Looking into the future of food production in a changing climate
(without a crystal ball)

Ana Iglesias
Department of Agricultural Economics and Social Sciences, Universidad Politécnica de Madrid, Spain

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Looking into the future of agriculture in a changing climate

Ana Iglesias[†]*, Sonia Quiroga[‡] and Agustin Diz[†]
[†]*Universidad Politécnica de Madrid, Spain;* [‡]*Universidad de Alcala, Spain*

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Re-thinking water policy priorities in the Mediterranean region in view of climate change

Ana Iglesias[a,*], *Luis Garrote*[b], *Agustin Diz*[a], *Jeremy Schlickenrieder*[a], *Francisco Martin-Carrasco*[b]
[a] Department of Agricultural Economics and Social Sciences, Universidad Politécnica de Madrid, Spain
[b] Department of Hydraulic and Energy Engineering, Universidad Politécnica de Madrid, Spain

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Reasons for concern

	Possible effect	Confidence level
Optimal location of crops (zones)	change	high
Crop productivity	change	high
Irrigation requirements	increase	high
Soil salinity and erosion	increase	medium
Damage by extremes	increase	medium
Environmental degradation	increase	medium
Pests and diseases	increase	medium

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Questions about the future

How will farmers deal with an uncertain future?

How will vulnerability, and disparities determine this response?

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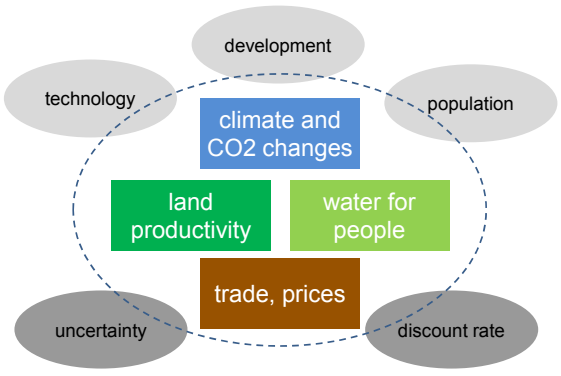

A view of the problem from the academic side

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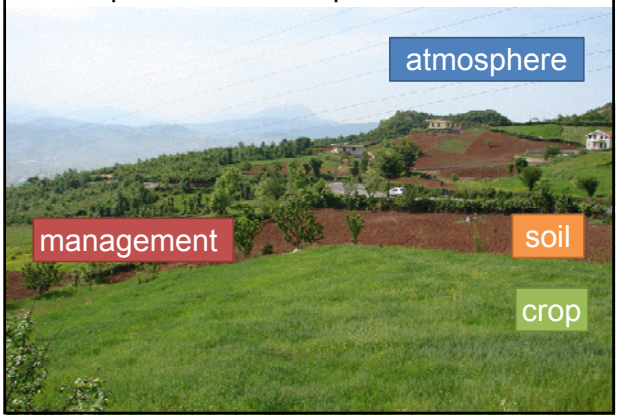
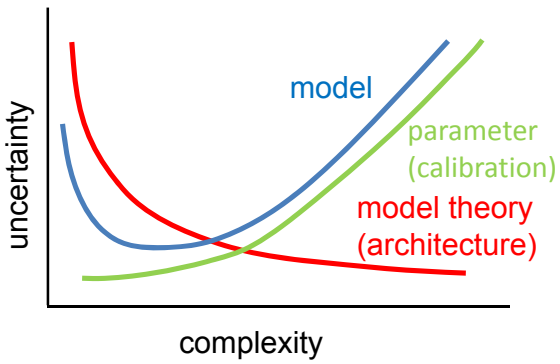
crop models: conceptual framework





3 issues: discount rate, sustainability, uncertainty

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SARA (Supporting Agricultural Modelling in Regions for Adaptation to climate change)

An evidence-based framework for adaptation in agriculture

Agro-climatic and land use change component	Land productivity component
Agricultural water component	Adaptation component

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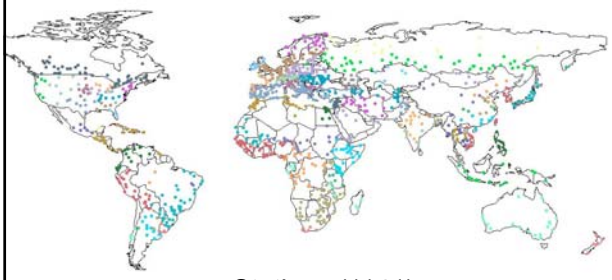
Understanding global uncertainty, land and water



