

CLIMATE INFORMATION BETWEEN PLANNING AND EMERGENCY: WHAT ARE THE NEEDS FOR A MUNICIPALITY

2° CLIM-RUN School
ICTP Trieste, 3.12.2013

CITTA' DI
VENEZIA



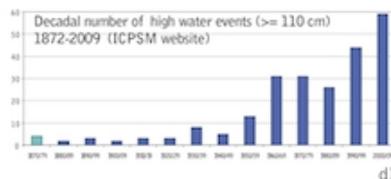
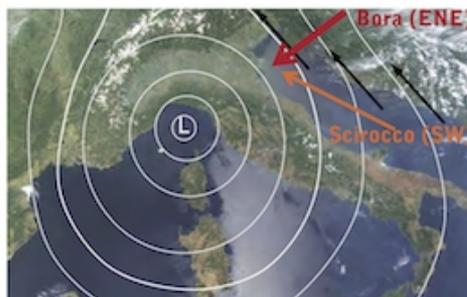
Sandro Caparelli
Comune di Venezia, sostenibilità urbana



VENICE AND ITS LAGOON

Total surface: 540 km², of which:
 - 8% land above sea level (littorals, reclaimed areas, islands, embankments)
 - 92% "watersystem": channels (11,9%), shallows, mud flats and salt marshes (80,1%).

TIDE GAUGE AND METEOROLOGICAL NETWORK



ACQUA ALTA

A sea level higher than 80 cm above the local datum of Punta Salute: the water begins to cover the lower areas of the city.

MAIN CAUSES

a) Low atmospheric pressure and winds (storm surge)

The presence of a low atmospheric pressure event on the Northern part of the Tyrrhenian sea results in a Southern wind (Scirocco) on the Adriatic sea

b) Sea surface oscillations (seiches)

Wind, or difference in atmospheric pressure between the two extremities of the Adriatic sea can produce a difference in the level of marine surface. Gravity always seeks to restore the horizontal surface of the basin.

Vertical harmonic motion results, producing an impulse that travels the length of the basin.

The impulse is reflected back from the end of the basin, generating interference. Repeated reflections produce standing waves, i.e. seiches which could be in phase with the highest level of the astronomical tide and lead to "acqua alta".

c) Tides

Semidiurnal tide: two maximum and two minimum tides each day. Micro-tidal basin: tidal range less than two meters.

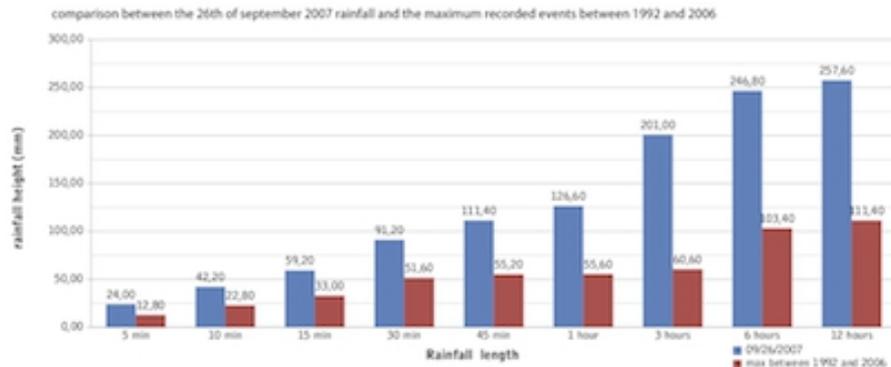
d) Trend

During the XX century the frequency of flooding tides higher than 110 cm has increased about 13 times. During the period 2000-2010 a number of 6 exceptional events (≥ 140 cm) occurred. Moreover, the eustatism due to climate changes and the phenomenon of land subsidence cause arise in the relative sea level, making the flooding tides more frequent.

METEOROLOGICAL EVENTS

During the morning of September 26, 2007 an intense and persistent storm system affected, with the strongest rainfall, the central eastern area of the Veneto region and, in particular, the Venetian mainland.

Convergence of winds in the lower layers of the atmosphere, thermal contrast between land and sea, convective phenomena fostered by the transport of warm moist air from the sea, led to precipitations so intense as to locally exceed 100 mm per hour and 200 mm in 3 hours.



The uniqueness of the event-for which it was calculated a return period of 150 years-is even more evident when one considers that the value of average annual rainfall in the coastal Venetian area is less than 800mm.





Publishes and updates the informations on the institutional web site and sends alert sms for citizens wich have signed up.

▲
City of Venezia - Civil Protection Departement

▲
Emits a critical alert with Civil Protection advice.

FLOODS

Regional Meteorological Center (ARPAV) ▶ Forcasts "intense" meteorological conditions. ▶ Decentralized Functional Centre of the Veneto Region

INDUSTRIAL RISK

Is the effect caused on the population by possible major accidents that may occur in companies located in the industrial area of Porto Marghera. Following an accident wich releases toxic substances from an industrial plant, the person in charge of the factory has to immediately report the incident to various entities, including the City. The Mayor and/or the prefect activates the siren system for alerting the population, integrating the communication by sending messages through variable-message signs, radio and local TV, text messages, posts on the city website recalling the common rules of conduct to be adopted during the emergency.

RED: high-risk industrial sites.
YELLOW: areas covered by the alarm system with sirens.



ACQUA ALTA

The ICPSM provides daily services informing citizens about the tide forecast through the ICPSM website, the graphic displays located in different points in the city, and local media. An automatic answering device and a SMS service are also available.



