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INTRODUCTION

Considering the importance of the debate on the topic of disasters related to landslides, flooding and technological risks, under international and more recently in Brazil, this work analyzes the situations of vulnerability risk areas on the Northern Coast of São Paulo. The situation analyzed refers to the effects of the implementation of large infrastructure projects related to oil and gas on the occupation of risk areas to landslides and flooding, besides considering the technological risks inherent in these megaprojects. Figure 1 show the technological and environmental risks in three regions of Brazilian Southeast coast – detailed to Northern coast of São Paulo.

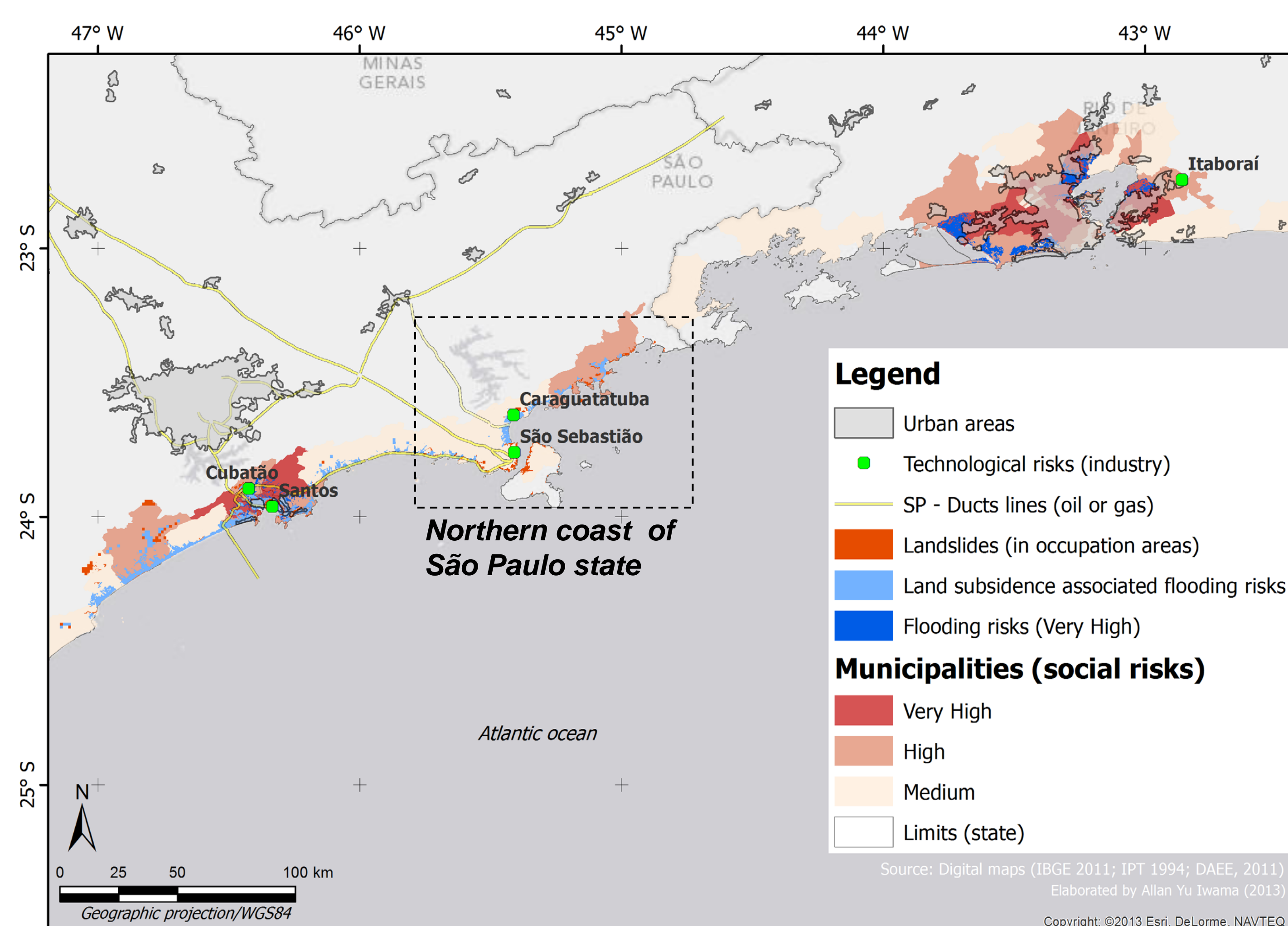


Fig 1. Technological, environmental risks in three regions of Brazilian Southeast coastline (Northern coast of São Paulo state, in detailed)

