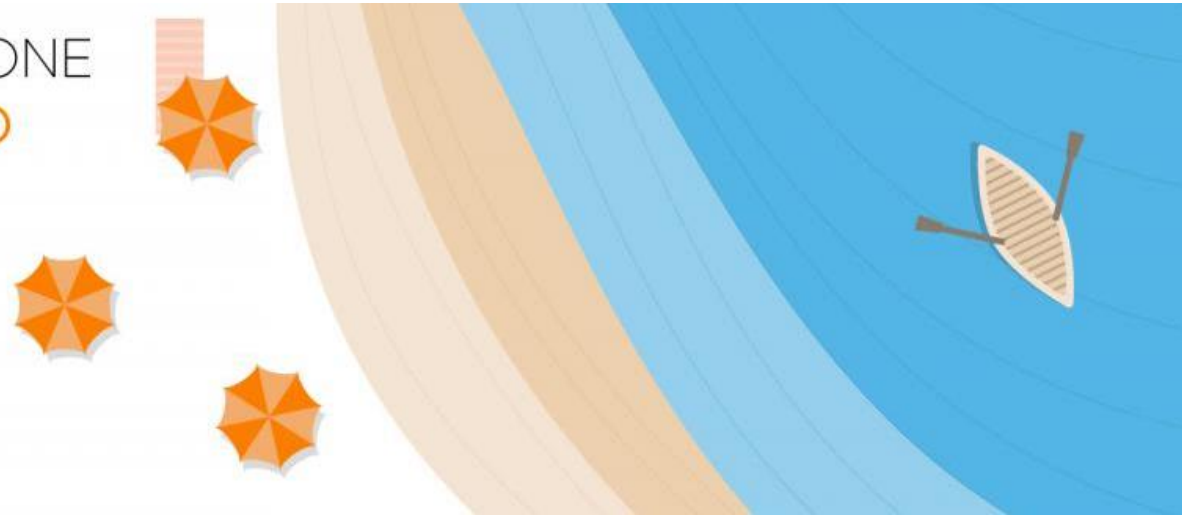


# GESTIONE E PREVENZIONE DEL **RISCHIO COSTIERO** DI UN TERRITORIO IN EVOLUZIONE

**PISA 8 OTTOBRE 2019**

Scuola Normale Superiore  
Piazza dei Cavalieri  
9:00 - 17:30



## Erosione Costiera e adattamento

*Enzo Pranzini, Dipartimento di Scienze della Terra, Università di Firenze*



La cooperazione al cuore del Mediterraneo



MARITTIMO-IT FR-MARITIME

Fondo Europeo di Sviluppo Regionale

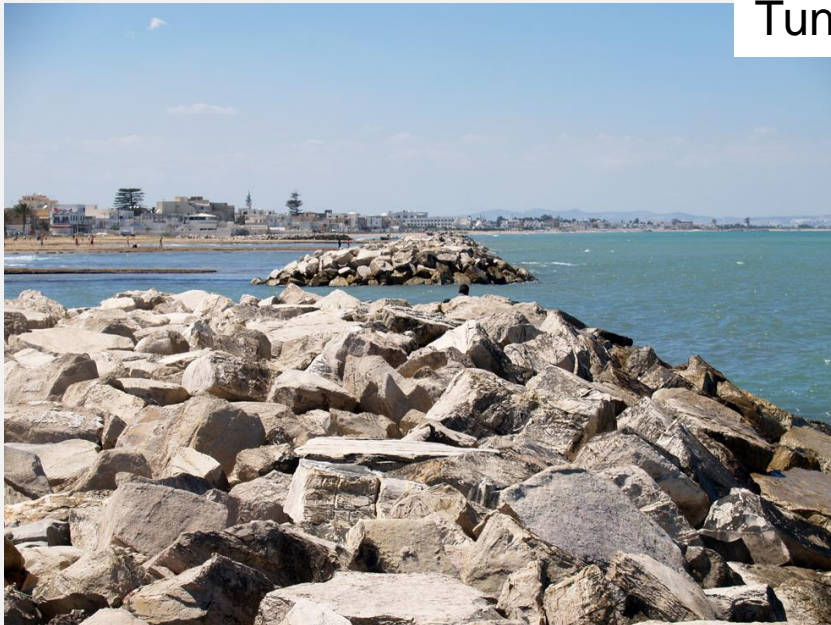
# La gran parte delle spiagge del Mediterraneo è in erosione