A call manager service is guaranteed for those citizens who live on the ground floor and for the owners of commercial activities in the historic city who live on the mainland.

Further information about the boardwalks, alternative public transport routes, city areas subjected to flooding, altimetical map of the city, and the colour code of tidal forecast are also available to the public.



Acousting Alarm System: 23 sirens alert citizens 3 hours in advance allowing the distinction between tide levels.

Every person has access to a free service which automatically sends an alert sms.

Institutions, public service companies, police and public security entities are also alerted by phone alarms.



Those who live or work on the ground floors use watertight bulkheads which avoid the entrance of water.

Citizens and owners of commercial activities have seen to the adaptation of electrical systems in order to guarantee its safe functioning



"climate information between planning and emergency"



ACQUA ALTA

The ICPSM provides daily services informing citizens about the tide forecast through the ICPSM website, the graphic displays located in different points in the city, and local media. An automatic answering device and a SMS service are also available.



A call manager service is guaranteed for those citizens who live on the ground floor and for the owners of commercial activities in the historic city who live on the mainland.

Further information about the boardwalks, alternative public transport routes, city areas subjected to flooding, altimetical map of the city, and the colour code of tidal forecast are also available to the public.



Acoustic Alarm System: 23 sirens alert citizens 3 hours in advance allowing the distinction between tide levels.

Every person has access to a free service which automatically sends an alert sms.

Institutions, public service companies, police and public security entities are also alerted by phone alarms.



Those who live or work on the ground floors use watertight bulkheads which avoid the entrance of water.

Citizens and owners of commercial activities have seen to the adaptation of electrical systems in order to guarantee its safe functioning



"climate information between planning and emergency"





focus on cities



it's not enough!
(it is too costly both in human and economic terms)

The screenshot shows the website 'Corriere delle Alpi' with a weather forecast of +1°C and 'NUBI SPARSE'. The main article is titled 'Gabrielli accusa: «Siamo senza cultura di protezione civile» - IL MEMORIALE - LA MOSTRA'. The article text includes: 'LONGARONE. «A Longarone e nei paesi del Vajont 1910 persone non ci sono più e oggi pretendono da noi un impegno che spesso non sappiamo dare, come istituzioni e come cittadini». La diga del Vajont incombe alle sue spalle mentre Franco Gabrielli sale sul palco della Fiera di Longarone per chiudere il convegno sulla "Pericolosità idraulica a valle delle dighe". Il capo del dipartimento nazionale di Protezione civile non spreca l'occasione del cinquantesimo anniversario della tragedia del Vajont e usa il suo tempo per fare un elenco di ciò che non va. «Questo Paese ha un problema culturale, perché nonostante tutto quello che ha vissuto non ha ancora una cultura di protezione civile». A fronte di una legge illuminata, seppur nata in uno degli anni più bui della storia d'Italia, il 1992, oggi il dipartimento nazionale di Protezione civile ha ancora grandi limiti: «Se è stato fondamentale affiancare la comunità scientifica al nostro lavoro per maturare scelte collegiali», sottolinea

Below the article, there is a section for 'Pannelli Solari a casa tua?' with an image of solar panels and the text 'Confronta fino a 3 Preventivi'. There are also social media sharing buttons for Google+, Twitter, Facebook, and Email.

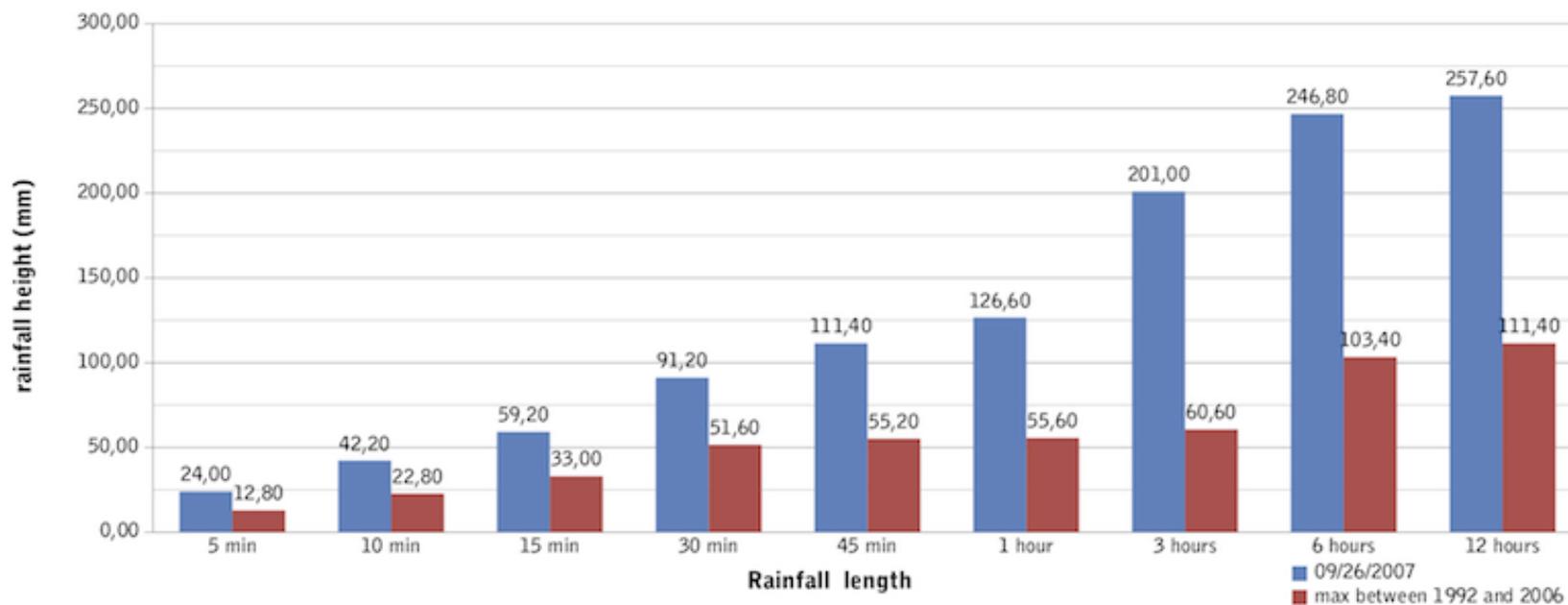
Italian 2014 budget:
30 mln €
for land restoration