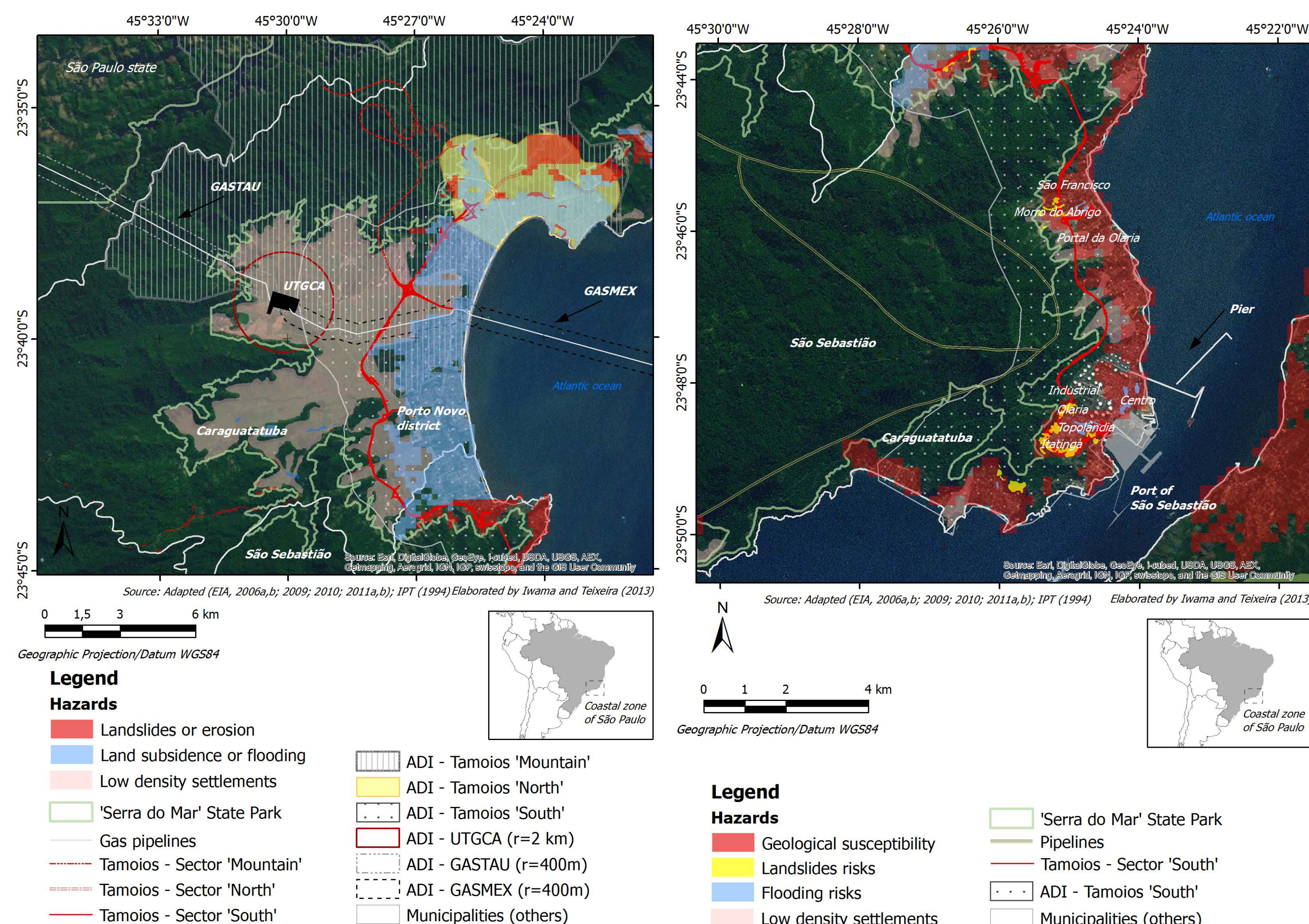


Fig 2(a). Megaprojects influence: pipelines (GASTAU – gas pipeline of Taubaté, GASMEX – gas pipeline of Mexilhão), station of gas treatment (UTGCA), complex of roads (Tamoios road – SP-099) and technological, environmental risks in Caraguatatuba region.