Stations (1141)
and agroclimatic zones (73)

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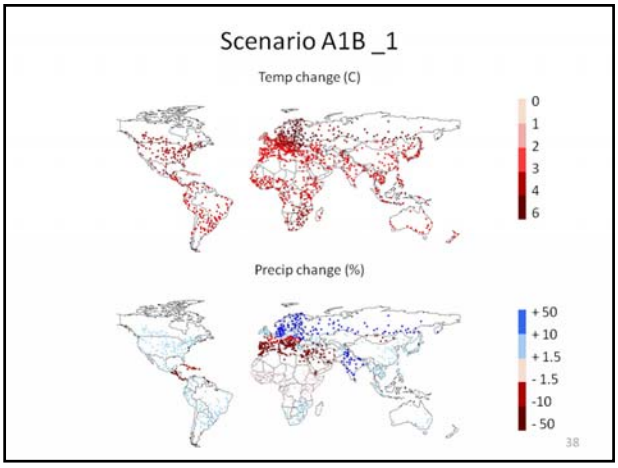
Scenario A1B _1



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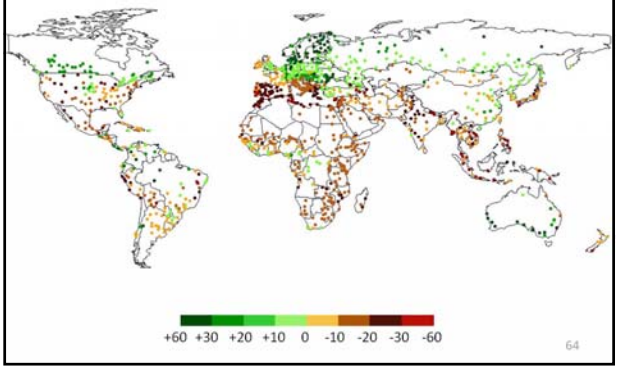
Scenario A1B _1

Agricultural productuivity changes (% of baseline)



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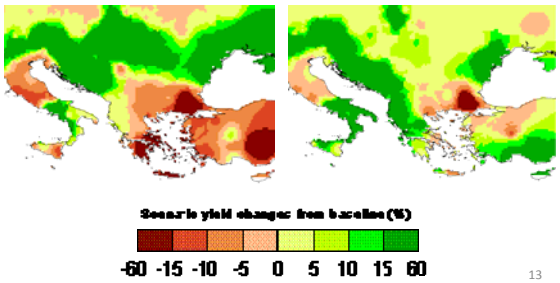
Changes in land productivity (Iglesias et al 2011)

HadCM3 A2 HadCM3 B2



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Complexity: need to understand local vulnerabilities

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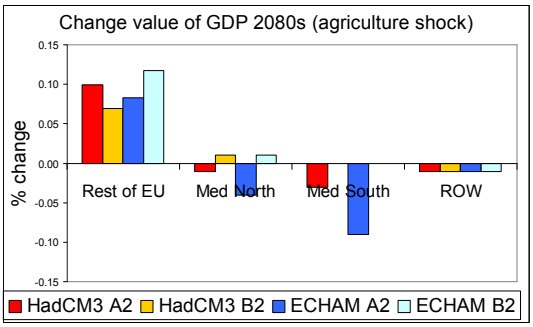
Managing the unavoidable (adaptation)

Example : Cost of action, cost of inaction



Source: Iglesias et al., 2007; Ciscar et al 2010

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Adaptation options

Adaptation policy	Irrigation water assumptions	Fertiliser input assumptions	Environmental implications
Adaptation 1	Demand satisfaction according to assumptions on technological capacity of the country	No optimisation of fertiliser input	Optimisation of environmental water requirements
Adaptation 2	No room for changes in irrigation	Optimised	Potential increase of difuse pollution
Adaptation 3	Demand satisfaction according to assumptions on technological capacity of the country	Optimised	Optimisation of environmental water requirements Potential increase of difuse pollution

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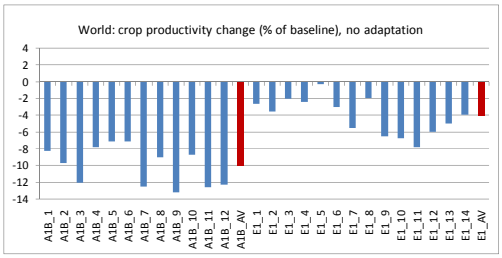
Without adaptation