Sardegna 19 nov 2013:
20 mln €
for Disaster Recovery

we need more prevention

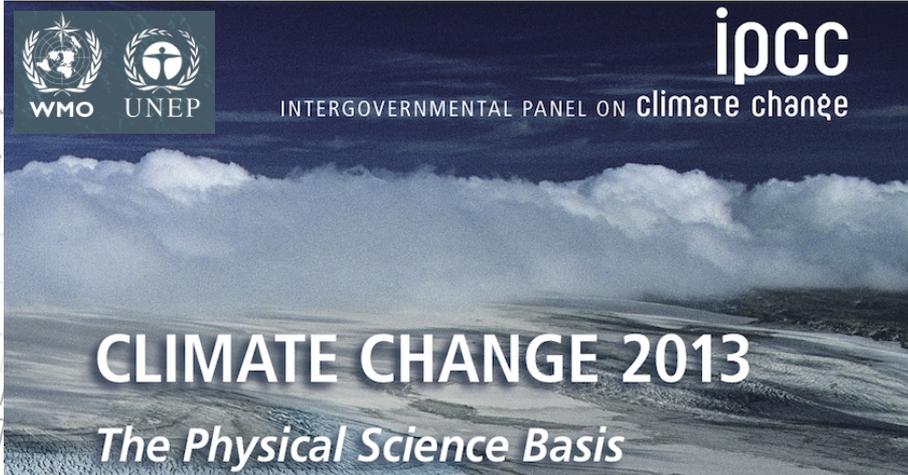
extreme events get worst

comparison between the 26th of september 2007 rainfall and the maximum recorded events between 1992 and 2006



Sardegna 19 nov 2013: 450mm/24h (half than annual rainfall)