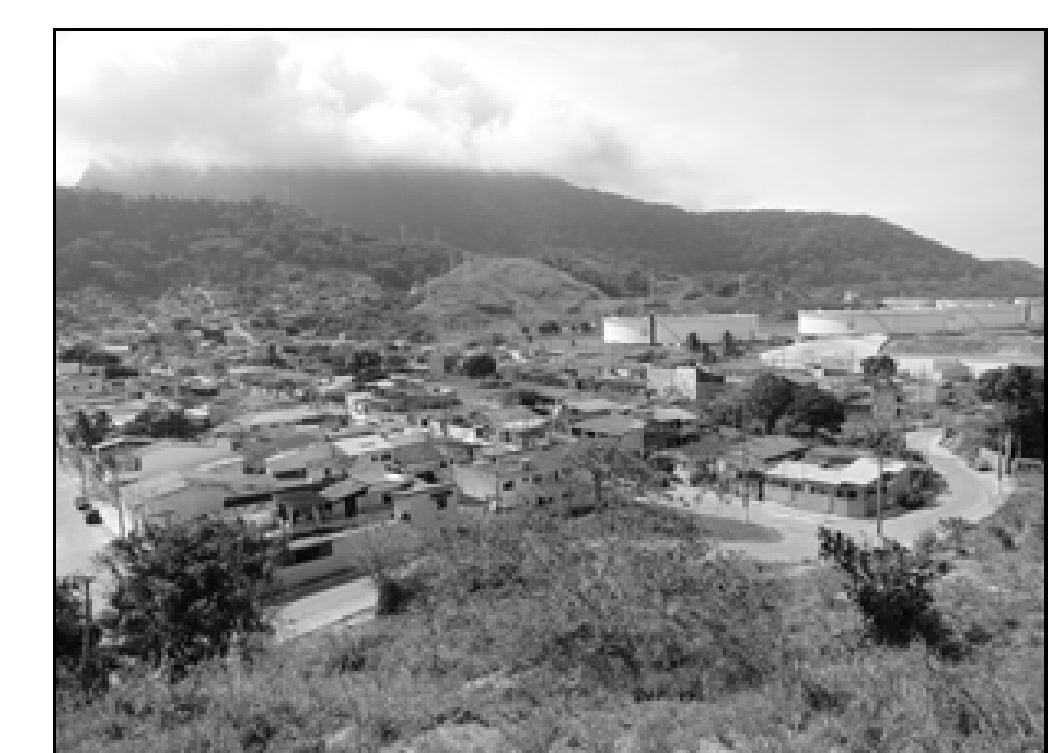
Fig 2(b). Megaprojects influence: Port of São Sebastião and pier expansion, pipelines, technological-environmental risks and geological risks in São Sebastião region.

The analyzes showed that the areas of influence of the projects are disputes related to the process of land occupation, especially among different land management instruments at the municipal, state and federal. This study pointed out to an increase in local conflicts and pressures generated by the presence of megaprojects increasing the immigration and commuting, speculation, conurbation, and megaprojects historically relate to the use and occupation (terrestrial and marine) of a process disorderly.

FRAMEWORK: RISK GOVERNANCE AND ECONOMIC SYSTEMS

In general, we observed a progress in the collected and communication of information by emergency removal of residents in risk areas. Furthermore, these aspects should be analysed in the historical context of land use dynamics, which not considered environmentally preserved and potential environmental risk areas. This topic associated with a weak multi-sectoral governance probably keep on acting focusing in an emergency situation and not in a large risk management (Figure 3).

Box. Northern coast of São Paulo: technological and environmental risks interconnectedness



Petrobras terminal (TEBAR): technological risks and environmental (by A. Iwama, 2011)



Debris flow: Camburi district (São Sebastião city) (by A. Iwama, 2012)



Topolândia district (São Sebastião city) (by A. Iwama, 2011)

The relation between a megaproject and environment aspects is complex and the situation analysed in São Sebastião and recently in Caraguatatuba illustrates how the process of urbanisation disordered can occur in some districts. The 'Itatinga', 'Olaria' and 'Topolândia' districts have arisen as a result of the Petrobras Terminal facility in the 1960s. Currently, it is predicted there will almost 400 expropriations as a result of the new road network ('Tamoios' sector road project). It is interesting to note that the districts affected by megaprojects installed in previous decades are today being looked at to understand the problems in installing new infrastructures projects. The population movements arising from the installation of large projects were not properly included in mitigation programmes for these megaprojects. These situations are cyclical and will always put the population in a situation of risk amplified, not only environmental or technological risks, this situation also raises a series of implications on the social structure of vulnerable residents.



Rio do Ouro district (Caraguatatuba city) (by M. Stasiak and A. Iwama, 2012)



Morro do Algodão district (Caraguatatuba city) (by R. Souza, 2010-2012)

METHOD APPROACH

The proposed method was based on survey studies and reports environmental impacts of major developments in the study area as well as in obtaining data for territorial management. An analysis geospatial indicating areas of overlap between environmental and technological risks and areas defined for implementation of megaprojects. Figures 2(a) and 2(b) show the conflicts areas in Caraguatatuba and São Sebastião cities.