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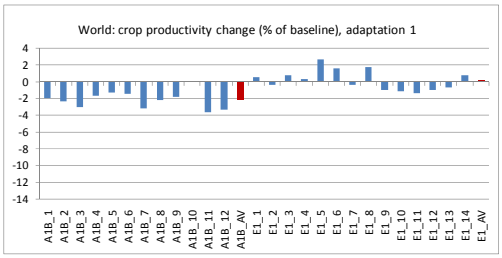
Adaptation 1



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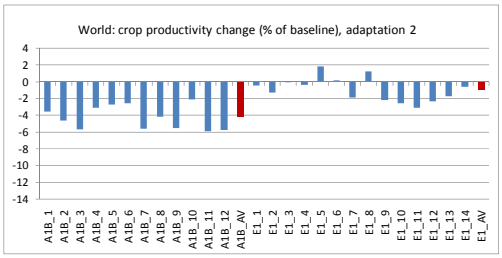
Adaptation 2



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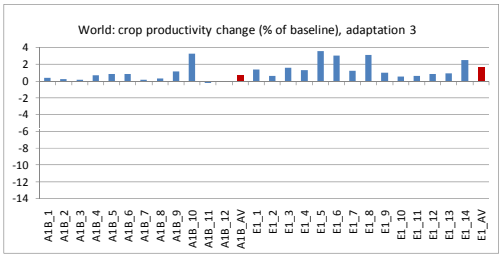
Adaptation 3



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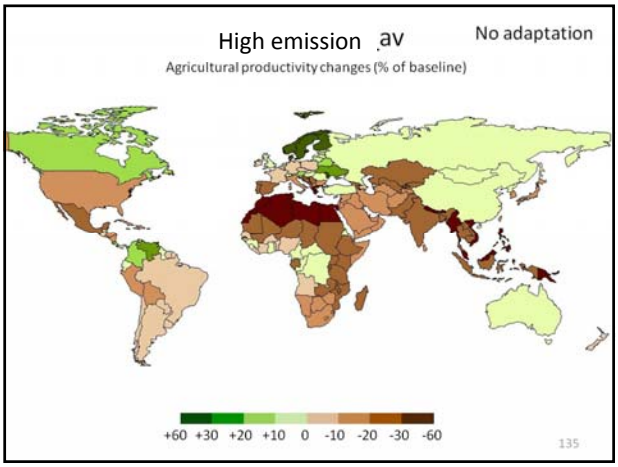
High emission av — No adaptation



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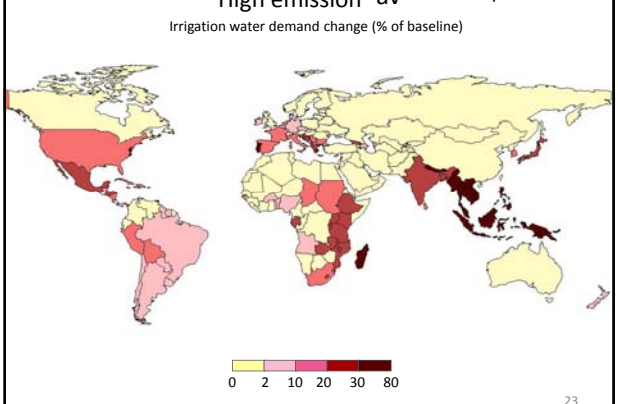
High emission av — Adaptation 1&3



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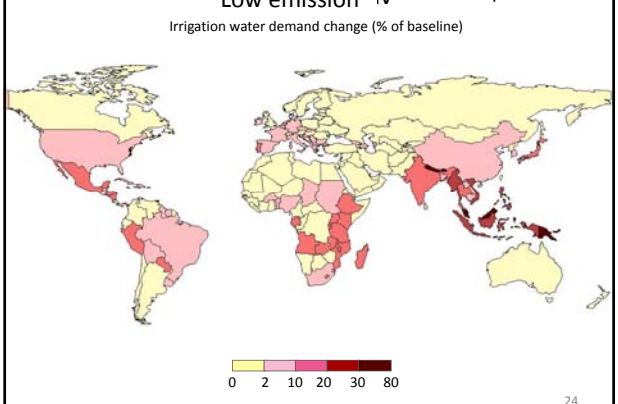
Low emission lv — Adaptation 1&3



