions of urban planning, the emergence of "contractual urban planning" has increased opacity in decision making with the contracted entrusting decisions to those with land ownership interests. Various forms of complicity have proliferated within this opacity, all at the expense of the protection of the natural landscape, its assets and those of the public interest. In "contractual urban planning", landowners make plans and then contract the authorities to achieve their objectives. This allows strong interests to be imposed, while the coherence and equity of "ordinary" planning is waived [39]. In some cases, this mechanism was accompanied by corruption of local authorities [4].

E. The "Soliloquy" of Planning Tools

The lack of coordination of the many overlapping planning tools available within a territory has also had negative effects. The fragmentation of the planning framework with different plans, competent authorities and awarding bodies, often entirely isolated from each other, has led to an excessively fragmented and compartmentalised knowledge of a single territory (Table IV). The lack of knowledge of the real overall conditions and possibilities of danger is the main result is the main result.

TABLE IV
PLANNING COEXISTENT TOOLS

Planning tools	Competent Authority (tools elaborated by)
Basin Plans	Bacin Authority- District
Landscape Plans	Regions
Hydrogeologological Risk Assessment and management Plan	Bacin Authority- District
Park Plans	Park Autorithy
Territorial coordination Plans	Provinces
Sectoral Plans	Various Authorities

F. The Agricultural Land Abandonment

Farmers have always had a role of territorial defense, through the ongoing work of maintenance carried out in parallel to their agricultural and livestock activities. However, the abandonment of many cultivated areas, following the gradual exodus from the country, has left various areas "unattended" making them available to a conversion of use that has often favored urbanization. For a long time the suburban territory was not, in fact, considered, assessed and treated in relation to its own quality, but in its ability to enter the cycle of uses urban and economic values [44]. Simultaneously, the mechanization of the production process in agriculture has required a drastic revision of existing landscape sometimes affecting, in the case of hilly areas, the stability of the slopes as well as the balance of the soil. While the European countries most active on the side of environmental protection have launched incentive policies to promote the maintenance of historic rural landscape, alongside the traditional legal remedies, for long time Italy has remained passive in the face of these processes [15], [45], [28], [41]. As Agnoletti points out [1] although, the growth of urban areas, from the point of perception constitutes one of the most evident phenomena of recent territorial development, in reality it is the abandonment of agricultural areas which is the most significant phenomenon of the last century, (about 100,000 ha per year), followed by forestry post abandonment.

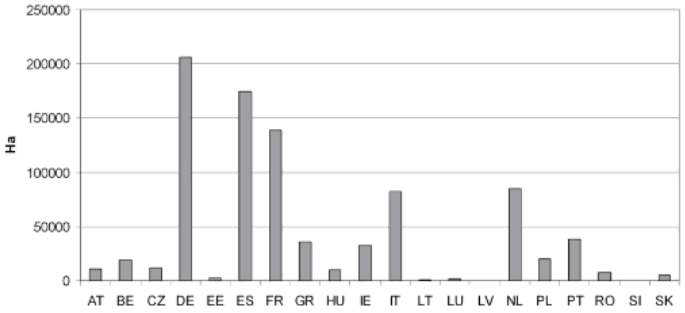

Fig. 2 European agricultural areas loss 1990-2006 [12]

Although environmental catastrophes involving increasingly urban areas due to short-sighted land use choices, often the source of the problems lies in the mountainous and hilly areas, where the important phenomena of abandonment take place. Various studies have highlighted that the disruption of traditional agro-forestry- livestock activities not only brought hydrological disorder and instability phenomena, but, that even more so, the suspension of the practices of the establishment and maintenance of agricultural water organization, followed by unchecked reforestation, have started degradation phenomena that have significantly fueled risk [1]. Special attention must be paid to peri-urban landscapes. The most exposed to the processes of transformation, characterized by land use are not always adequately managed by planning, activities economic-productive programming tools or by effective policy of natural and cultural local heritage.