we must tackle the climate change

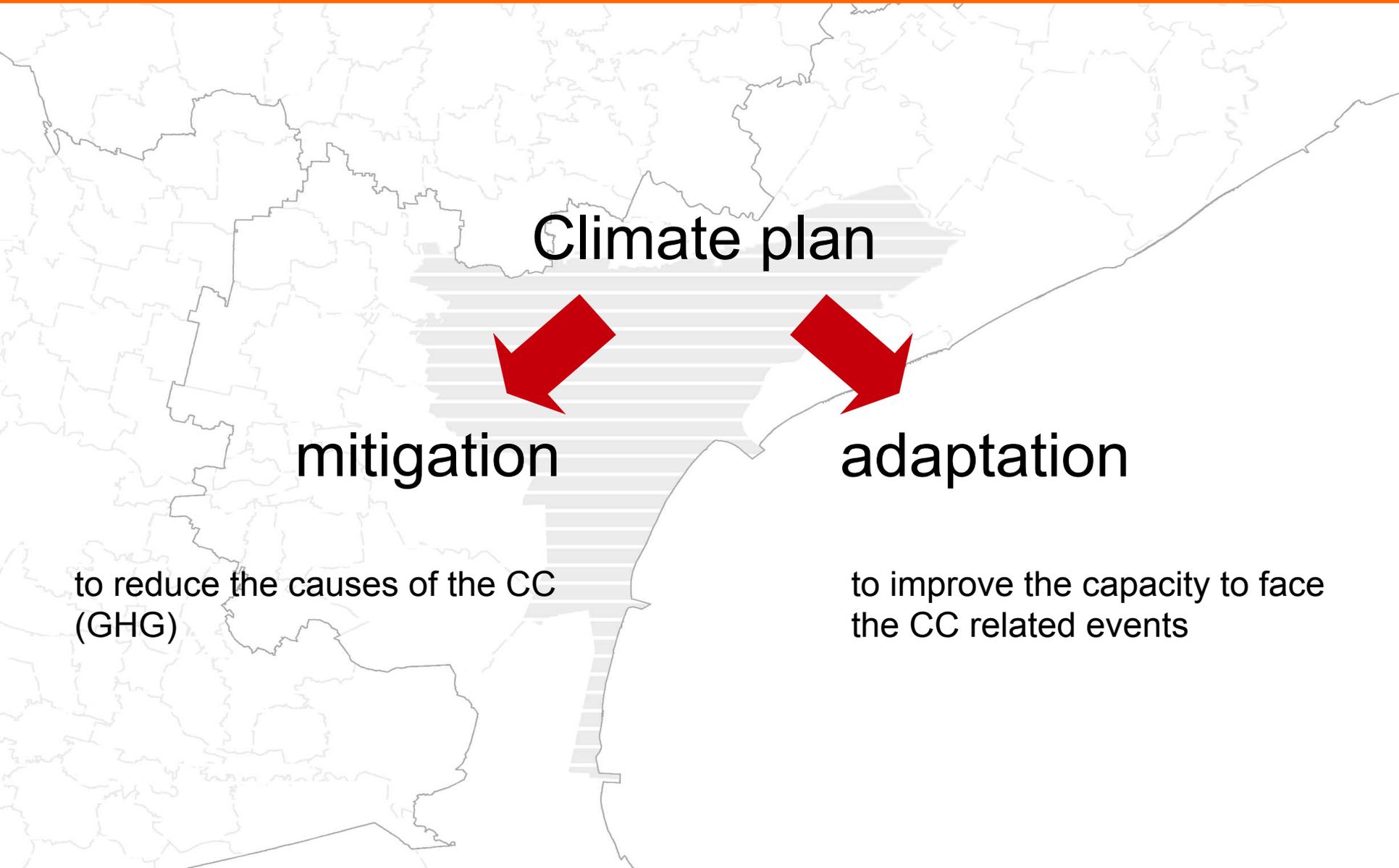


Fifth Assessment Report of the Intergovernmental Panel on Climate Change

Observational and model studies of temperature change, climate feedbacks and changes in the Earth's energy budget together provide confidence in the magnitude of global warming in response to past and future forcing.

Changes in the global water cycle in response to the warming over the 21st century will not be uniform. The contrast in precipitation between wet and dry regions and between wet and dry seasons will increase, although there may be regional exceptions.

**there is no longer the option of waiting for major certainty
now it's important to take into account the range of possible changes**



Climate plan

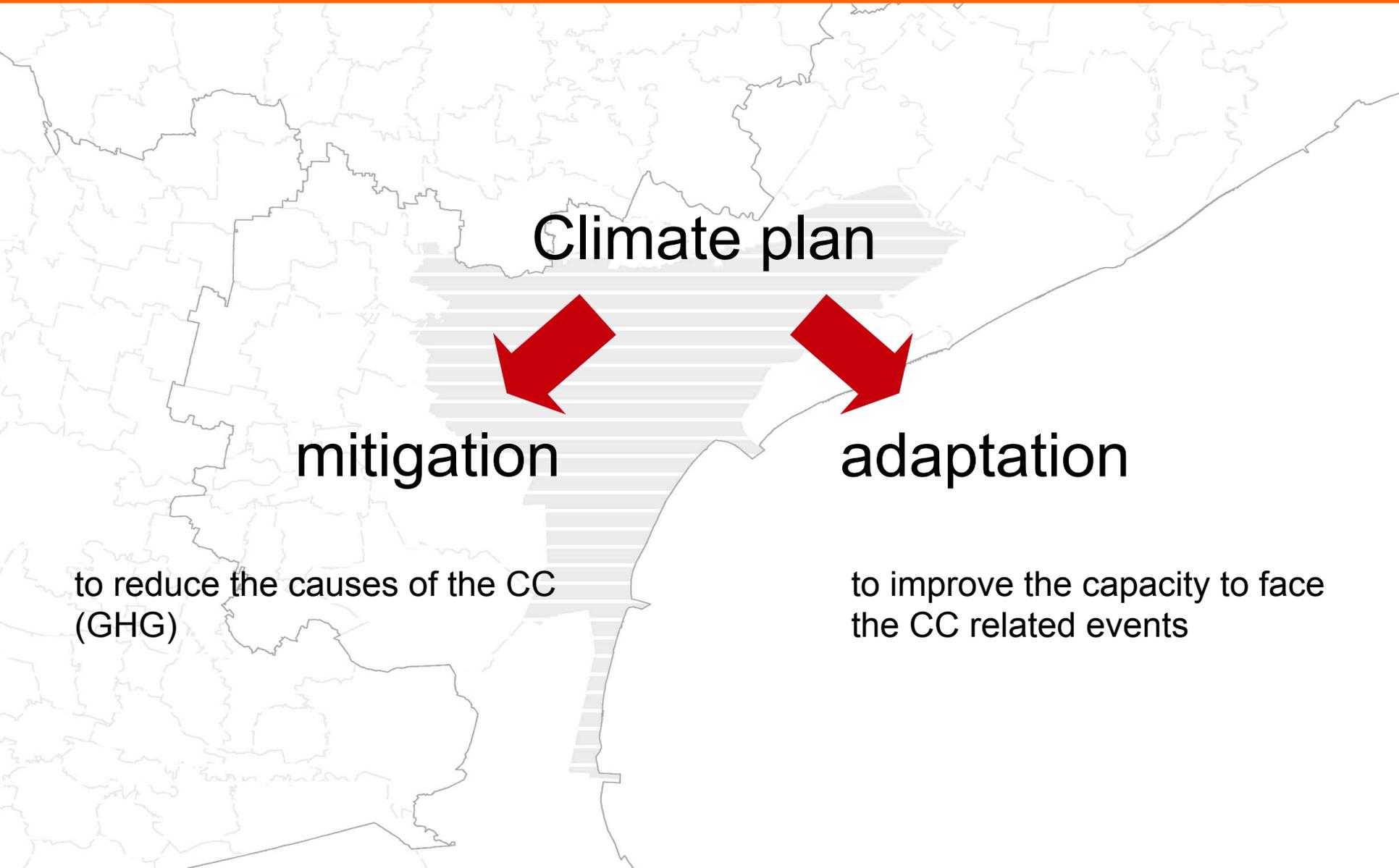
mitigation

to reduce the causes of the CC
(GHG)