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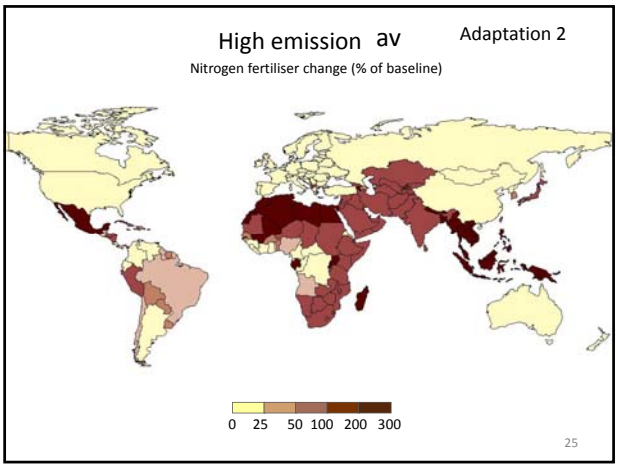
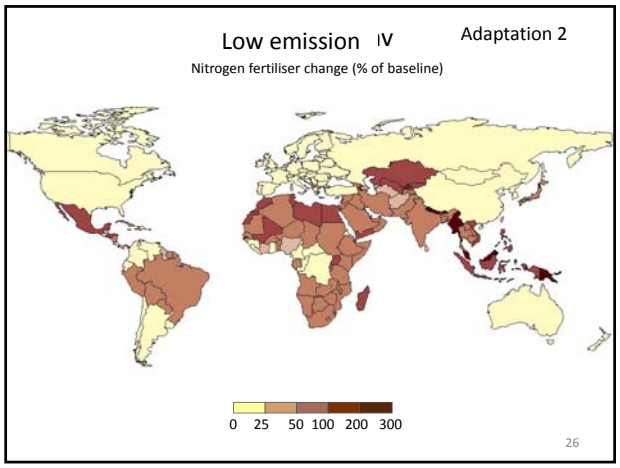
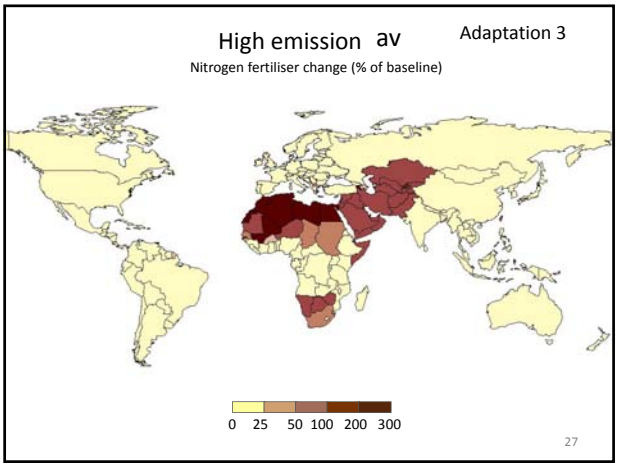
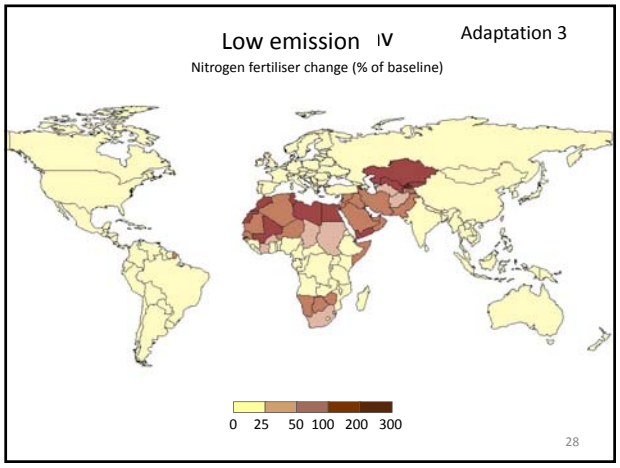
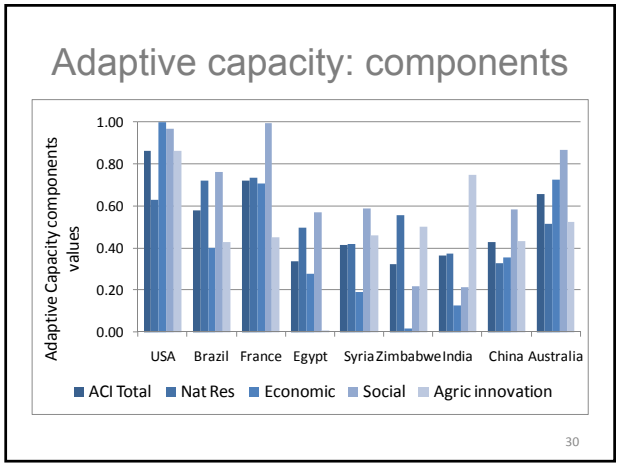