Italia



Grecia

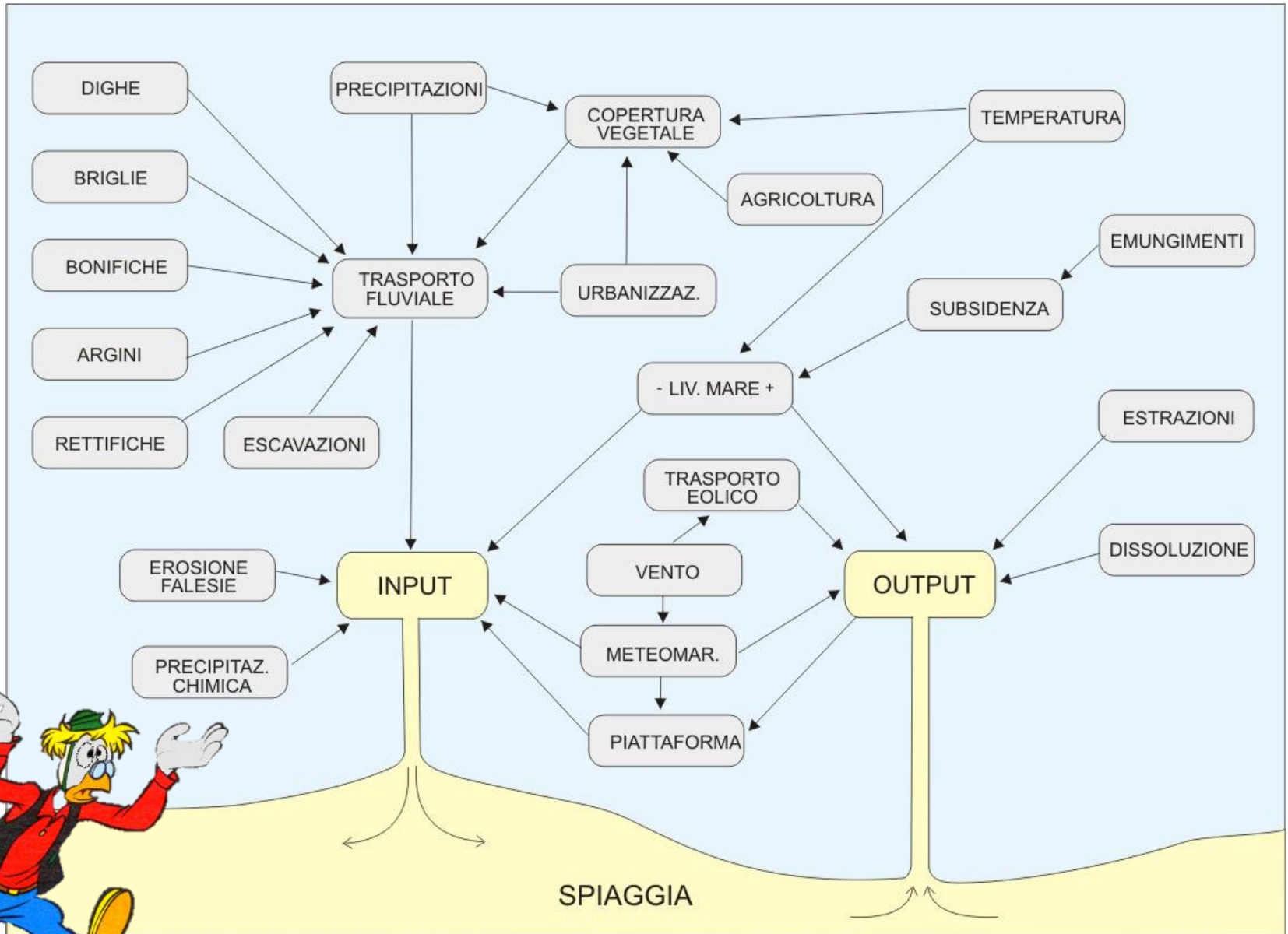


Tunisia



Spagna

# Bilancio sedimentario





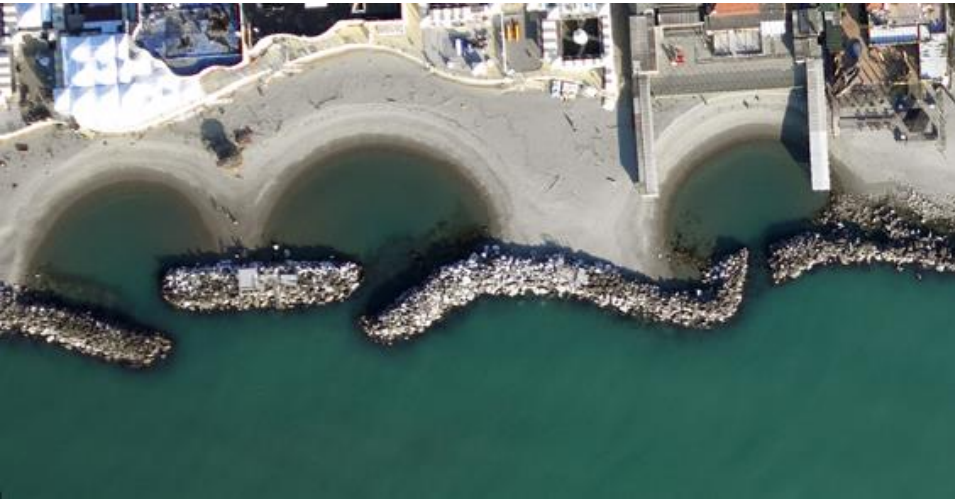
Marche



Misano (Emilia-Romagna)