II. THE ASSESSMENT OF RISK

In the scientific literature, the theme of risk was continuously present although it was fragmented as there is not a dominant paradigm [20] because of its multidisciplinary nature. The various approaches adopted on the one hand reference the level of vulnerability of the territories, and on the other hand their ability to answer assuming the risk as a concept positively correlated with the first and negatively correlated with the second [7], [33], [14], [47]. Over time, there was, in fact, a conceptual evolution of both concepts which led to an integrated reading of risk on the basis of factors related to different dimensions. If initially there were parallel lines of research aimed to study risk mitigation, in

which the vulnerability was identified with the evaluation of the potential damage, or the political economy dimension, in which exposure to risk was fundamental, or the ecological dimension, where were established permissible load thresholds, in the present works prevails a multisectoral approach [21]. Given the complexity of the topic, in fact, it is no longer possible to think of a linear monodisciplinary type approach. So many aspects compete and co-exist in the risk analysis that it assumes the character of territoriality. In empirical application, vulnerability is defined in relation to a set of indicators that relate to multiple aspects: space systems (physical vulnerability), connections (vulnerabilities in network systems), interdependence (functional vulnerability) and welfare conditions (social - economic vulnerability).

While the answer capacity is defined as the sum of two components: the resilience (ie, ability to recover from disturbance) and resistance (ie the untroubledness).

Systemic analysis plays an important role in this regard.

The challenge is to choose an appropriate set of indicators that draw on economic, social and environmental sectors, and that can be combined to produce a compound indicator with an appropriate scale of application (usually regional), to arrive at a classification of territories based on their level of risk (Fig. 3, Tab V). Furthermore is important to get a good cartographic representation (scale of not less 1:25.000) that highlights:

1) urban centers and urban sprawl areas
2) industrial areas
3) infrastructural system and transport corridors even at local level
4) environmental and cultural heritages
5) public and private services, receptive, recreational and sport areas.

For example [3] and [42] used a multi-criteria approach to environmental risk assessment that integrated the ecological dimension and resilience of the agriculture landscape with other territorial dimensions. Approaches of this type consider environmental risk as a composed notion, which incorporates two main concepts: a notion of hazard or probability that the event will occur and a notion of vulnerability of components subject to risk. The hazard is linked to the existence of a pressure. It is assumed, therefore, the existence of a function of the type of risk Risk = F (hazard, vulnerability) [16] where the function F is specified depending on the problem analyzed and temporal time observation. Indeed, the risk, as well as the pressure and hazard, has a time and/or spatial profile [27]: has a spatial location (is punctual or spread) and a temporal reality since could have impacts both immediate and delayed. Furthermore, the negative impact of a risk occurs only beyond a certain limit or threshold.

Finally, risk has a definite cultural and social component, and undoubtedly depends on social perception. For example, a flood in a Western country is a disaster and is unacceptable with respect to the consideration of the floods in the Asian context. In Bangladesh, floods are positive events for their supply of fertilizers on land [16]. In Fig. 4 there is an example of environmental risk function. It is defined by a curve or more curves iso-risk locus of points that unite situations at equal level of risk and identify a border between acceptable and not acceptable risk situations.