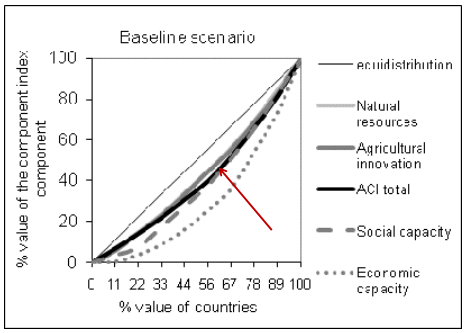






- **Green Climate fund:** Operating entity of the financial mechanism, "to support projects, programmes, policies and other activities in developing countries related to mitigation"
- **From my expertise** in terms of the sectoral impacts and the cost of adaptation policies … the question is if the Green Climate Fund will be effective to support undertaking the kind of adaptation policies necessary worldwide?
- Adaptation and mitigation efforts do not occur in isolation, they need to be **mainstreamed** into development policies





Gini coefficient – Lorenz curves

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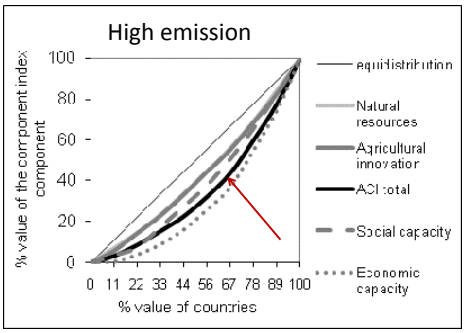

Gini coefficient – Lorenz curves

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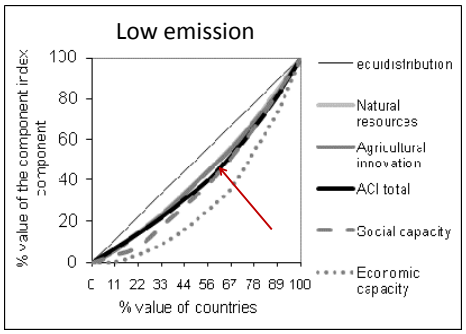

Gini coefficient – Lorenz curves

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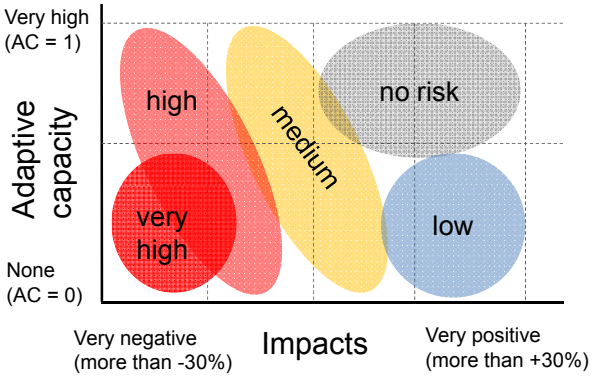

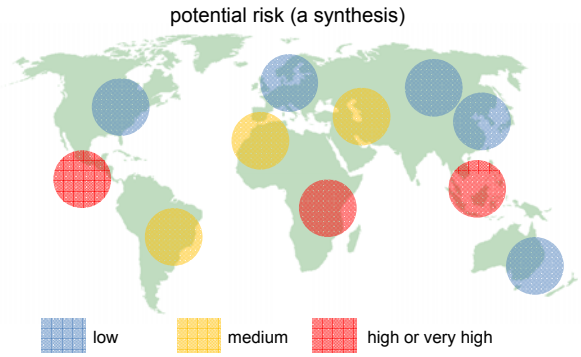

1 key issue can climate change science provide insights about the future of food production?

3 assertions

- Understanding uncertainty is useful for facing agricultural challenges
- Understanding and reducing vulnerability does not demand accurate predictions of the impacts of climate change
- It is politically difficult to justify vulnerability reduction on economic grounds

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