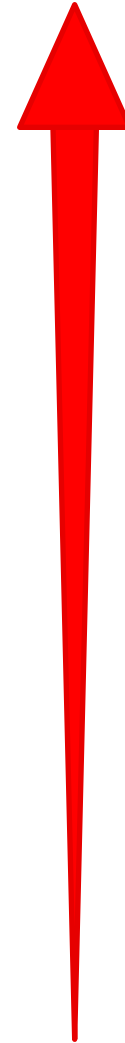


Marina di Massa, Toscana





**1000 €/day**



**20 €/day**



# Canone demaniale

**Valore**  
**2000 €/m<sup>2</sup>**

1 €/m<sup>2</sup>

2 €/m<sup>2</sup>

4 €/m<sup>2</sup>





**Costo dell'intervento = 100.000 €**

**40 (74) ombrelloni in più, a 2400 €/stagione = 96.000 (177.000) €**



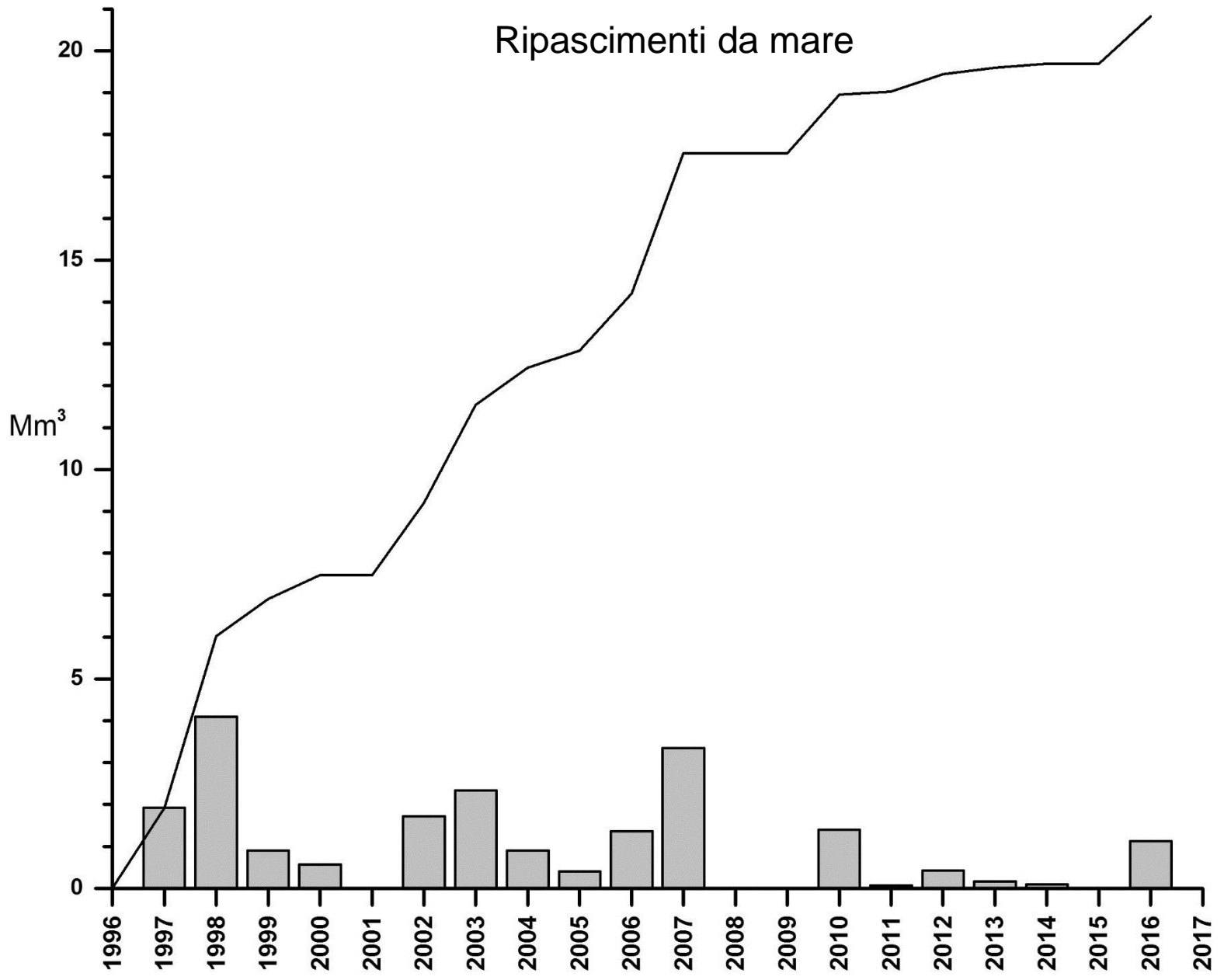