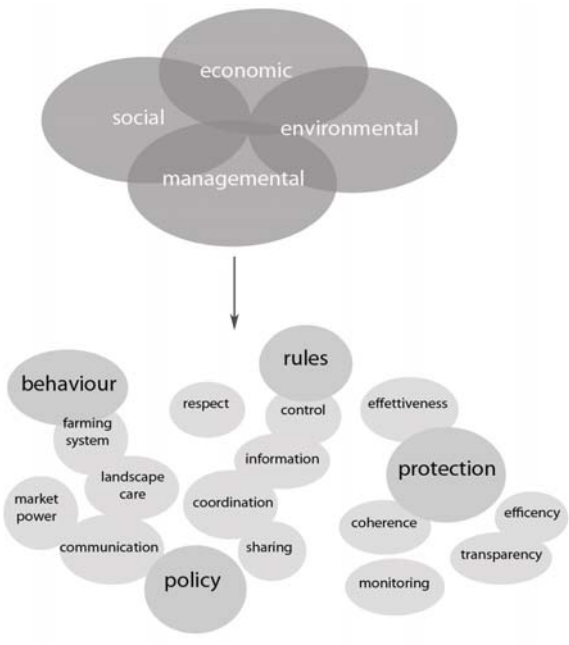

Fig. 3 Elements in risk vulnerability assessment

TABLE V
POSSIBLE SET OF INDICATORS FOR RISK ASSESSMENT

Resilience and economic vulnerability	Resilience and social vulnerability	Resilience and environmental vulnerability
• Economy openess degree • Local economy structure • Export concentration • Territorial marginality • Social development • Income variability • Financial system • Demography • Healt • Governance • Geographic and environmental feature	• Sense of belonging to community • Control of crisis situations • Optimistic prospective • Presence of collective expertise useful to confront and overcome the difficulties • Shared value and popular belief that reinforce identity and community ties in time of crises • Social support, by networks and formal and informal organization - Social capital • Social protection instruments • Diversification of family work	• Climatic factors • Geomorphologic factors • Geographical factors • Factors that adversely affect biological diversity • Factors related to human pressure

In general, acceptable risk means "the level of human, material and environmental loss perceived by the community and relevant authorities as tolerable compared to actions necessary to minimize the risk of potential disasters" [34]. The degree of acceptable risk and the choice of the boundary between acceptable and unacceptable risk does not depend on technical and scientific criteria but basically comes down to the main policy and regulatory provisions on risk. Assessment of risk also has other advantages. Indeed, it is possible to affirm that the assessment has two key roles:

1) it is a purely technical activity directed to measure levels of risk and as such is configured as environmental risk

assessment;
2) it is a political activity aimed at measuring the effects of specific policies or plans and programs and then direct to guide public action;

In the first case assessment constitute a tool oriented to provide a measure of environmental risk [40], [25], with the objective of defining its levels in certain contexts in order to take protection, reclamation or sustainable management measures. As we as we pointed out various methods have been proposed in this direction. The second case constitutes a tool for measuring the effects of policies or measures taken in a program and so represents a real tool for decision aiding [36], [37] that supports policy makers in the phases of design and implementation of programs through various types of models such as structural and econometric models. It allows responding to ex-ante, in-itinere and ex-post assessment need.

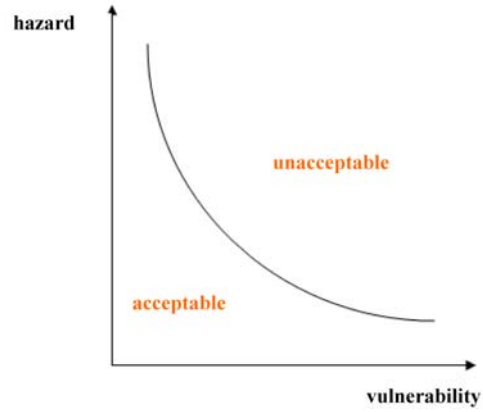

Fig. 4 Iso-risk curve and edge between acceptable and unacceptable risk

III. National Legislation and Policy

The Directive 2007/60/EC of the European Parliament and of the Council of 23 October 2007 on the assessment and management of flood risks aims to establish a framework for the assessment and management of flood risks, aiming at the reduction of the adverse consequences for human health, the environment, cultural heritage and economic activity associated with floods in the Community.

Differently from other states, before the Directive emanation, the Italian law has faced the problem with the Law n. 183/89 and the Law n. 267 of 1998 which were the first attempt at an integrated approach to soil, water and planning. The Laws impose the Basin Authority institution and the hydrogeological risk assessment. However, until Law n. 152/06 "Environmental Code" there was no official definition of hydrogeological instability.

The central tool it was based on was the plan of hydrogeological (PAI) an excerpt plan of the basin plan. On the basis of the Decree n. 49 of 2010, which concerns the application of the Directive 2007/60/EC, the PAI definition is a responsibility of the Basin Authority in collaboration with regions and National Department of Civil Protection. The PAI has to define measures for hydrogeological risk management in areas with potential relevant risk and for reducing the negative consequences for human health, goods, environmental and cultural heritage and social and economical activities, by non structural operations and actions directed to hazard reduction. Coherently with the Annex I of the 2007/60/EC Directive the PAI has to contain:

1) part A: elements for a preliminary hydrogeolocical risk management plan and description of plan steps;
2) part B: elements for a plan updating;
3) part C: criteria and methods for hydrogeolocical risk management plan definition and updating.