2012: Venice's Sustainable Energy Action Plan



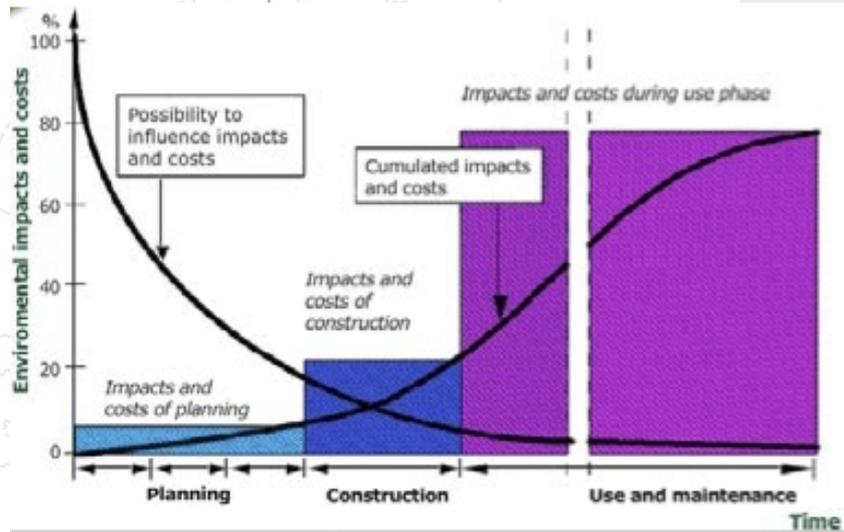


Climate plan

it's time to adapt!

adaptation

to improve the capacity to face the CC related events





new diseases

changes in animal populations

biodiversity (environment and agriculture)

tourist seasons

heat islands

CITY

fires

drought

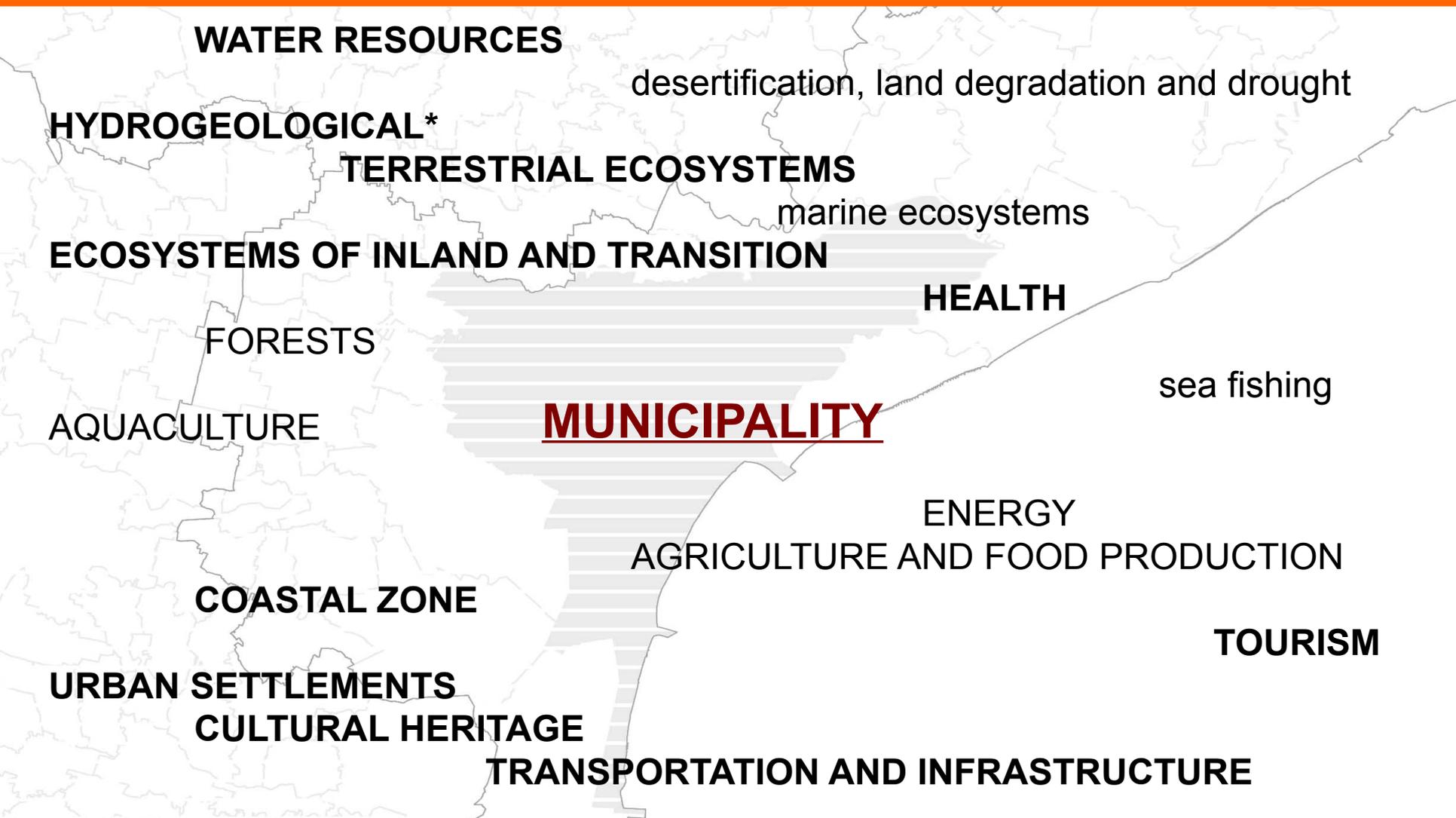
floods and overflows (sea + rivers)

climate refugees and migrants

heavystorms



"climate information between planning and emergency"



Cities are the large majority of the energy is consumed

Cities are interdependent and especially vulnerable to climate change

Cities are home to a majority of people

Adaptation requires local knowledge

city based approach

- Climate leadership starts at the most local scale possible
- Solutions become smaller and simpler, more diverse and distributed (faster learning)

Only when the more localized solutions are impractical, uneconomic or undependable does the design focus on the next scale up.

