



Built Environment
leArning for Climate
AdaptatiON



Flexible adaptation strategies to coastal flooding enhanced by climate change in Macaronesia coastal urban areas. LIFE GARACHICO Project

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Project co-funded by



LIFE20 CCA/ES/001641



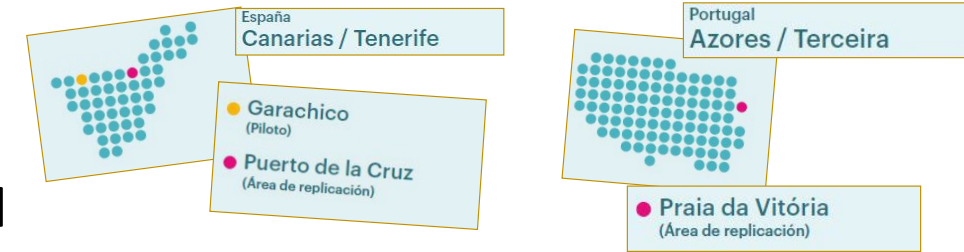
L-Università ta' Malta



Co-funded by the
Erasmus+ Programme
of the European Union

LIFE GARACHICO Project

Flexible adaptation strategies to coastal flooding enhanced by climate change in Macaronesia coastal urban areas



Subprogram:
Climate action

Priority area:
Climate Change Adaptation

Demonstration projects: projects that implement, test, evaluate and disseminate actions, methodologies or approaches that are new or unknown in the specific context of the project, such as geographical, ecological or socioeconomic context, and that could be applied elsewhere under similar circumstances.

Budget / EU contrib.:
2.638,132 € / 55%

Duration:
2021 - 2026





Outline

- Motivation
- Objectives
- Methodology
- Conclusions





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Motivation



La Palma volcanic eruption 2021



Garachico village was founded on a low island





Motivation

17/11/2018



Motivation



17/11/2018

Extreme coastal flooding episodes



Economic losses

Garachico
(800.000€/year 4-5 years, Nov. 2018)

Macaronesia
(>250 M€ in the last decade)

Social losses

Motivation

17/11/2018



Extreme coastal flooding episodes

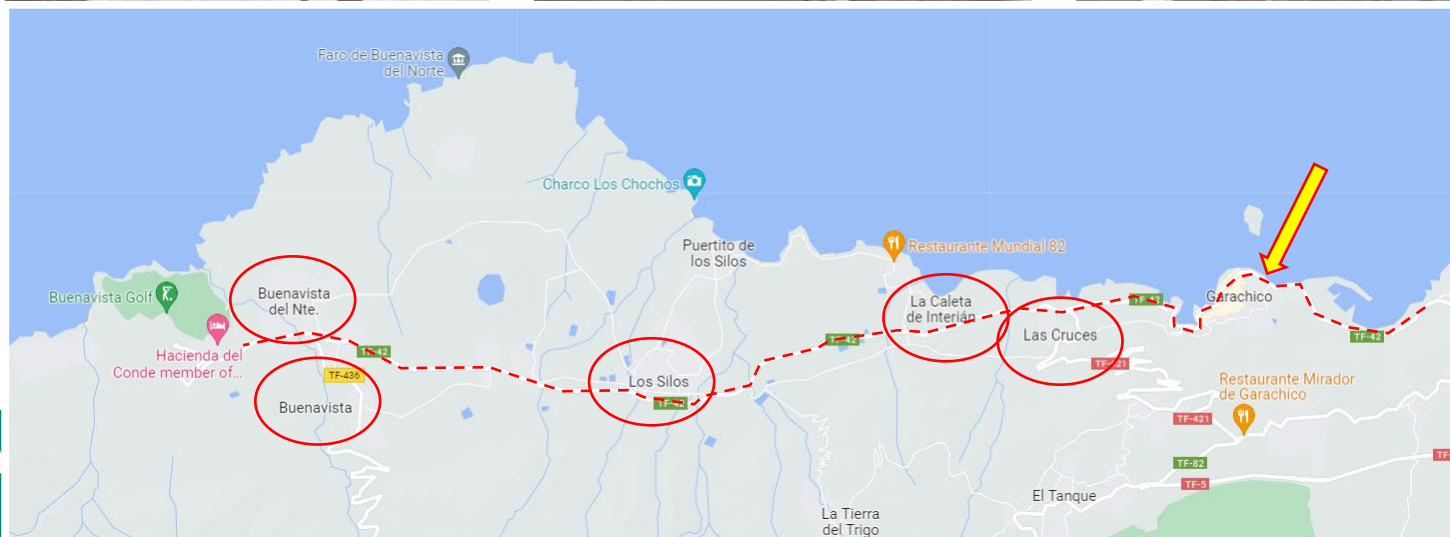


Economic losses

Garachico
(800.000€/year 4-5 years, Nov. 2018)

Macaronesia
(>250 M€ in the last decade)

Social losses



Motivation

How could CC affect local people?

Which is the vulnerability of local people?

People



How could we protect local people from CC impacts?

Which are the implementation limitations or barriers? (acceptance level)