All legislation on hydrogeological instability revolves around that tool, which gradually evolved into the various sectoral laws. The Decree n. 49 of 2010 disposes:

- the preliminary evaluation of hydrogeolocal risk till the 22th September of 2011;
- the updating and definition of hydrogeological hazard and risk maps till the 22th June of 2013 (art. 6);
- the conclusion and publication of hydrogeolocal risk management plan till the 22 June 2015 (art. 7);
- more updating (2019, 2021).

However, various elements that contributed to the ineffectiveness of legislation and delays the plan timing definition are apparent from an examination of the regulations:

1) the continuous rearrangement of the rules and the lack of deadlines or the extension of existing ones was certainly the primary cause of the delay in implementing the rules
2) the gradual integration of the planning of instability in general spatial planning has inadvertently reduced its importance and shifted the focus onto other priorities
3) a systemic approach has been lacking for a long time and in part still lacks a unified approach in which the phases of prevention, planning and management of the collapse were analyzed and treated
4) the legislation enacted as result of past tragic events tended towards emergency rather than programmatic nature, while the attention to this issue has not been stable and long-lasting with little significant effect caused by the lack of a continuity
5) sectoral rules are often uneven because there is no explicit connection with those of other related sectors

So the process of adoption of the PAI started in 1989 should have been completed until 30/04/2001, however this has not happened. To date, according to the report of the Ministry for the Environment, Land Protection and the Union of Italian Provinces, areas at high risk and very high flood risk in the Italian territory cover an area of 7,774 sq km, equal to 2.6% of the national area, while management tools are still being developed (Tables VI, VII, Fig. 5).

Only 10 regions currently have a third generation landscape plan [17] and the approval of some PAI is still in progress. According to data reported in the statistical yearbook of APAT, in Italy the PAI currently approved are 35, 4 are those adopted awaiting approval and one is adoption phase. Only one national Basin Authority (ADB) still lacks of an approved Plan. Instead, the interregional Basin Authorities have generally returned to the process of implementation of the

Plans (4 authorities have not an approved a Plan). Finally, almost all regional Authorities have an approved Plan [13]. The situation regarding the adaptation to PAI by the municipalities is more critical.

TABLE VI
HYDRO-GEOLOGICAL RISK IN ITALY [30]

Region	Number of Municipalities under threat	% Municipalities under threat
Calabria	409	100%
Provincia Autonoma di Trento	222	100%
Molise	136	100%
Basilicata	131	100%
Umbria	92	100%
Valle d'Aosta	74	100%
Marche	239	99%
Liguria	232	99%
Lazio	372	98%
Toscana	280	98%
Piemonte	1049	87%
Abruzzo	294	96%
Emilia Romagna	313	95%
Campania	504	92%
Friuli Venezia Giulia	201	92%
Sardegna	306	81%
Puglia	200	78%
Sicilia	277	71%
Lombardia	929	60%
Provincia Autonoma di Bolzano	46	59%
Veneto	327	56%
TOTAL	6633	82%

TABLE VII
ESTIMATED FINANCIAL REQUIREMENT FOR ACTIONS IMPLEMENTATION [29]

Area	Basin Authority	Financial requirement for actions implementation (mila€)
National	Po	13.747,000
	Serchio	1.089,000
	FTCB	113.843
	Lemente	49.100
Inter-regional	Magra	487.000
	Reno	144.000
	Fiora	9.231
	Tronto	413.965
	Sele	590.390
Regional	Regional Basins of Liguria	1210 (only urgent actions)
	Regional Basins of Marche	435.000
	Campania sinistra Sele	57.045
	Veneto Sile and plain between Piave and Livenza	137.000
Total	Total	17.273.784