I.C.L.E.I
Local Governments for Sustainability
www.iclei.org

Eco² Cities
Ecological Cities as Economic Cities
www.worldbank.org/eco2

"climate information between planning and emergency"



we have to consider the scenarios of climate change in planning our cities and project us deep into the future

we need to imagine our future cities in a safe, functional, sustainable way

we must prevent that, to the conclusion of the works, the future is already past



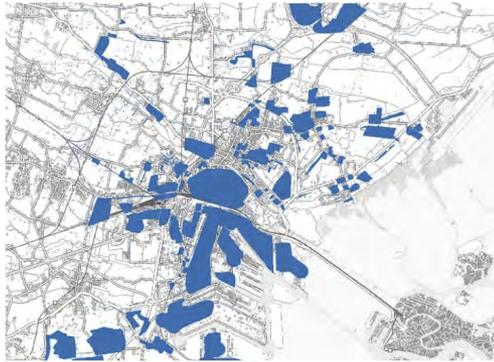
climate plan
long term planning

"climate information between planning and emergency"



coordination of responsibilities and government levels

The flooded areas in 09/26/2007

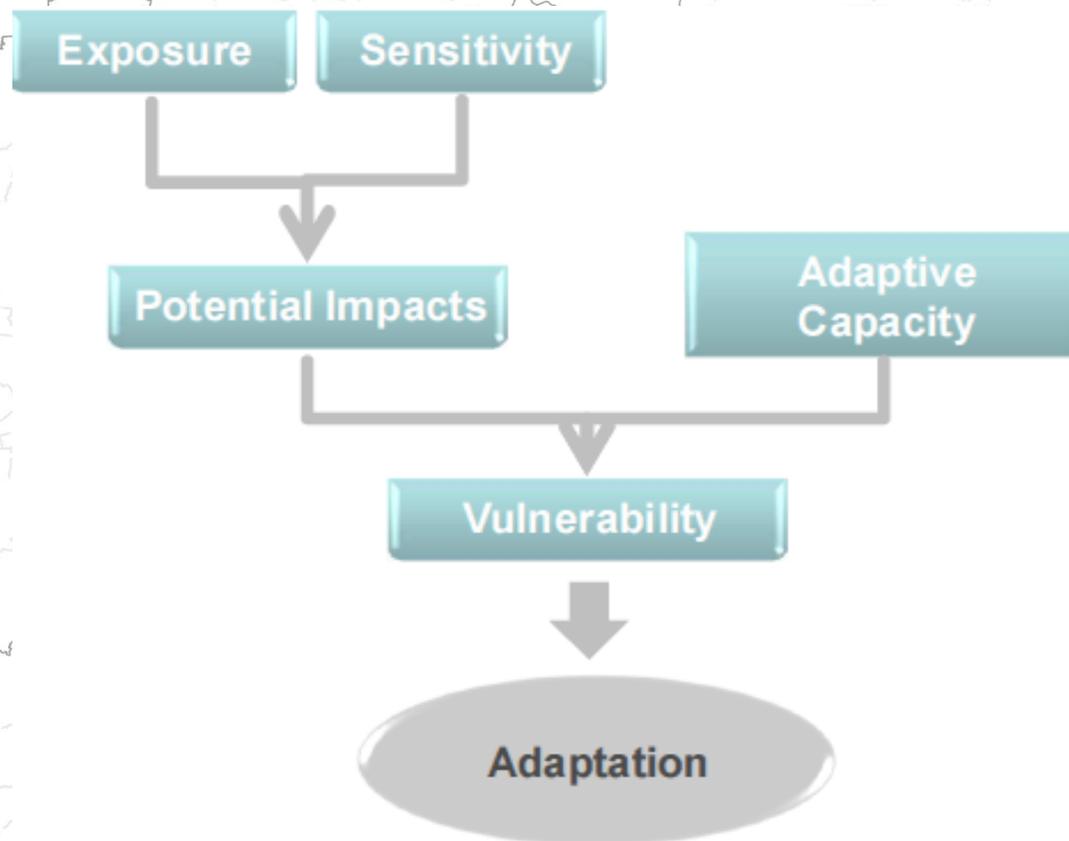


The 400 planned interventions by the Commissioner

20 days after the flood, the national government has appointed a **Special Commissioner** with the task to restore the safety conditions in the flooded areas. The Commissioner has also issued some ordinances for the “hydraulic compatibility assessment” and for prevention from flooding and mitigation of the effects

more than 350 mln euros for the 400 commissioner's interventions
2013 municipality budget for land restoration: 21,5 mln euros