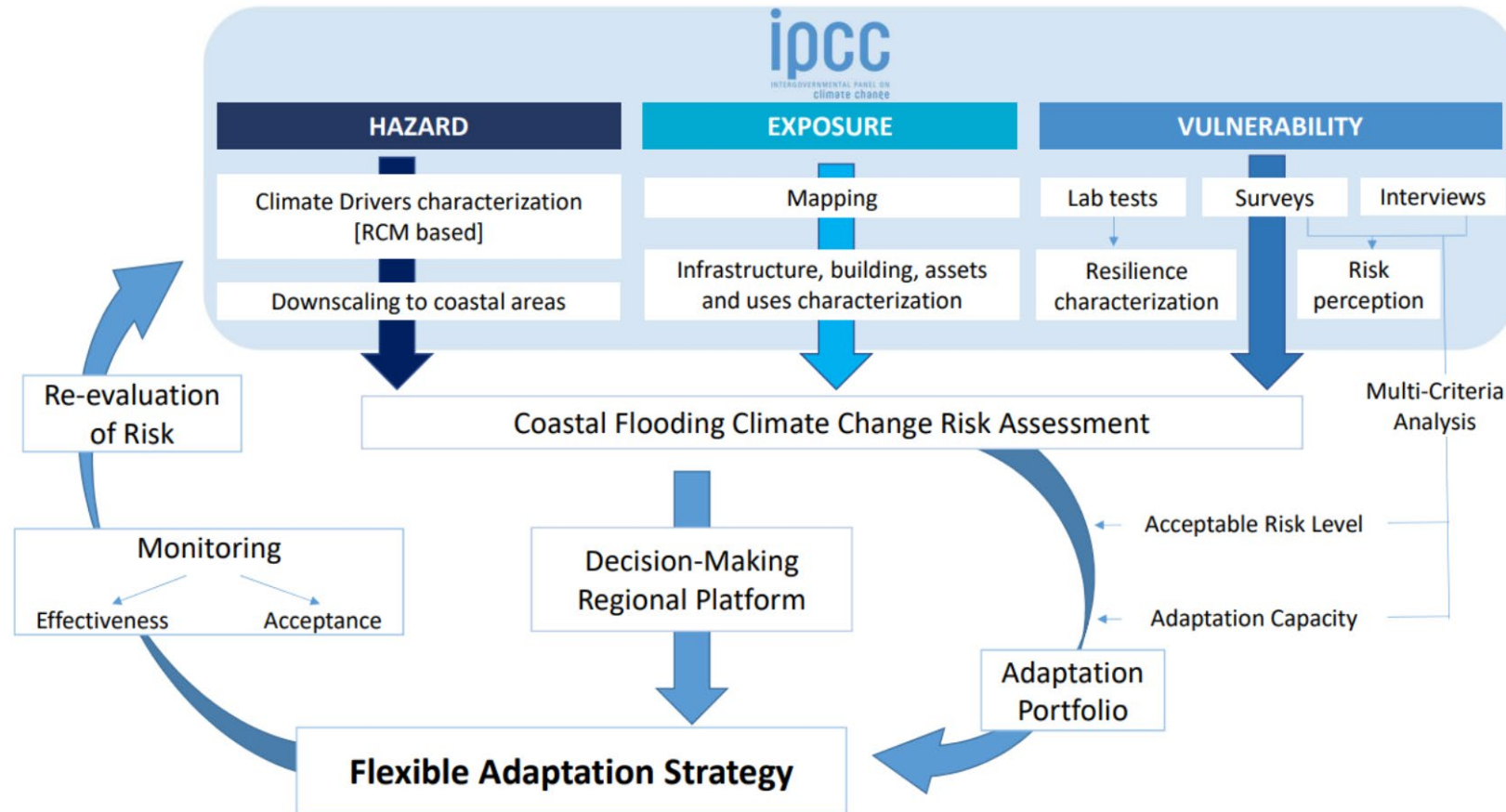
Main objective

To develop a methodology to create a **Flexible Adaptation Strategy Framework (FASF)** in Macaronesia **urban island environments**, based on the **assessment of acceptable risk levels** and on **specific interventions** at the local level, in order to **increase the resilience** of these areas to current and future extreme coastal events due to **climate change**.