Basin Authority	Project plans adopted	PAI adopted	PAI approved	year of first approval
National				
Po			X	2001
Adige			X	2006
Alto Adriatico (Isonzo, Tagliamento, Livenza, Piave, Brenta-Bacchiglione)		X		2004
Arno			X	2005
Tevere			X	2007
Liri, Garigliano e Volturno			X	2006
Serchio (bacino pilota)			X	2005
Inter-regional				
Fissero-Tartaro-Canalbianco		X		2006
Lemene		X		2010
Magra			X	2006
Reno			X	2004
Conca e Marecchia			X	2004
Fiora		X*		2006
Tronto			X	2008
Sangro			X	2008
Trigno, Biferno e minori, Saccione e Fortore	X			2006
Bacini interregionali della Puglia			X	2002
Sele			X	2011
Bacini della Basilicata			X	2002
Lao			X	2002
Regional and Autonomous Provinces				
Bolzano-Bozen			X	2001
Trento			X	2001
Veneto-Sile e pianura tra Piave e Livenza			X	2007
Veneto-bacino scolante in Laguna di Venezia	X			
Regione Friuli Venezia Giulia			X**	2009
Bacini liguri			X	2003
Bacini romagnoli			X	2003
Bacini toscani			X	2005
Bacini marchigiani			X	2004
Bacini del Lazio	X			2006
Regione Abruzzo			X	2008
Campania Nord Occidentale			X	2010
Campania Sarno			X	2002
Campania destra Sele			X	2001
Campania sinistra Sele			X	2001
Bacini calabresi			X	2001
Regione Sicilia			X	2007
Regione Sardegna			X	2006

Fig. 5 Implementation state of priority catchment area plan for hydro-geological system (PAI) [13]

IV. CONCLUSIONS AND UNANSWERED QUESTIONS

The problem of maintenance of the territory and the prevention of risk is intrinsically connected with the history of the transformation caused by the socio-economic and environmental characteristics that have crossed it. Phenomena such as the abandonment of farming, industrialization and urbanization, generated not only changes in the structure of land use, but also the overall characteristics of the Italian landscape and the relationship between town and country. In this context, the interventions for the defence of the soil, such hydrological forest management, water regulation, and works in defence of the coasts, constitute productive investment, even if only in the long-term. It is, in fact, proved that the cost to implement preventive works can be significantly lower than the amount of the economic loss and the investment for the repair works. However it should be noted that as well as the problem of prevention through a conscious planning of the territory there is a pressing problem of management of dangerous existing situations.

The analyses relating to the level of danger and complex indexes of risk assessment are undoubtedly very useful tools in guiding the future choices on the destinations of use of territory, as well as the planning of interventions and allocation of resources. However, they are few useful in implementation strategies for risk mitigation in existing settlements [6]. Even though the need to integrate mitigation strategies of natural hazards in the policies for achieving sustainability goals, especially in the processes of governance

of urban and territorial transformations, is officially recognized as a priority [32], [22] the difficulties encountered in materialization of these principles in the planning tools still appears evident [19]. Transfer in terms of planning practices current knowledge on natural hazards [20] cannot be exhausted in the simple delimitation of the existing situations. The realization of efficient and coordinated monitoring networks, the predisposition of protective actions aimed at prevention, are an essential precondition to a strategic plan of action with respect to already overt risk situations based on the definition of mitigation actions that can be managed through ordinary tools of government of urban transformations.