20/100.000.000 m<sup>3</sup>



21.500.000 m<sup>3</sup>

# Ripascimenti da mare

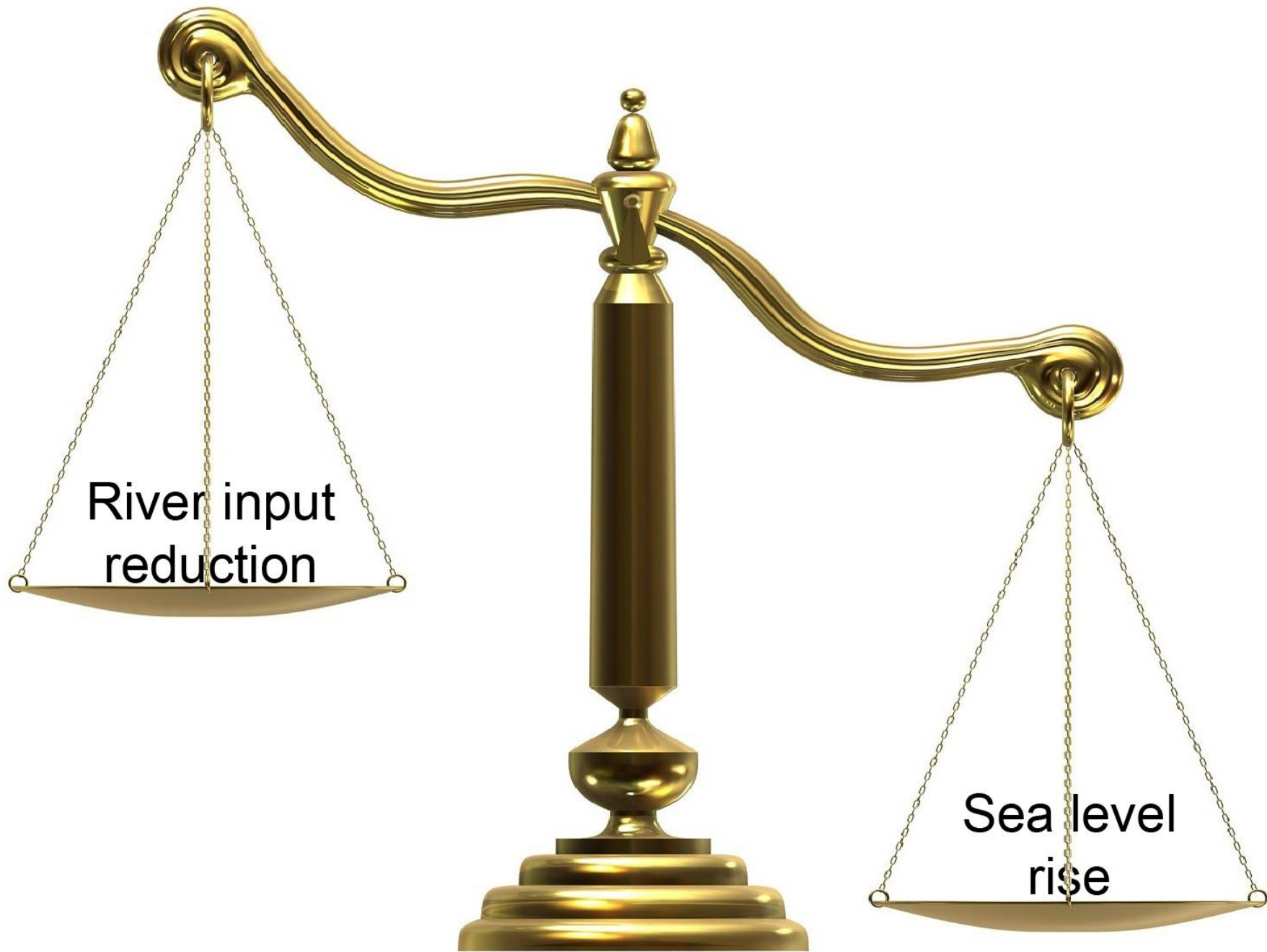


**Il Mediterraneo è un mare molto sensibile**



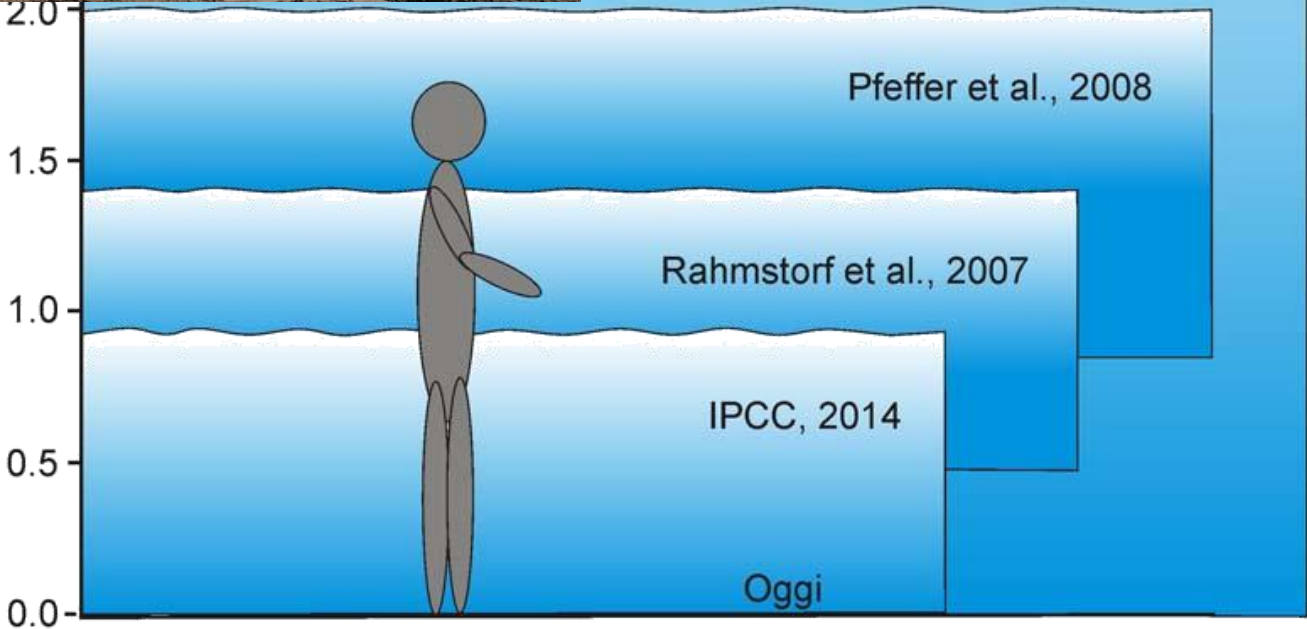
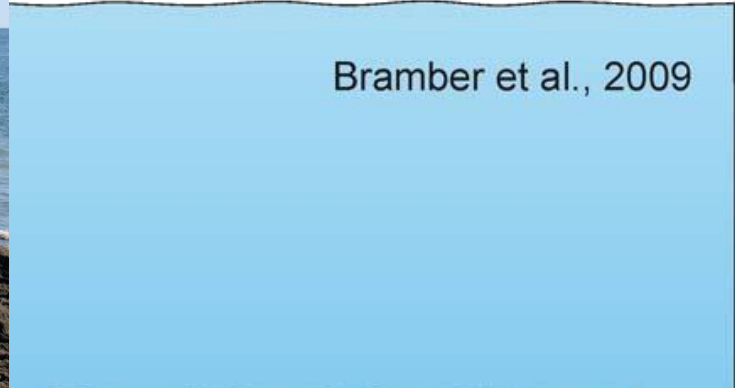
**I sedimenti di fondo non sono una risorsa rinnovabile**