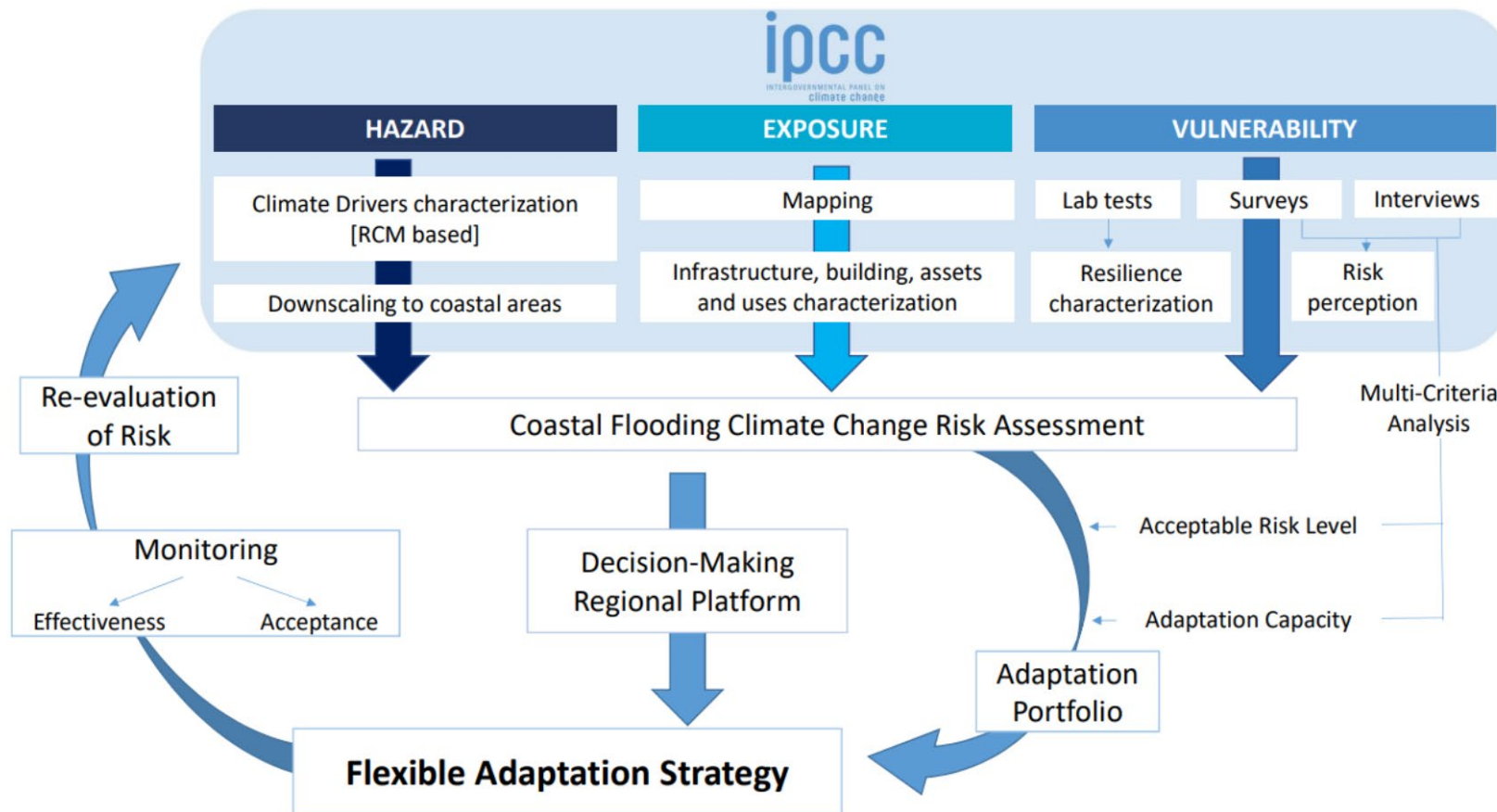


Pilot case: Garachico

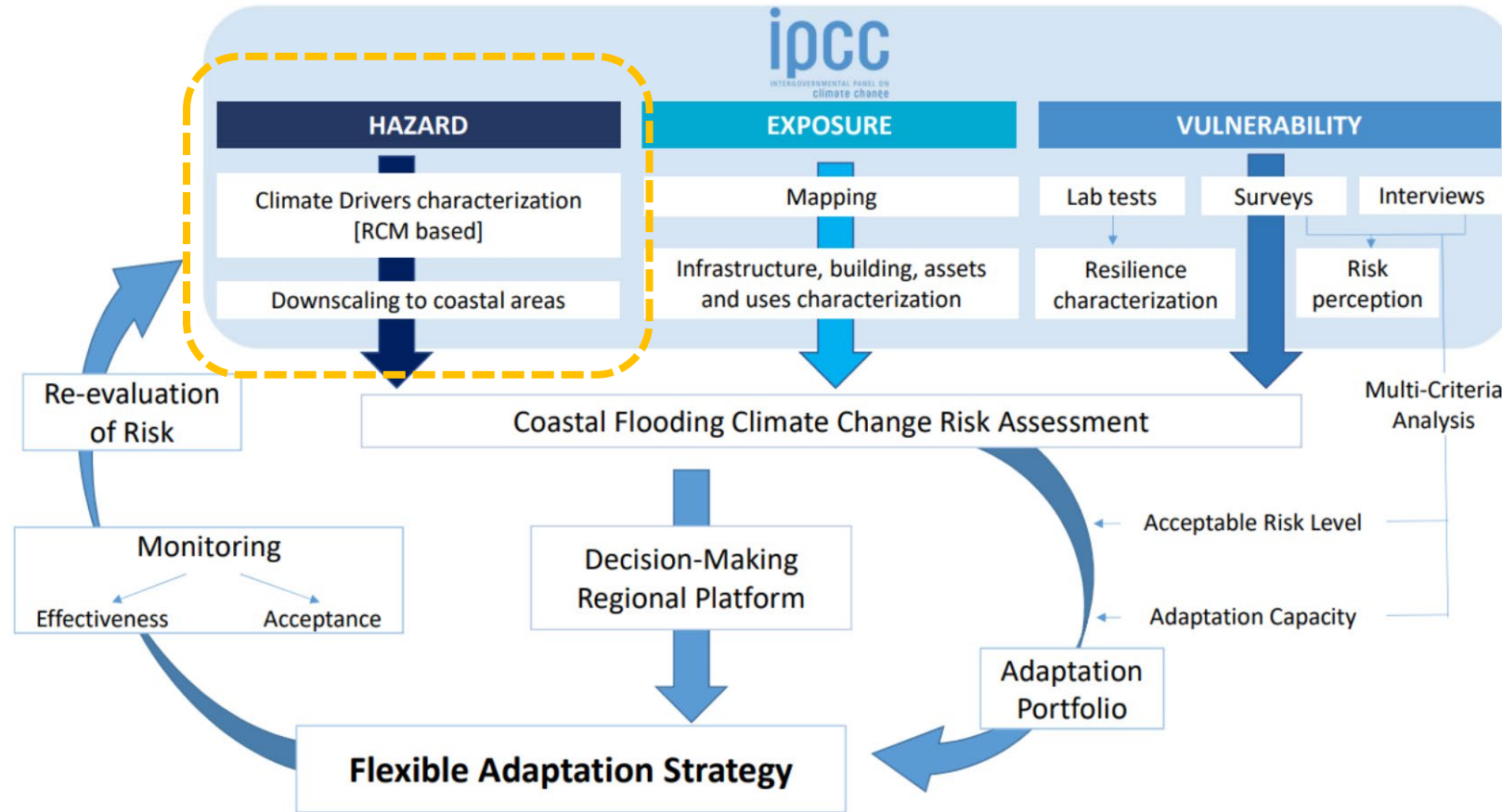
Methodology



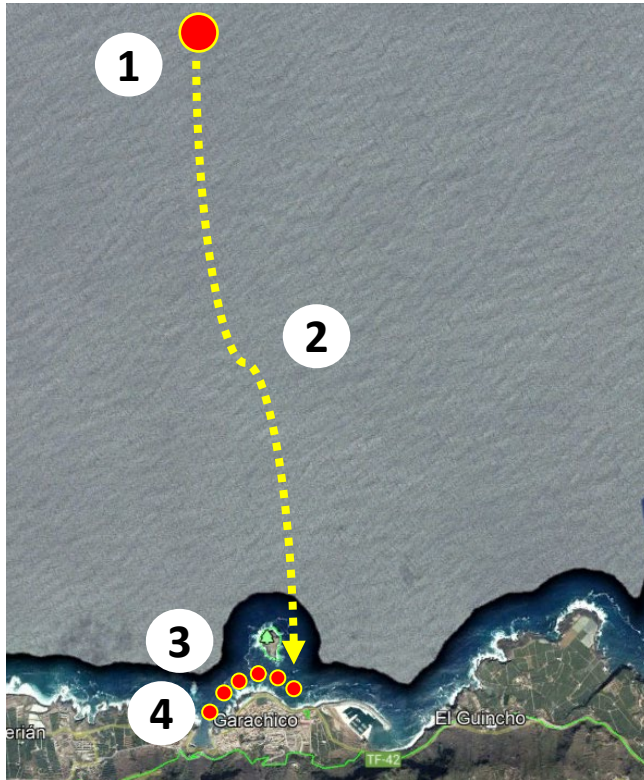
Methodology



Methodology - Hazard



Methodology - Hazard

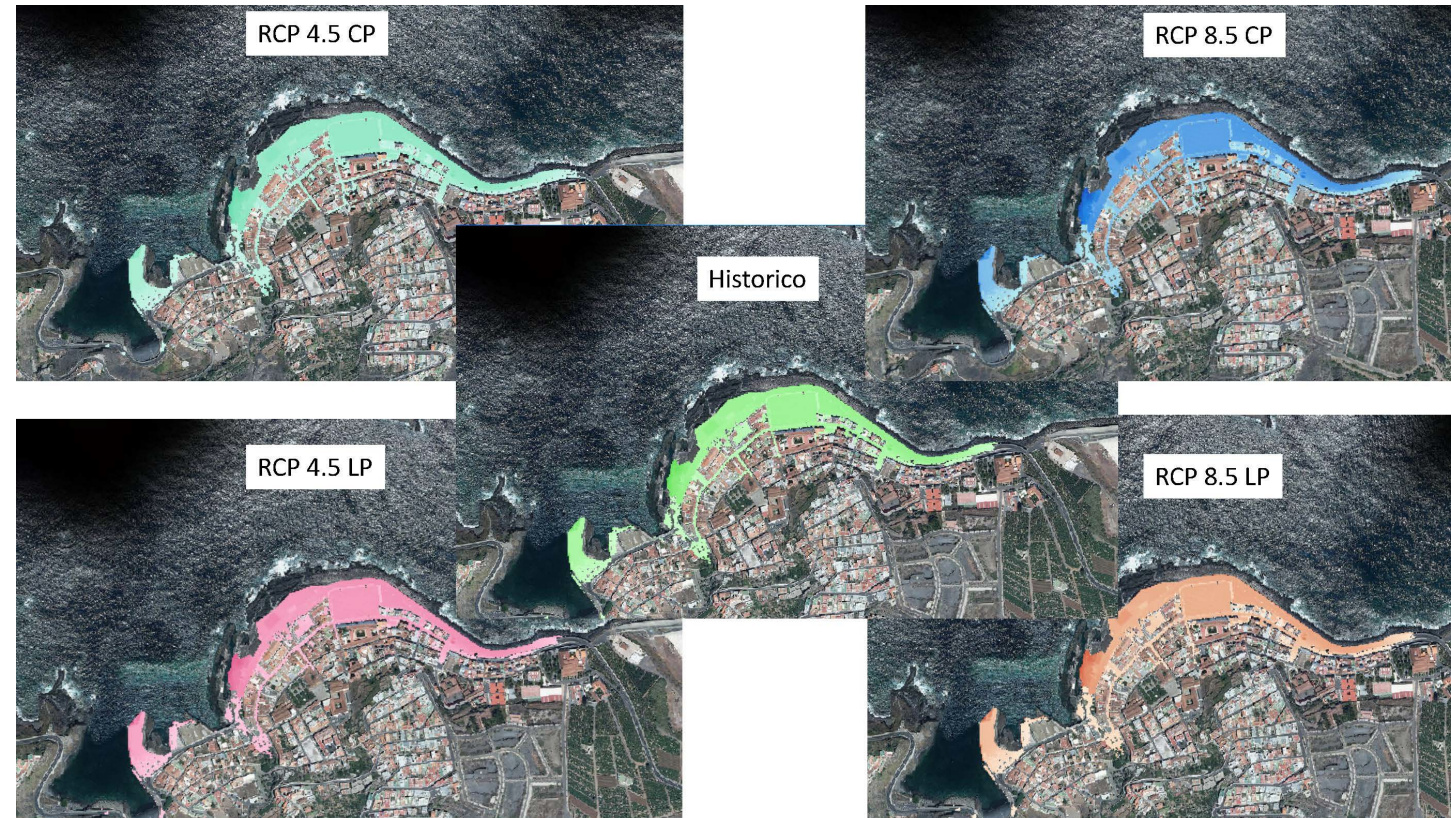
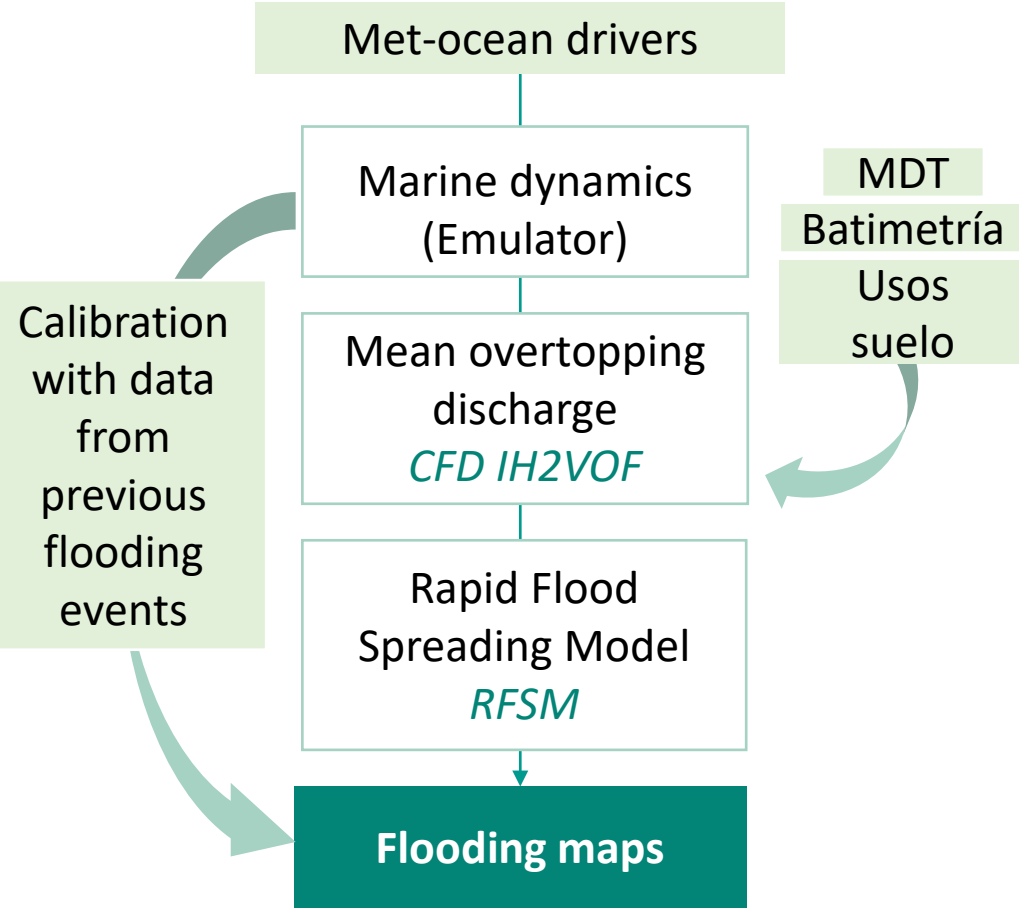
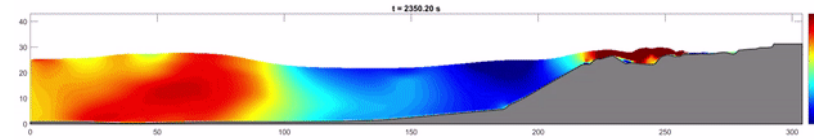


- 1 Synthetic generation of multivariate extreme wave and level events
Wave emulator: 6 RCMs/3 periods with 20-year multivariate hourly time series
- 2 Statistical-numerical propagation to the coast while considering a probabilistic evolution of mean sea level rise
- 3 Reconstruction of the time series in the coastal front
- 4 Characterization of the extreme wave and level regime in the coastal front