REFERENCES

[1] M. Agnoletti, Ed., *Italian Historical Rural Landscapes*, Heidelberg London New York: Springer Verlag, 2013.
[2] M. Antrop, "Landscape Change and Urbanization Process in Europe", *Landscape and Urban Planning*, vol. 67, pp. 9-26, March, 2004.
[3] M. Arouri, C. Nguyen and A.B. Youssef, "Natural Disasters, Household Wel-fare, and Resilience: Evidence from Rural Vietnam", *World Development*, vol. 70, pp. 59-77, June, 2015.
[4] M. Balestrieri, "Zone d'ombra della pianificazione", *Urbanistica Dossier*, vol. 4, pp. 571- 575, 2013.
[5] P. Berdini, *Breve storia dell'abuso edilizio in Italia dal ventennio fascista al prossimo futuro*, Roma: Saggine, 2010.
[6] M. Besio, "Dalla carta del rischio al piano integrato della sostenibilità territoriale", *Urbanistica*, vol. 117, pp. 5-17, 2001.
[7] L. Briguglio, G. Cordina, N. Farrugia and S. Vella, Economic Vulnerability and Resilience Concepts and Measurements, *Research Paper* N. 2008/55, UNU-WIDER World Development Economic Research Institute, 2008.
[8] R. J. Burby, P. J. May and R. G. Paterson., "Improving compliance with regulations: Choices and outcomes for local government", *Journal of the American Planning Association*, vol. 64, no. 3, pp. 324-34, November, 1998.
[9] R. J. Burby, T. Beatley, P. R. Berke, R. E. Deyle, S. P. French, D.R. Goldschalk, E. J. Kaiser, J. D. Kartez, P. J. May, R. Olshansky, R. G. Paterson and R. H. Platt, "Unleashing the power of planning to create disaster-resistant communities", *JAPA*, vol. 65, no.3, pp. 247-58, November, 1999.
[10] R. Camagni, M. C. Gibelli and P. Rigamonti, *I costi collettivi della città dispersa*, Firenze: Alinea Editrice, 2002.
[11] R. Camagni, "Perequazione urbanistica estesa, rendita e finanziarizzazione immobiliare: un conflitto con l'equità e la qualità territoriale", *Scienze Regionali*, vol. 16, no. 2, pp. 29-44, 2014.
[12] Crcs, *Rapporto 2010*, Roma, http://consumosuolo.org/files/2014/06/abstract_rapporto_2010.pdf
[13] Cresme, *Lo stato del territorio italiano 2012, Insediamento e rischio sismico idrogeologico*, www.camera.it/temiap/temi16/CRESME_rischiosismico.pdf
[14] Cutter, S.L. & Finch, C., "Temporal and spatial changes in social vulnerability to natural hazards," in *Proc. of the National Academy of Sciences*, vol. 105, no. 7, pp. 2301-2306, 2007.
[15] M. Dallimer, D. Tinch, S. Acs, N. Hanley, H.R. Southall, K. J. Gaston, and P.R. Armsworth, "100 years of change: examining agricultural trends, habitat change and stakeholder perceptions through the 20th century", *Journal of Applied Ecology*, vol. 46, no.2, pp. 334-343, March, 2009.
[16] A. Dauphiné, *Risques et catastrophes: observer, spatialiser – comprendre – gérer*, Paris:Armand Colin, 2001.
[17] A. De Montis, "Impacts of the European Landscape Convention on national planning systems: A comparative investigation of six case studies", *Landscape and Urban Planning*, vol. 124, pp. 53-65, April, 2014.
[18] L. Fregolent, *Governare la dispersione*, Franco Angeli: Milano, 2005.
[19] A. Galderisi and A. Ceudech, "Dalle tecniche per la conoscenza agli strumenti urbanistici per la mitigazione del rischio idrogeologico in ambito urbano", in Proc. XXIX Conferenza italiana di Scienze Regionali *Journal of Applied Ecology*, Bari, 2008.
[20] A. Galderisi and S. Menoni, "Rischi naturali, Prevenzione e Piano", *Urbanistica*, vol. 134, pp. 7-22, 2007.
[21] P. Graziano, "Vulnerability and resilience of the economic, social and environmental dimensions of italian provinces", in *Proc. Regional Studies Association European Conference*, Tampere, May 2013.
[22] ISDR, Hyogo Framework for Action 2005-2015: Building the Resilience of Nations and Communities to Disasters, http://www.unisdr.org/2005/wcdr
[23] Ispra, *Il consumo di suolo in Italia*, Roma: Ispra, 2014.