River input  
reduction

Sea level  
rise

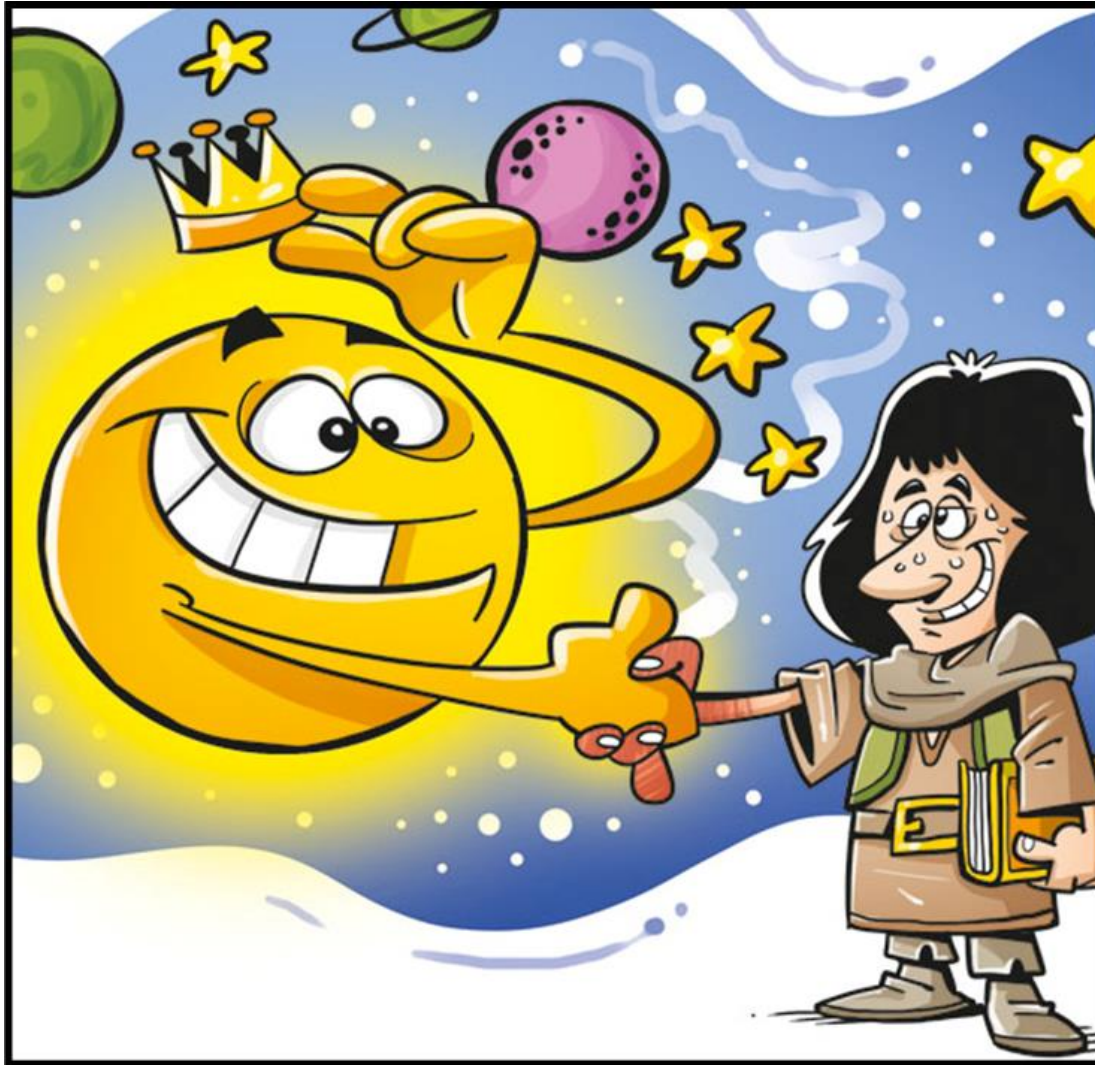








A Copernican revolution is needed!



# Difesa dei litorali e giustizia sociale



# Difesa dei litorali e giustizia intergenerazionale



Non tutti i tratti di costa italiana saranno difendibili.



**Abbandonarli?**

Quante file di ombrelloni metterò il prossimo anno?

Quante file di ombrelloni metterà mio figlio?

Quante file di ombrelloni metterà mio nipote?

E' solo un problema della «mia» famiglia;  
o è un problema della «mia» comunità!

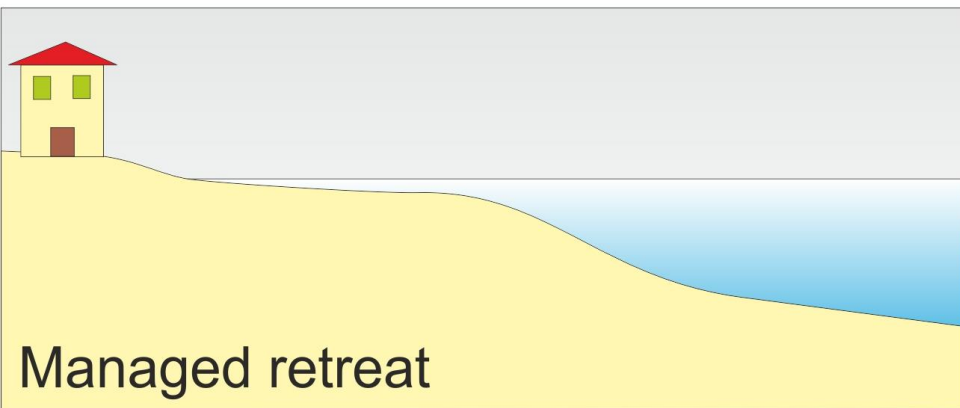
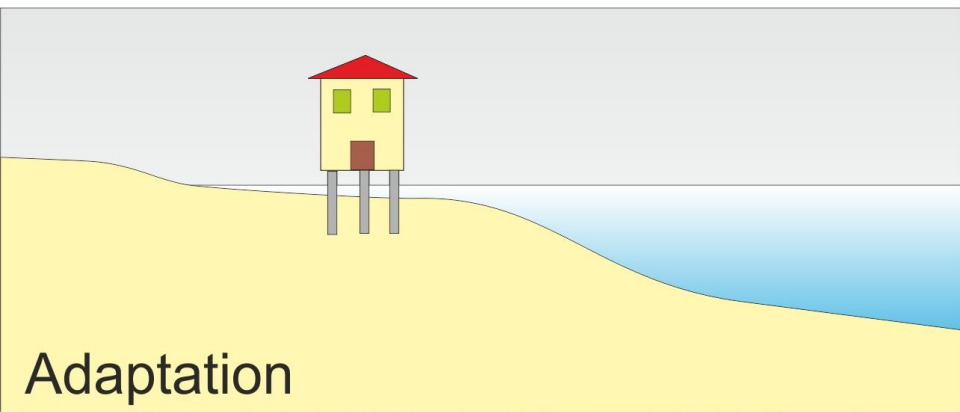
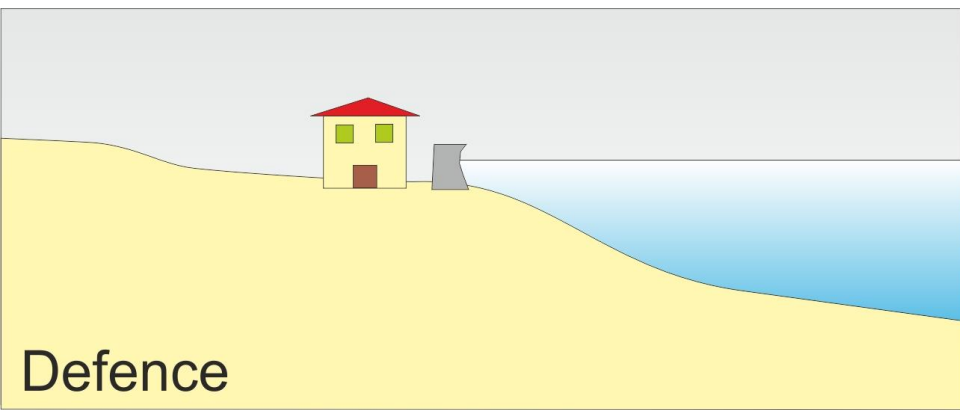