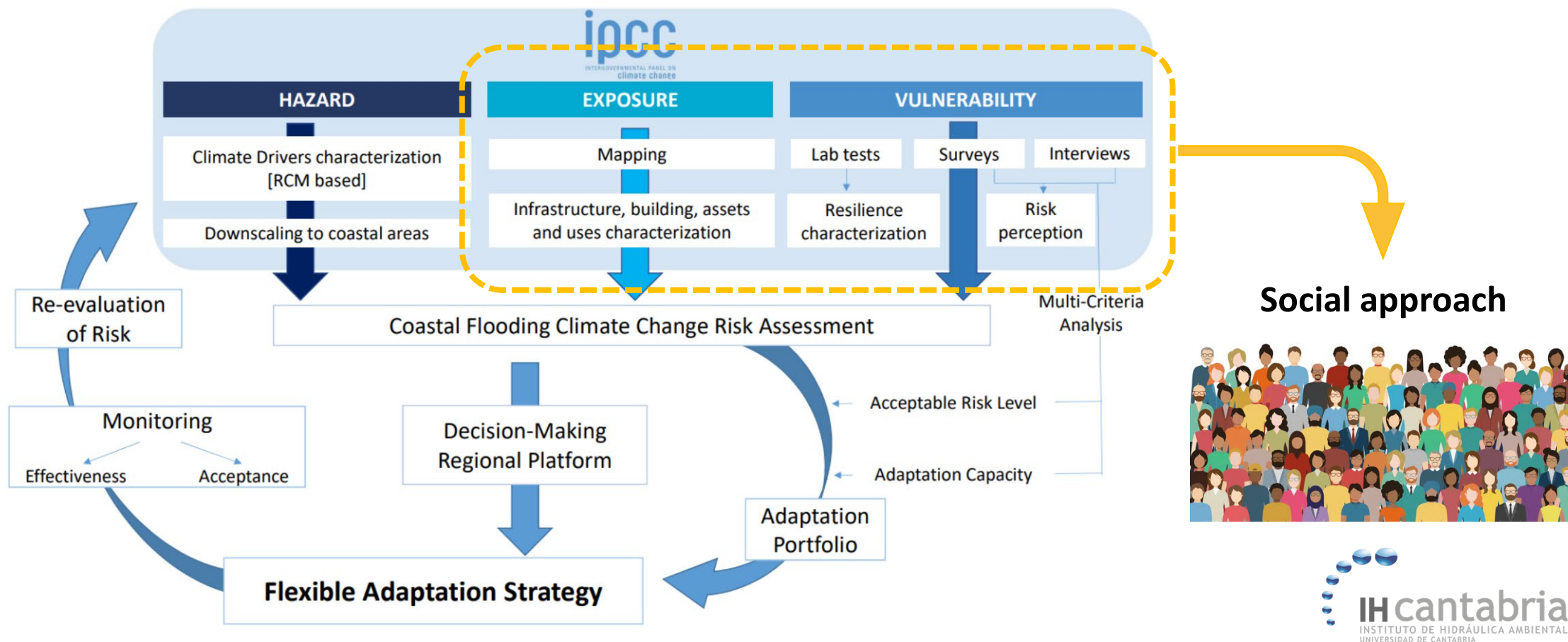




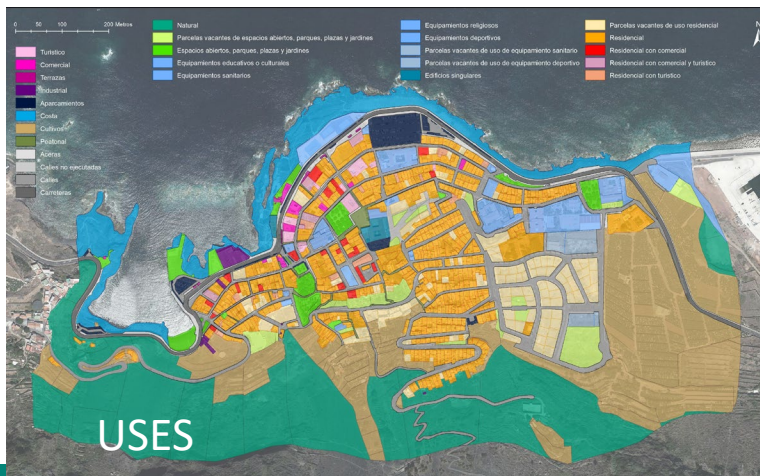
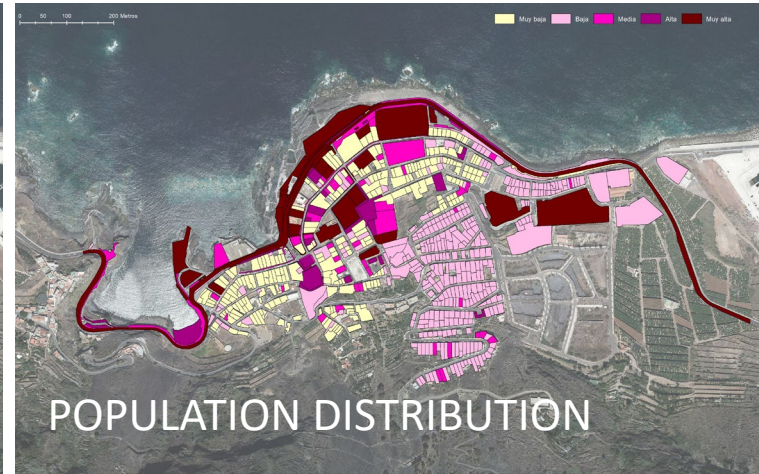
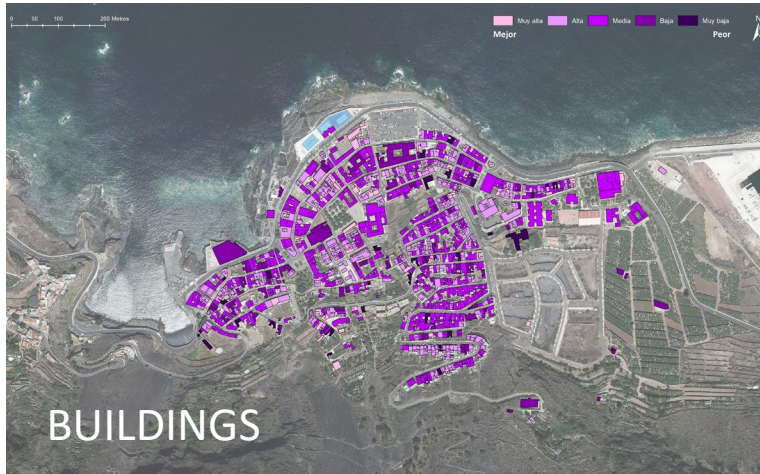
Methodology - Impact