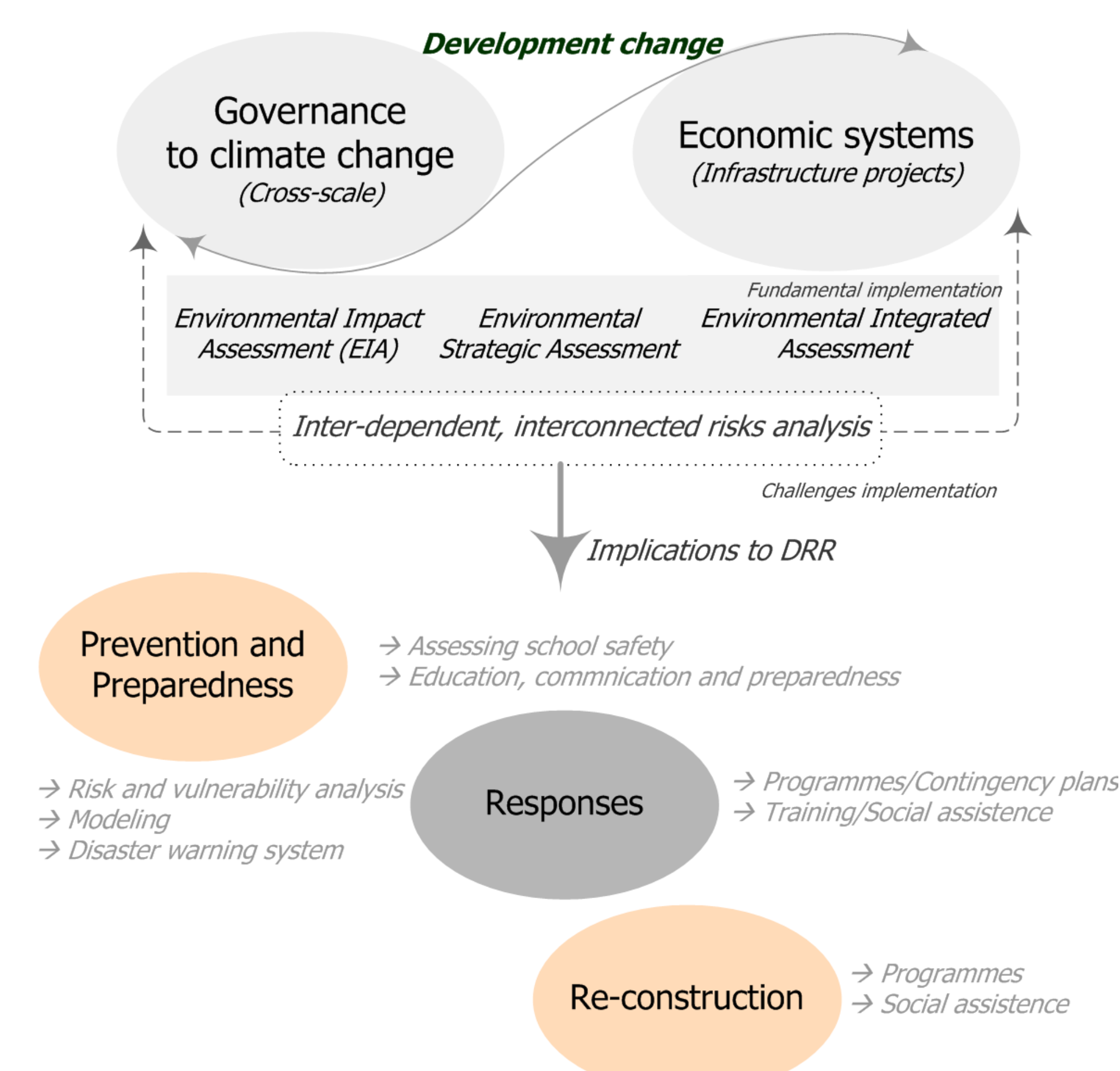


Fig 3. Framework – governance to climate change by cross-scale and infrastructure projects: inter-dependent and interconnected risks analysis in to land use and territorial management.

The results indicate the need to articulate the different spheres of action of the government to minimize the recurring problems of human occupation on risk areas and environmental protection. The weak linkage between land management instruments has generated a spatial segregation in the context of the increase in extreme weather events, may potentiate the indirect impacts of megaprojects in areas recognized as a risk to urban density.