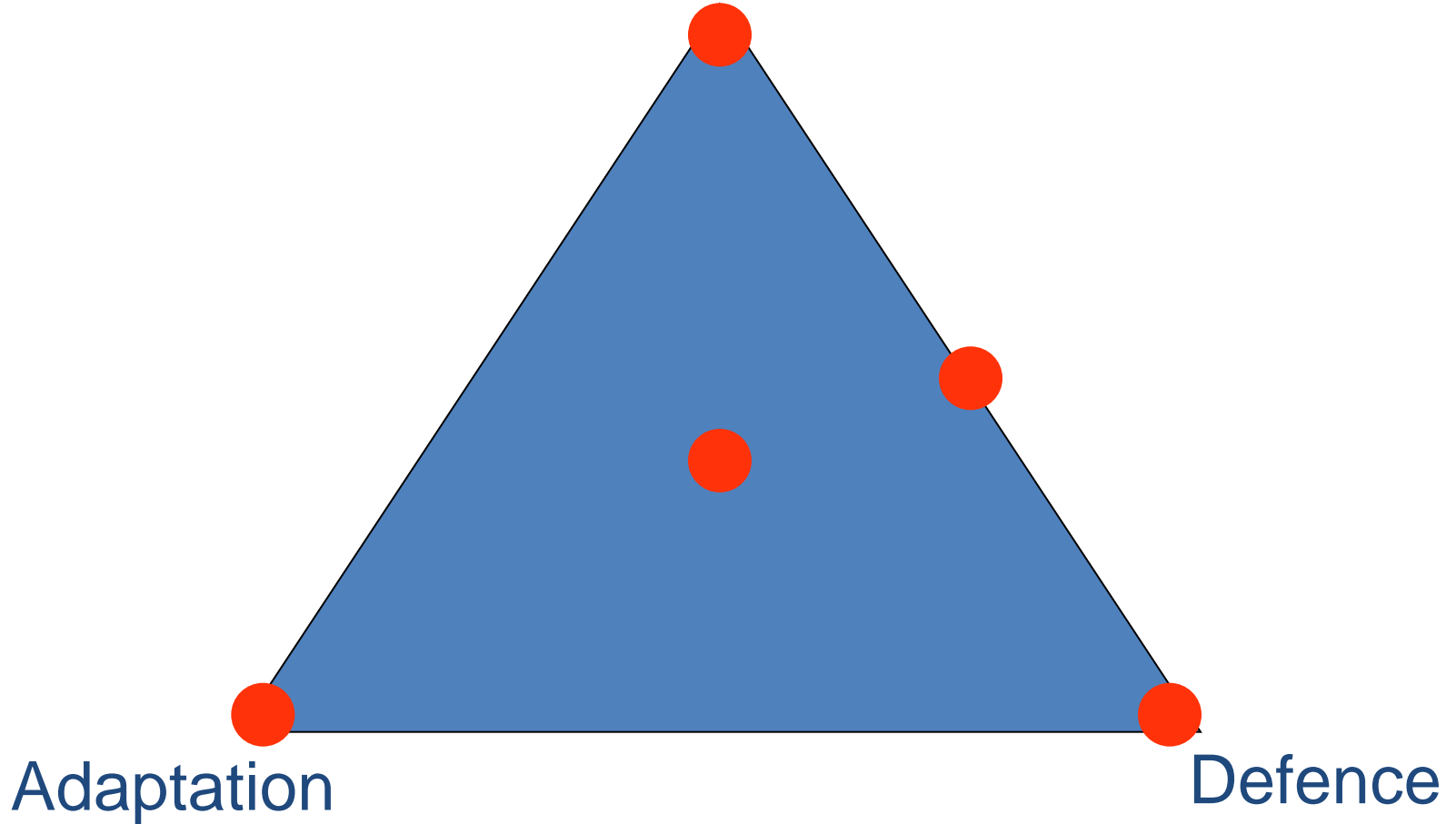






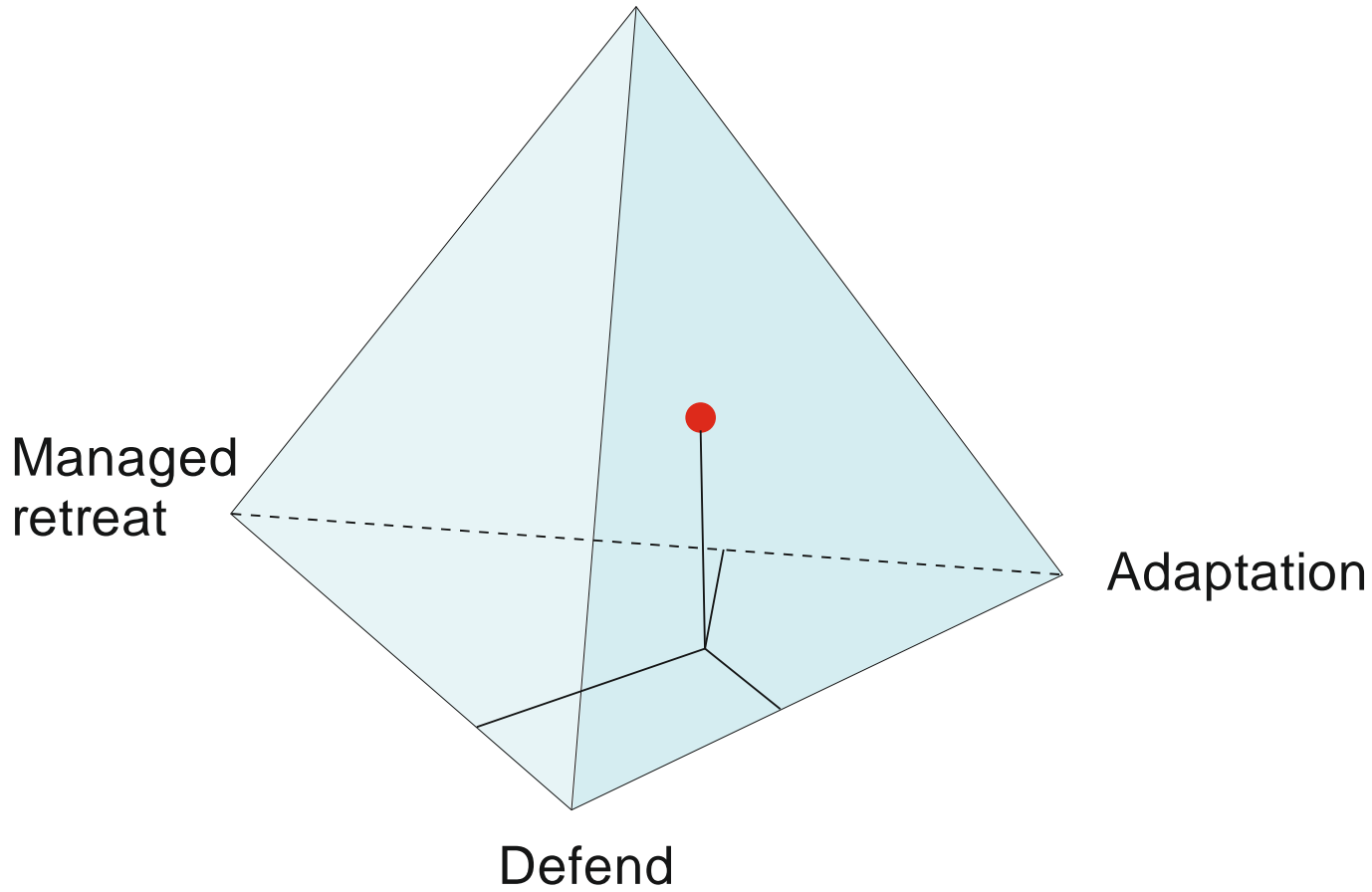


Managed retreat



Criteri di gestione del problema

# Interventions on the causes



Innalzamento del  
livello del mare  
(globale)



