



DEBRIS FLOW AND FLASH FLOOD, ISPRA EXPERIENCES THROUGH MAPPING AND MONITORING OF MITIGATION MEASURES AND RISK REDUCTION IN ITALY

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Abstract

Italy is characterized by frequent and widespread phenomena of geological instability and floods. The main factors that contribute to this geological and hydraulic risk are the geomorphological setting of the Italian territory, characterized by a relatively young environment often still in evolution. These specific dynamics and phenomena are frequently triggered by heavy rainfall like the one happened last 1st October in Giampilieri (ME) where more than 30 people were killed. The Institute for Environmental Protection and Research, ISPRA, acting under the vigilance and policy guidance of the Italian Ministry for the Environment, is involved in several institutional planning activities, promoting mitigation of natural risk reduction policies. Aim of this work is to present the main outcome obtained by two distinct activities, the IFFI project finalised to landslide mapping and the ReNDiS project finalised to mitigation measures monitoring.

1 Introduction

In order to monitor urgent works for the reduction of the geological and hydrological risk, and with the purpose of creating a synergy between the land protection bodies concerned, ISPRA developed, since 2000, the

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ReNDiS project (National List of Land Defence interventions). Together ISPRA carried out, jointly with the Regions and Self-Governing Provinces, the IFFI project (Italians Landslide Inventory), supplying a detailed picture of the distribution of landslide phenomena within Italy.

2 Data

ReNDiS project is aimed at creating a digitalized archive of all interventions against geological and hydrological instability and it is currently populated with more than 3,200 records (Fig.1) concerning all the programs of urgent engineering works funded in the last ten years by Ministry of Environment (2,4 billions of euro). Actually the engineering works addressed to flash flood and rapid landslide events risk reduction collected in ReNDiS are more than 280, all over the entire national territory (Fig.2). Till 2007 the Italian Landslide Inventory has recorded almost 485,000 landslide phenomena affecting an area of about 20,721 sq km, or 6.9% of the national territory (Fig.3). The project developed a *WebGIS* with online mapping service able to visualise landslides and query, providing a summary of information on landslides at different scale. The rapid mass movement (e.g. debris flow, soil slip) actually contained are more than 72,000 (Fig.4) equal to 15% of the entire data collected, mainly distributed in the Alpine and Campania region.

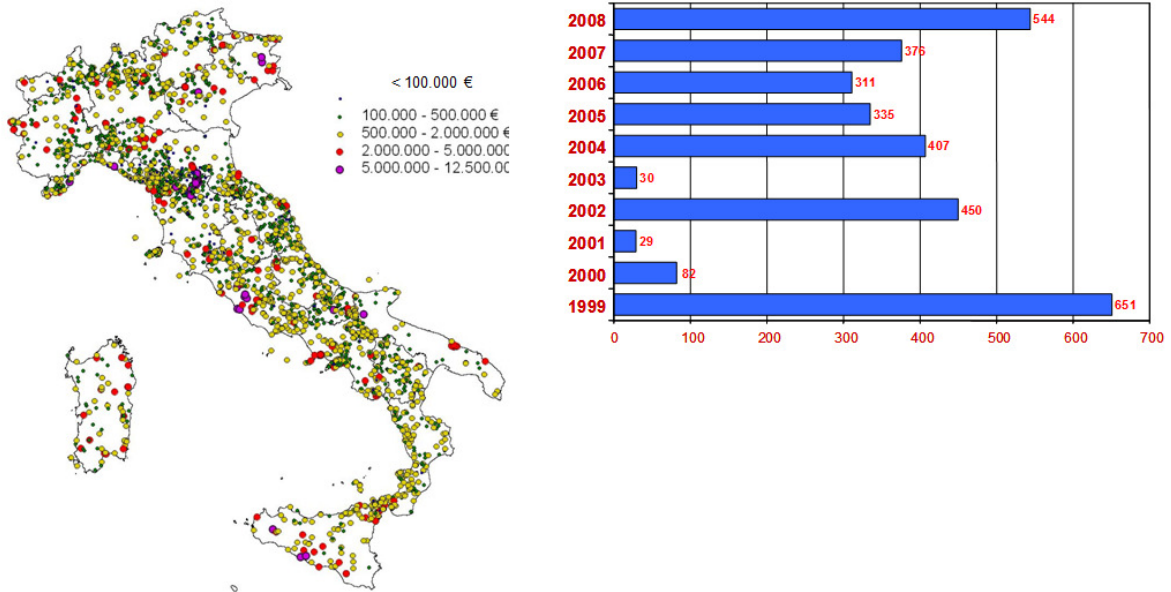


Figure 1. Mitigation measures distribution at national scale categorized by amounts (left); allocated funds during last ten years (right)