what we need for climate planning



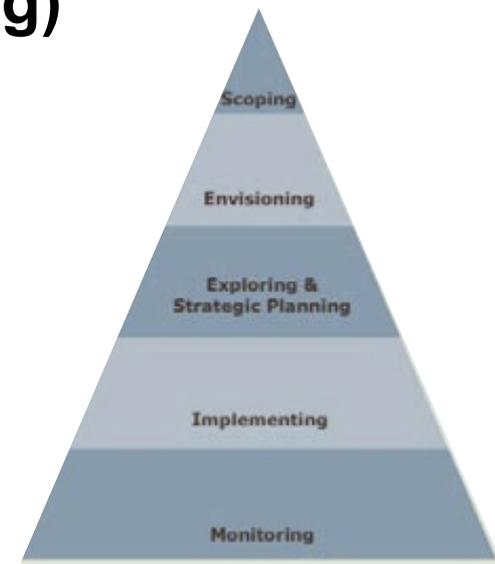
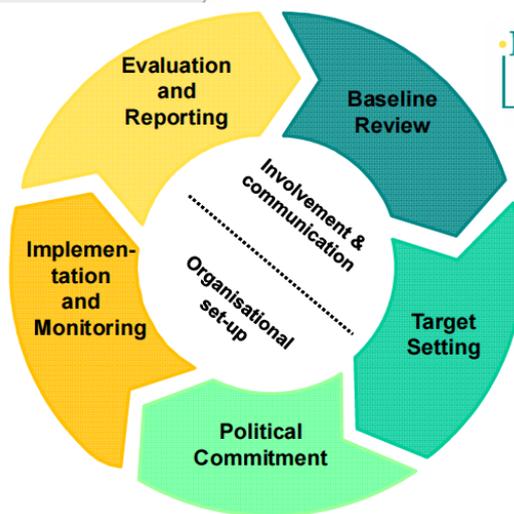
"climate information between planning and emergency"



what we need for climate planning

think

**strategic
creative
olistic (mainstreaming)**



"climate information between planning and emergency"



what we need for climate planning

1. City as Corporation

Council
Departments

2. City as Provider of Services

Administration
Utilities
Agencies

3. City as Leader in Urban Region

Industry
Property Owners
Rural Fringe & Adjacent Communities
Watershed
Agricultural and Forest Lands

- Purchase labelled high efficiency products only
- Follow guidelines for life cycle cost evaluation
- Report annually on energy efficiency targets and performance for public facilities
- Upgrade public buildings
- Convert feet and buildings to low-carbon energy sources
- Upgrade lighting, electrical appliances, medical or laboratory equipment

- Upgrade water, wastewater, and solid waste facilities
- Align transport planning with land use and climate mitigation
- Manage city-wide performance in each sector using whole- system perspective (cascading, looping, layering of resource flows)

- Work with energy utilities and regional energy agencies to provide green energy options for electricity delivered to the city
- Work with National government on minimum energy performance standards for buildings and appliances
- Work with regional government, adjacent jurisdictions and others to develop efficient containment and growth management planning
- Arrange for Energy Saving Performance Contracts for high- demand properties

work on the city as a whole

what we need for climate planning

cooperative approach with the community



Community engagement improves quality, ownership, acceptance

Engagement can also:

1. Facilitate autonomous adaptation
2. Increase social capital
3. Promote and enable community-based adaptation

what we need for climate planning

clear and persuasive communication

because of climate change, the scientific community expects the progressive intensification of intense rainfall events (as is the case of the 2007 flooding) ...



"I do not think this event can be attributed directly to climate change. Rather it is a "preview" of events that can be repeated more frequently in a changing climate..."



it's helpful to see the extreme rainfall event of September 2007 (which resulted in the flooding of the Venetian mainland) as a sort of preview of the phenomena expected in the future projections in our possession today. When we bring this kind of example, it's necessary to specify that it is the intensity of the event to represent a preview, while the effects on the city mainly depend on the capacity of the infrastructure to absorb such an event.

what we need for climate planning

forward-looking decisions and immediate actions



The screenshot shows a web browser window displaying a news article. The browser's address bar shows the URL: http://www.corriere.it/cronache/11_maggio_14/burchia-muro-fudai_74adc98c-7e27-11e0-b8e5-ff5d2143f9c2.shtml. The article title is "Il muro della discordia ha protetto Fudai" and the subtitle is "Alto 16 metri, fu contestato dai cittadini. Ora fiori e biglietti sulla tomba del'ex sindaco che lo fece costruire". The article text discusses how a 16-meter tsunami barrier saved the town of Fudai, Japan, from a tsunami in March. It mentions that the barrier was initially criticized as a waste of public money but is now celebrated as a heroic act. A small photo shows the barrier, and a larger photo shows a woman walking in a field.

Il muro della discordia ha protetto Fudai - Corriere della Sera

http://www.corriere.it/cronache/11_maggio_14/burchia-muro-fudai_74adc98c-7e27-11e0-b8e5-ff5d2143f9c2.shtml

Corriere della Sera - Cronache - Il muro della discordia ha protetto Fudai

Share 1.2K Tweet 45

LA CITTADINA DEL NORD EST DEL GIAPPONE E' USCITA ILLESA DALLI TSUNAMI

Il muro della discordia ha protetto Fudai

Alto 16 metri, fu contestato dai cittadini. Ora fiori e biglietti sulla tomba del'ex sindaco che lo fece costruire



La barriera anti-tsunami a Fudai è alta 16 metri

MILANO - Fudai è una piccola località di 3000 abitanti sulla costa nord-orientale del Giappone. L'11 marzo scorso è uscita quasi indenne dal disastro dello tsunami provocato dal terremoto. Come per miracolo non ci sono stati morti o danni. Grazie soprattutto all'ex sindaco Kotaku Wamura che, negli anni Settanta, fece costruire un gigantesco muro a protezione della cittadina. In un primo momento deriso e insultato per quella barriera anti-tsunami alta quasi 16 metri, oggi il politico oramai defunto viene celebrato come un eroe.