Riduzione  
dell'input  
sedimentario  
(regionale)



Interruzione del  
trasporto  
sedimentario  
(locale)





3 mareggiate  
estreme  
consecutiva

Innalzamento  
del Livello del  
Mare

Tasso di  
erosione  
x 100yrs

Linea di riva attuale



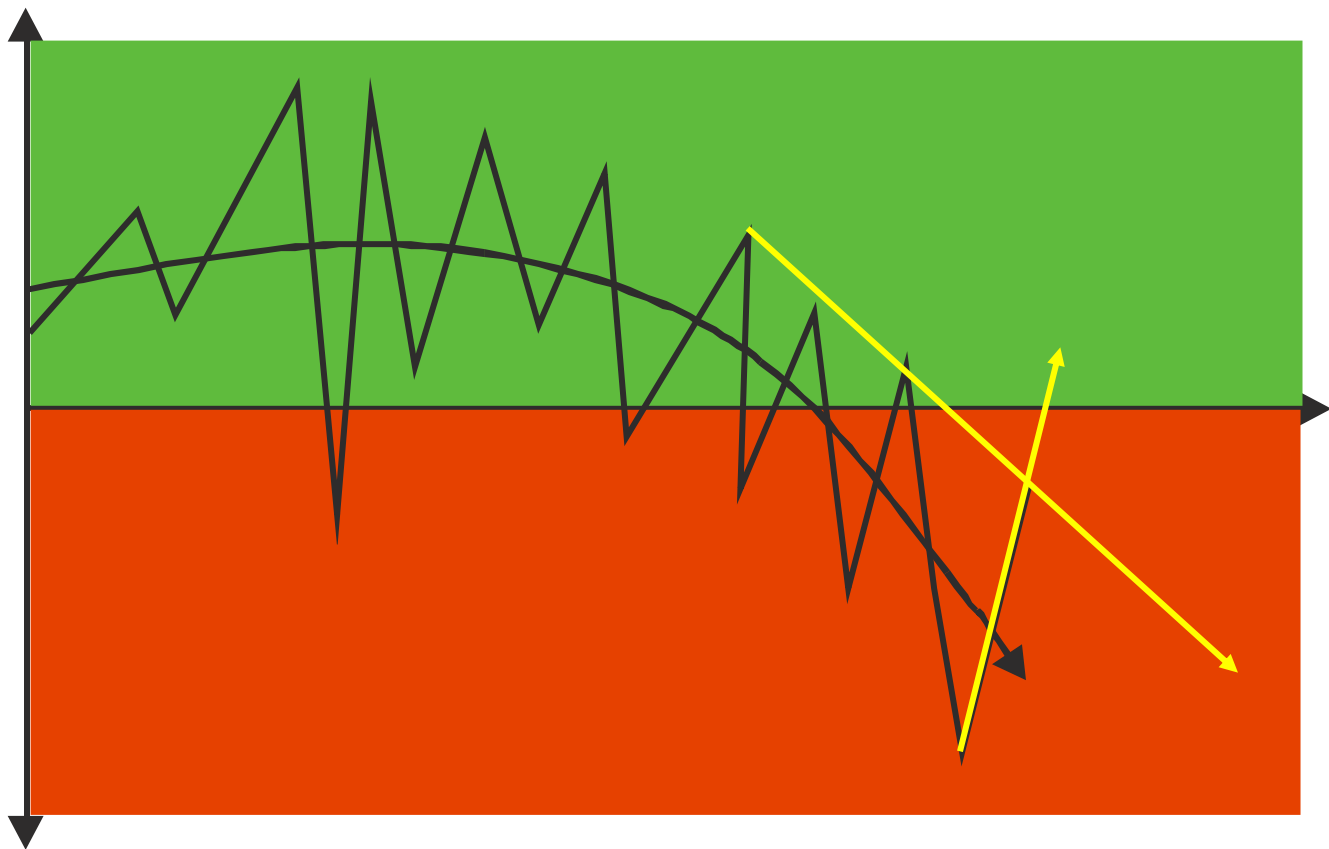
10 m/anno

2 km





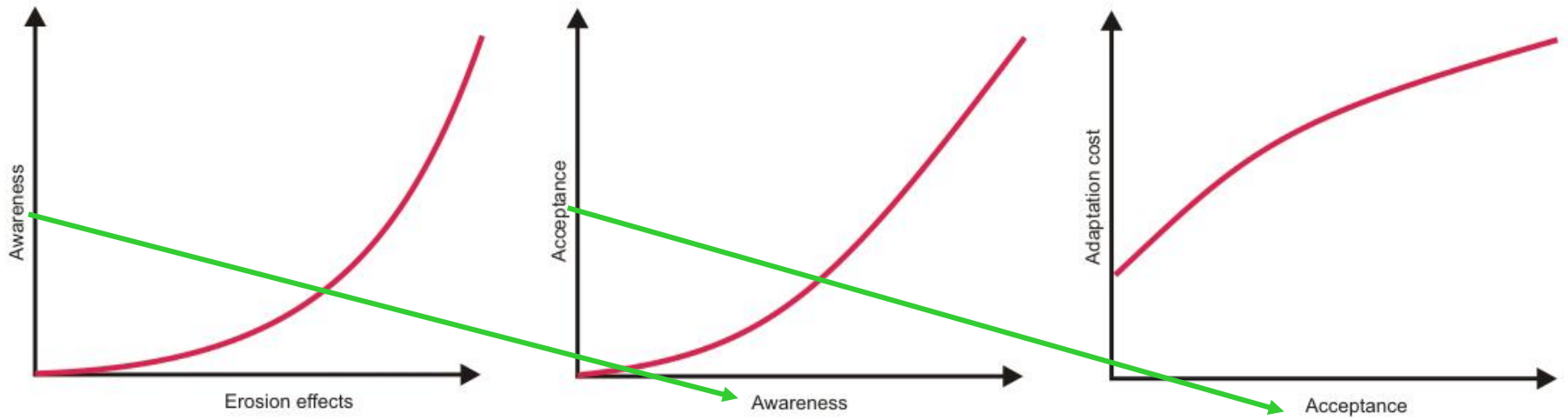


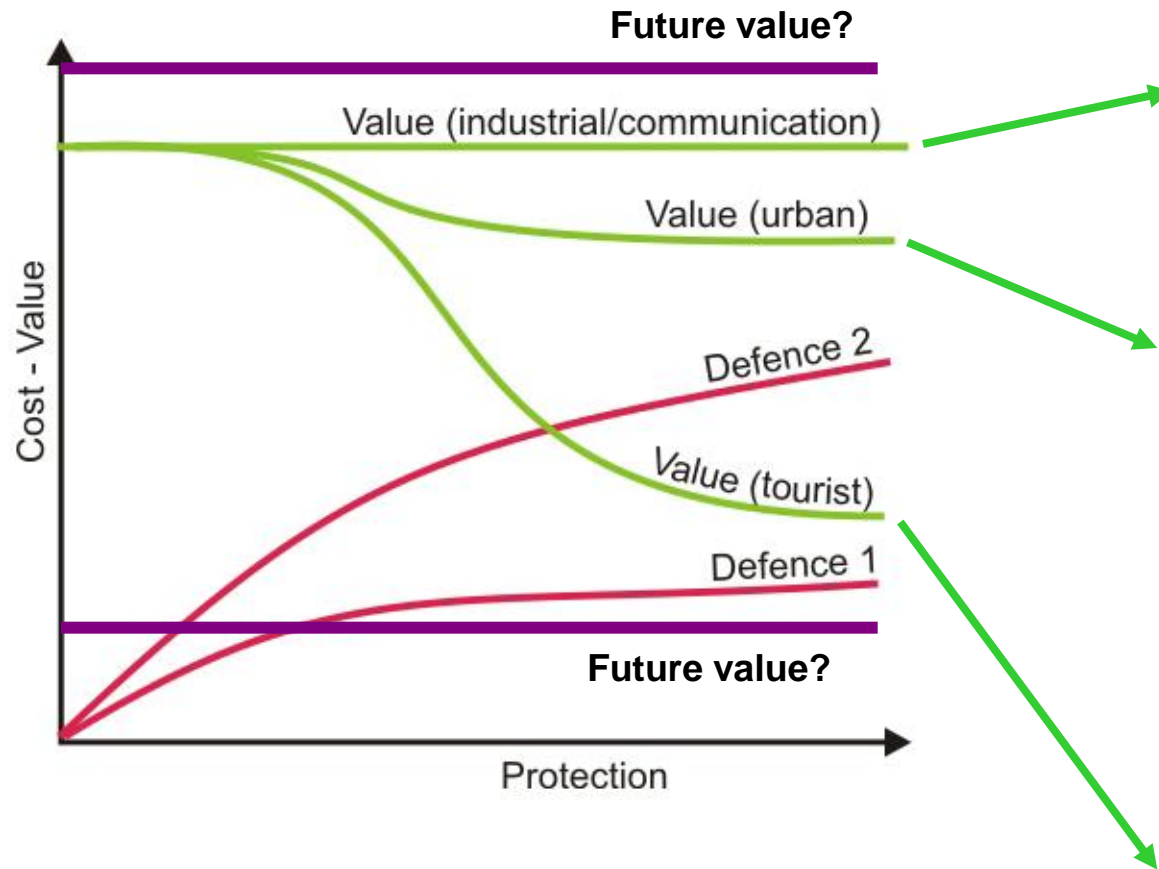


## **Decision making under deep uncertainty**

Making decisions when it is difficult or impossible to make quantitative estimates of the probabilities of alternative future conditions







Physical aspects

Data availability and reliability  
Model reliability  