Methodology – Exposure and Vulnerability



Methodology - Exposure

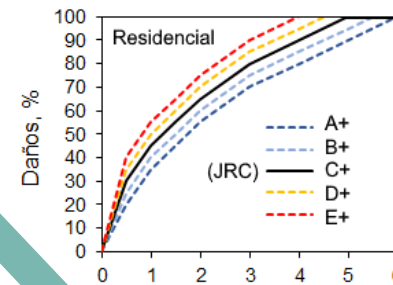


Methodology - Vulnerability

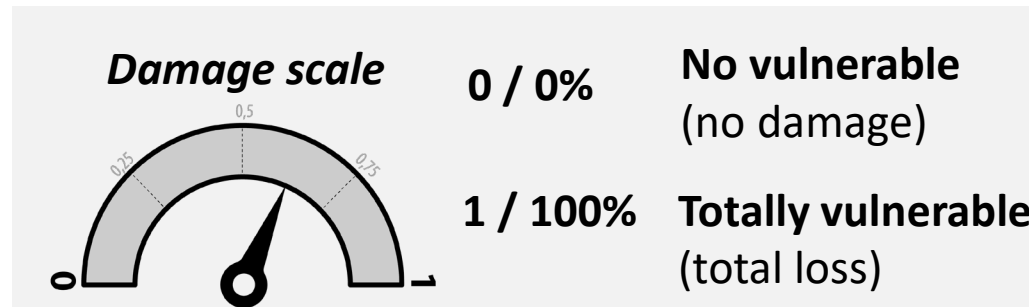
Exposure
Population
Uses
Buildings
Street furniture + singular elements
Natural heritage
Cultural heritage



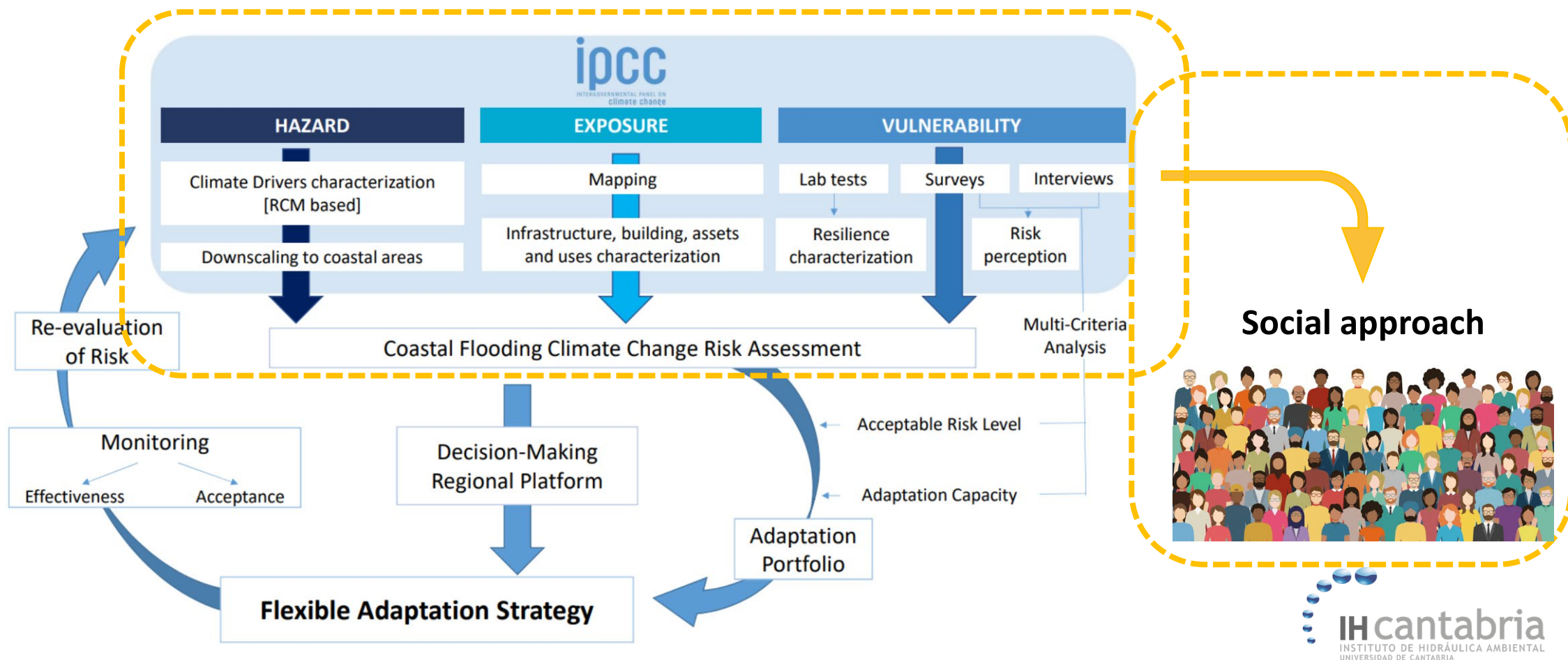
Vulnerability



Damage curves



Methodology - Social approach





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Methodology - Social approach

Which is the importance of local elements?

Which is the risk perception of local people?

Which is the acceptable risk level?

Is local people confident about the project?

Surveys / Tests / Participative mapping

Participative group sessions



Contract ID: 38



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Methodology - Social approach

Which is the importance of local elements?

Which is the risk perception of local people?

Which is the acceptable risk level?