[24] F. Indovina, *La città diffusa*, Venezia: Daest-IUAV, 1990.
[25] J. Jensen and M. Mesman, *Ecological Risk Assessment of Contaminated Land*, 2006, http://dce.au.dk/fileadmin/Attachments/Prefaceetc.pdf
[26] M.P. Johnson, "Environmental impacts of urban sprawl: a survey of the literature and proposed research agenda", *Environment and Planning A*, vol. 33, no. 4, pp. 717-735, 2001.
[27] M. Kamppinen and M. Wilenius, "Risk landscapes in the era of social transition", *Futures*, vol. 33, no.3-4, August, pp. 307-317, 2001.
[28] D. Knowler and B. Bradshaw, "Farmers adoption of conservation agriculture: a review and synthesis of recent research", *Food Policy*, vol. 32, no.1, pp. 25-48, 2007.
[29] Legambiente, *Rapporto Ecomafia 2008. I numeri e le storie della criminalità ambientale*, Milano: Edizioni Ambiente, 2008.
[30] MATTM, *Rischio idrogeologico in Italia*, Ministero dell'Ambiente e della Tutela del Territorio, 2008.
[31] L. Mazza, "Limiti e capacità della pianificazione dello spazio", *Territorio*, vol. 52, no. 7-24, 2010.
[32] D. S. Mileti, *Disasters by design, A reassessment of natural hazards in the United States*, Washington DC: Joseph Henry Press, 1999.
[33] W. Naudé, M. McGillivray, and R. Stephanié, Measuring the Vulnerability of Subnational Regions, *Research Paper* No. 2008/54, UNU-WIDER World Development Economic Research Institute, 2008.
[34] ONUG/DHA, (1992), Glossaire International multilingue agrée de termes relatifs à la gestion de catastrophes, http://www.unisdr.org/unisdr/glossaire.html
[35] C. V. Patton, Ed., *Spontaneous Shelter: International Perspectives and Prospects*, Philadelphia: Temple University Press, 1988.
[36] B. Roy, "Decision Science or Decision-aid Science?", *European Journal of Operational Research*, vol. 66, no. 2, pp.184-203, May, 1993.
[37] B. Roy, *Méthodologie multicritère d'aide à la décision*, Paris: Economica, 1985.
[38] L. Salvati, M. Munafò, V. G. Morelli and A. Sabbi, "Low-density Settlements and Land Use Changes in a Mediterranean Urban Region", *Landscape and Urban Planning*, vol. 105, no. 1-2, pp. 43-52, April, 2012.
[39] E. Salzano, "Dualismo urbano. Città dei cittadini o città della rendita", *QT2 Quaderni del territorio*, vol. 2, pp. 143-153, 2011
[40] R. Schoonjans and R. Luttik, "Specifying biodiversity-related protection goals for environmental risk assessment", *EFSA Journal*, vol. 12, no. 6, pp. 1-4, December, 2014.
[41] M. Scheele, The agri-environmental measures in the context of CAP reform, in Whitby M., Ed, The European Environment and CAP Reform, Policies and Prospects for Conservation, Wallingford: CAB International, pp. 3-7, 1996.
[42] M. Schouten, C. M. Van Der Heide, W. J. M. Heijman, and PFM. Opdam, A resilience-based policy evaluation framework: application to European rural development policies, *Ecological Economics*, vol. 81, pp. 165-175, September, 2012.
[43] S. Stanghellini, "Abusivismo edilizio: Il ministro degli interni si preoccupi", *Urbanistica Informazioni*, vol. 135, no. 6, 215-233, 1994.
[44] W. Tocci, "L'insostenibile ascesa della rendita Urbana", *Democrazia e Diritto*, vol. 1, pp. 17-59, 2009.
[45] C. Stoate C., A. Baldi, P. Beja , N. D., Boatman., I. Herzon, A. van Doorn, G. R. de Snoo, L. Rakosy and C. Ramwell, "Ecological impacts of early 21st century agricultural change in Europe - A review", *Journal of Environmental Management*, vol. 91, no.1, pp. 22-46, October 2009.
[46] F. Zanfi, "The "Città Abusiva" in Contemporary Southern Italy: Illegal Building Prospects for Change", *Urban Studies*, vol. 50, no. 16, pp. 3428-3445, December, 2013.
[47] B. Wisner, P. Blaikie, T. Cannon and I. Davis, *At Risk. Natural Hazards, People's Vulnerability and Disasters*, 2nd edition, London: Routledge, 2004.