Future data and models will produce different results?



Technical aspects

Present solutions: not suited to solving the problems!  
Faith in science: future technology will be more effective?



Economic aspects

Present value  
Future value  
Present economic resources (low!)  
Future economic resources (lower?)



Social aspects

Stakeholders' present expectations  
Stakeholders' awareness



Political aspects

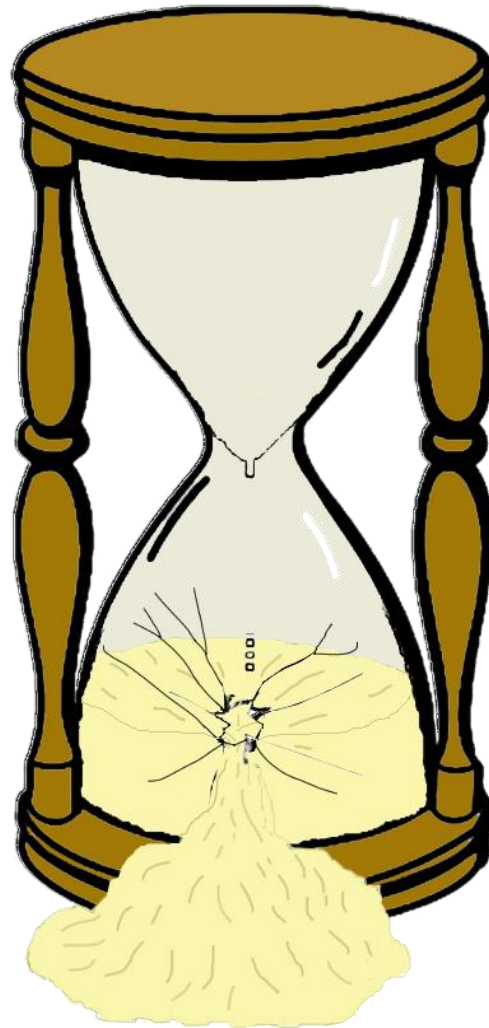
Clearing house of the contrasting interests/needs  
No short time political reward of long-term projects



**La clessidra si è rotta**

**Perde sabbia e nessuno la ricarica**

**Il tempo delle spiagge è finito!**







**Anche io mio!**  
**Grazie!**