Tipologie di opere	n. casi
Palificata, palificata tirantata, paratia di micropali, pali, palancole, pannelli in c.a.	58
Muro in c.a., muro in c.a. fondato su micropali	40
Gabbionata	28
Muro in c.a. rivestito in pietrame	11
Palificata doppia in legname con talee, palificata doppia in legname con talee fondata su micropali	11
Muro a gravità (in pietrame, in cls.)	6
Gabbionata rinverdita	3
Terra rinforzata rinverdita	3
Terra rinforzata	3
Spritz-beton con rete metallica e tiranti	2
Muro cellulare	1
Numero totale	166

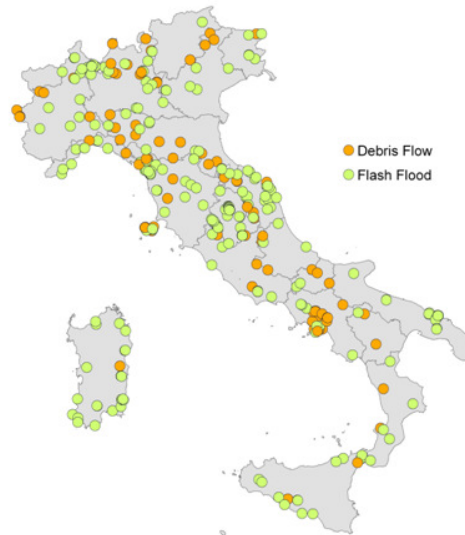


Figure 2. Flash floods and debris flow mitigation measures distribution at national scale (left); restoration work typologies adopted (right).

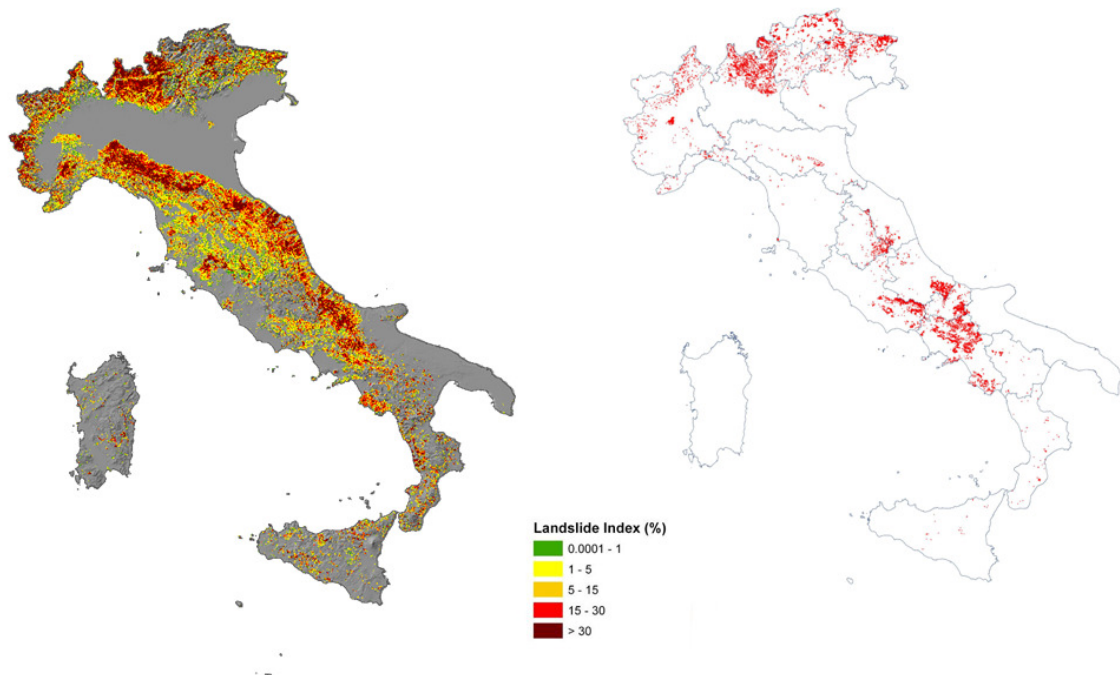


Figure 3. Italian landslide index (left); debris flow distribution at national scale (right)

3 Conclusions

ReNDiS project is one of the main operational tool for the information management on mitigation measures at national scale. The ultimate goal is to build up a unified, homogeneous, updated and complete framework of public intervention in the area of land protection and management. The ReNDiS geodatabase can share information between different local Authorities, improving the knowledge and support land use planning activities for risk reduction.

The IFFI Inventory is an important tool for hazard and risk assessment. Actually the inventory contain more than 480,000 landslides of which 72,000 are classified as rapid landslide. The analysis carried out with the IFFI database shows that: landslides affect an area of approximately 20,700 km² (6.9% of Italy); 70.5% of Italian municipalities are affected by landslides; 992,403 inhabitants are exposed to landslide risk.



References

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www.sinanet.apat.it/progettoiffi

www.rendisweb.isprambiente.it/rendisweb