Is local people confident

Surveys / Tests / Participative mapping

Exposure

Risk/Impact perception

Acceptable risk

Identification of additional elements

Vulnerability

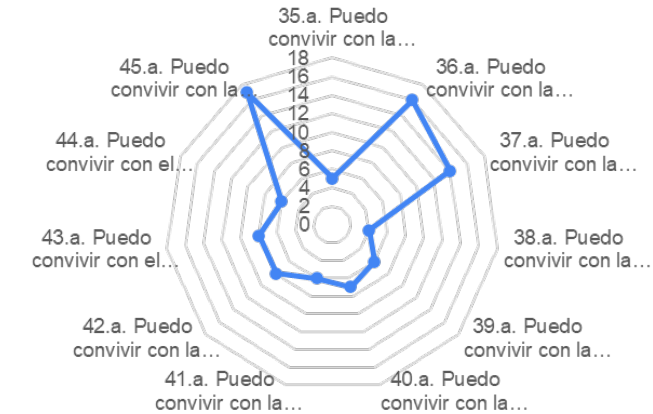
Risk

Risk

Risk calibration

Risk calibration

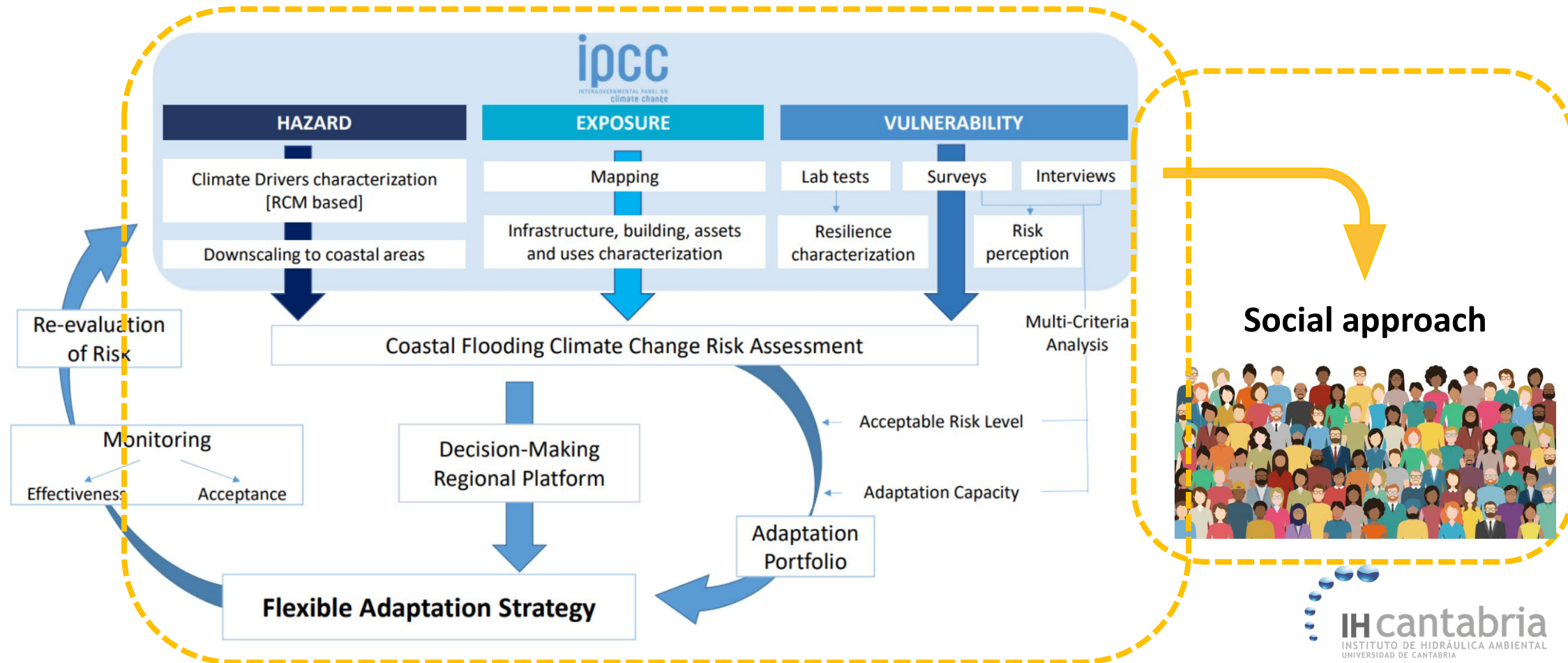
Adaptation measures



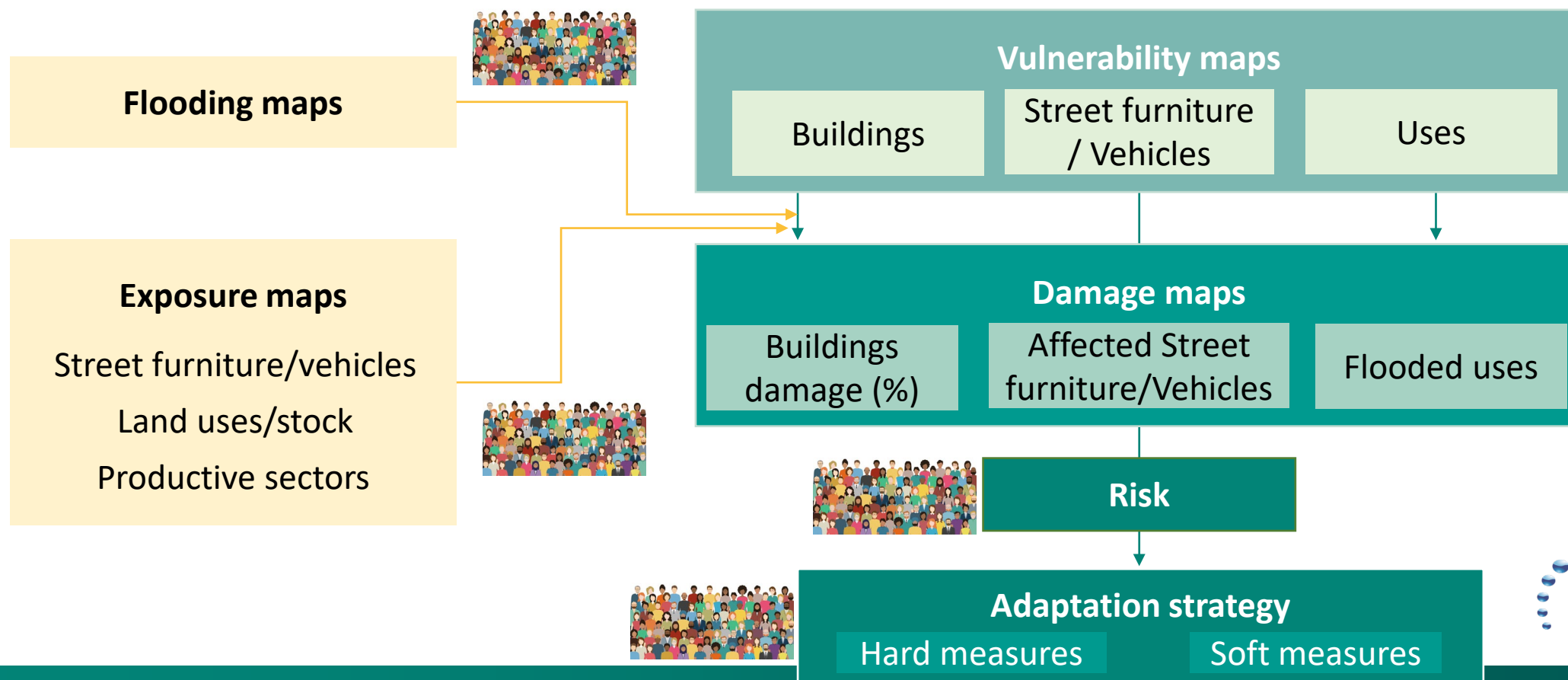
Higher acceptance levels

Priorities identification

Methodology – Risk and adaptation



Methodology – Risk and adaptation





Methodology - Adaptation

Hard measures

Reduction of risk level by implementing **constructive interventions**:

- ✓ **Constuction of anti-impact benches**
- ✓ **Drainage system re-design**
- ✓ **Reduction of parking lot on the maritime front**
- ✓ **Assistance/guidance in the reinforcement of private elements**

Reduce exposure and impacts!!



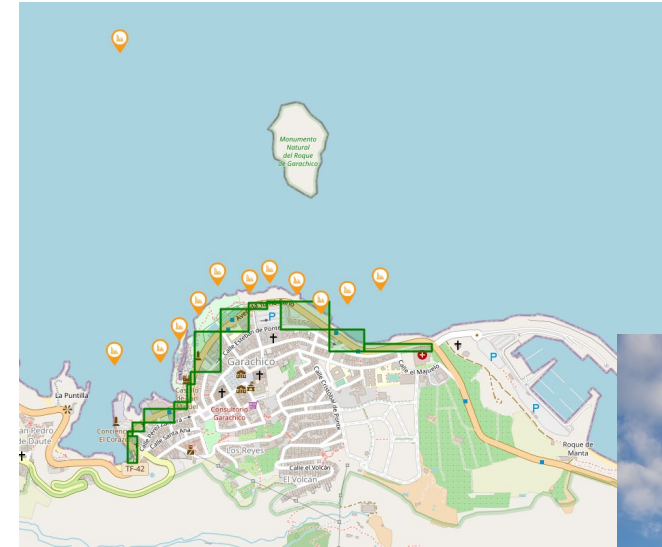
Methodology - Adaptation

Soft measures

Governance/social measures:

- ✓ **Flooding early warning system (72h)**
- ✓ **Protocols for urban traffic (access and circulation)**
- ✓ **Protocols for people circulation around the maritime front**
- ✓ **Reduction and maintainance of street furniture**
- ✓ **Social education**
- ✓ **Safety tourism oriented to wave storms**

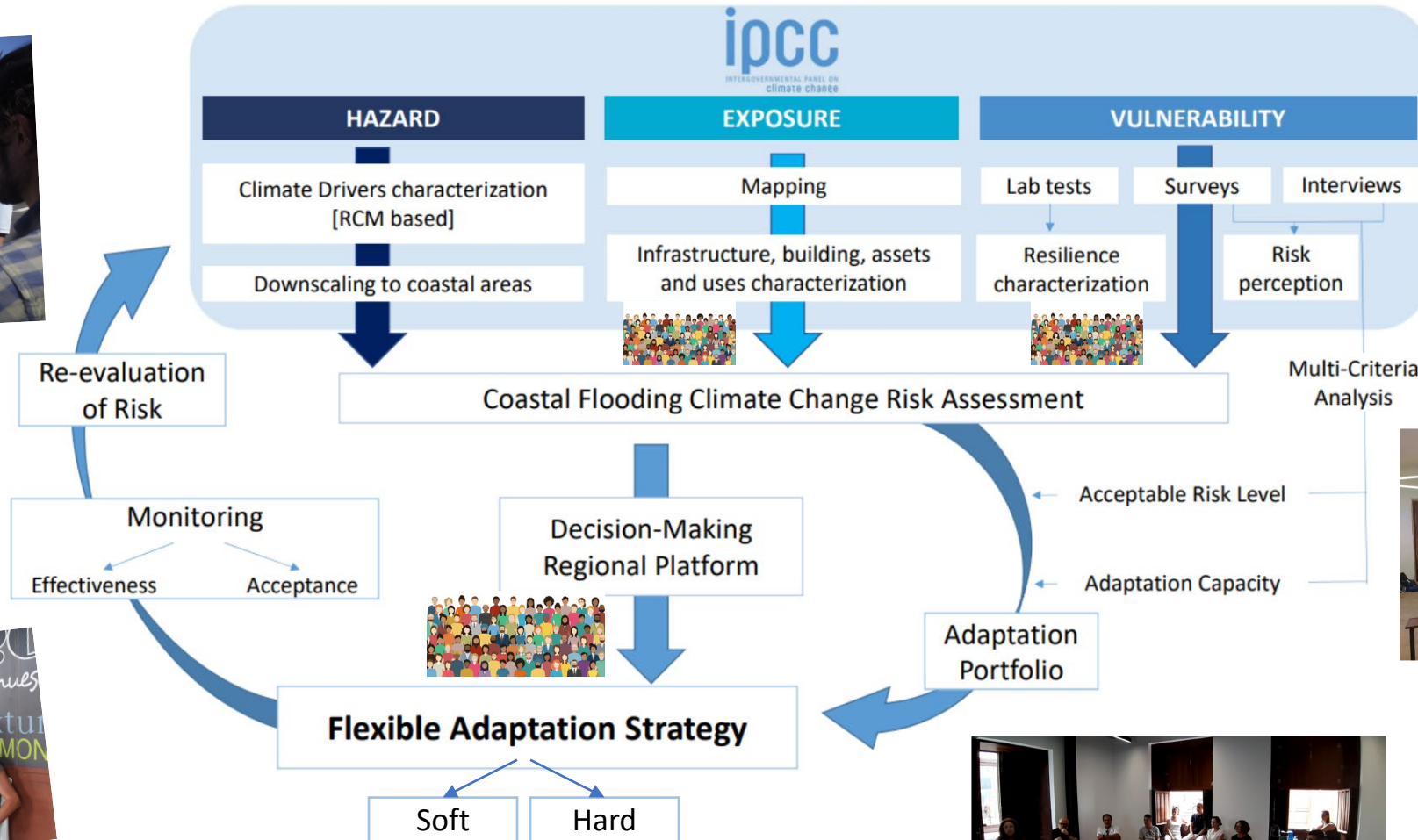
Reduce exposure and vulnerability!!





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Conclusions





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Thank you

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