OPERA SPROPORZIONATA - Le critiche sono continuate per diverso tempo. «Spreco di denaro pubblico»; «una bruttura»; «un'opera insensata e sproporzionata», gli rinfacciavano i cittadini. Il pomo della discordia era il progetto di costruzione di una parete di 16 metri in periferia che doveva difendere la località dalle onde di uno tsunami. Anche perché i villaggi e le città vicine facevano affidamento su strutture di protezione più piccole. La domanda che tutti si ponevano con insistenza era: «Perché Fudai ha bisogno di una simile costruzione?». Il sindaco, però, non si piegò e non si fece persuadere. La costruzione anti-tsunami da 25 milioni di euro doveva assolutamente essere eretta.

BARRIERA DI SALVEZZA - Oggi quell'interrogativo ha trovato una risposta chiara: quella parete ha salvato la vita ai 3000 abitanti di Fudai. Tutto intorno l'apocalisse, con villaggi e città rase al suolo. Per Fudai e i suoi cittadini, invece, solo un terribile spavento. Le gigantesche mareggiate sono infatti rimbaltate sull'alto muro. «È costato parecchio», ha raccontato Satoshi Kaneko



OGGI ANNA HA MIGLIORATO IL SUO RECORD

PIÙletti

what we need for climate planning

accurate data supply:

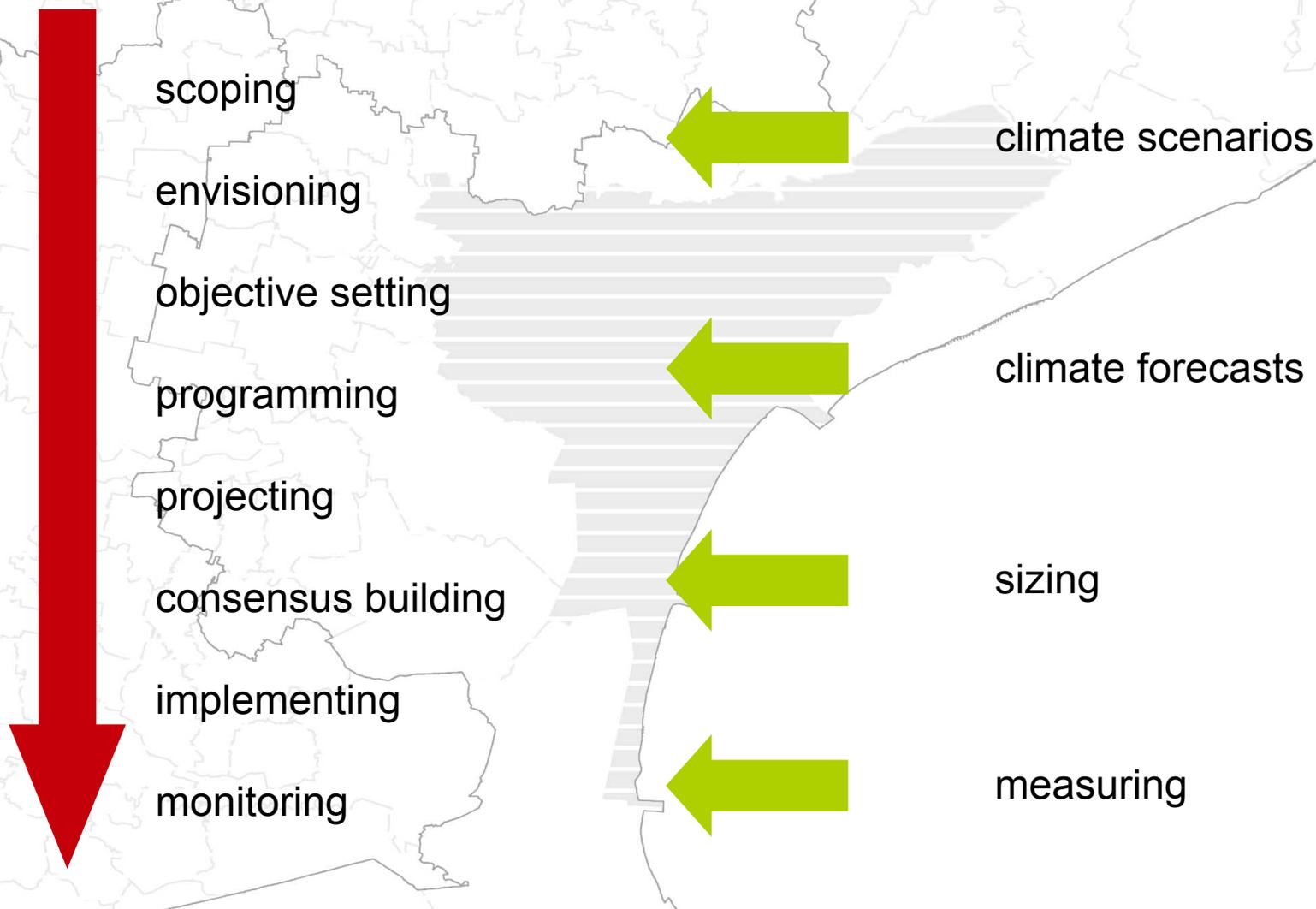
climate scenarios (> 50 years)

climate forecasts (9 – 12 months)

weather forecast (tomorrow!!!)



relations between data and steps of planning



"climate information between planning and emergency"



Pathway to Sustainability

