

Does aridity increase farmers' sensitivity to pollinator decline?

An analysis in five contrasting developing dry regions

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Introduction

- ❑ Insect pollination is an important **regulating ecosystem service** to agricultural production and the subsistence of farmers especially in dry low and middle income countries;
- ❑ Insect pollinators are facing severe declines; **Farming practices** and **climate change (progression of aridity)** are two main drivers of insect pollinator decline in these countries;
- ❑ Very few dry low and middle income countries have pollinator conservation strategies;
- ❑ The design of successful pollinator conservation strategies should be based on changes in the human behavior; **Changing farming practices** can help target **behaviors endangering** pollinators and **mitigate the impacts of climate change**;
- ❑ **Economic preferences** guide the human behavior thus **analyzing preferences for the benefits that farmers derive from insect pollinators can help achieve changes in farming practices.**



Fig 1: Focus groups held with farmers and experts to help develop the discrete choice experiment design and survey



Fig2: Interviews with farmers in different Moroccan regions

Methodology

- ❑ We used the **discrete choice experiment** which is a **survey-based** methodology used for **modelling preferences** for environmental goods and services;
- ❑ The benchmark site we used to represent dry low and middle income countries is **Morocco**; The survey was conducted in 5 regions in Morocco, each region represents a climate range;

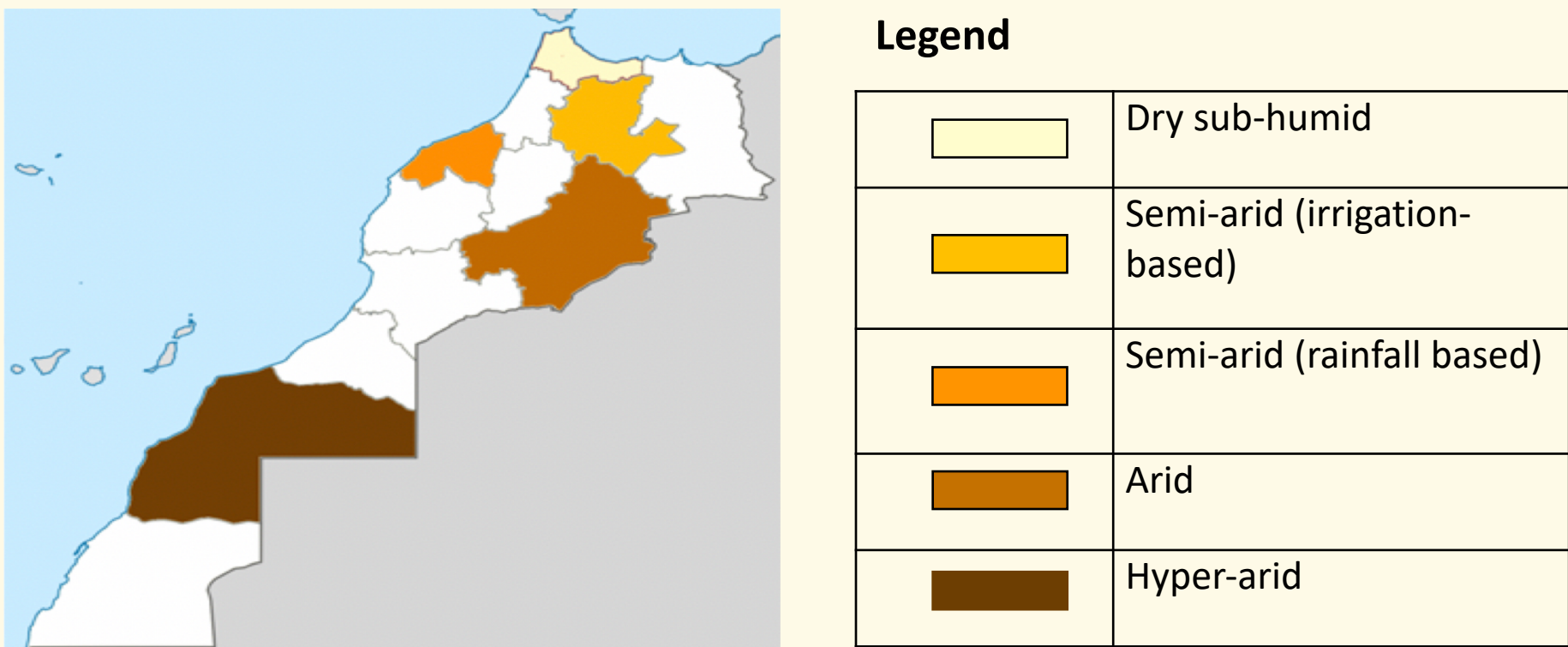


Fig 3: Map of five Moroccan regions/ climate ranges chosen for this study

- ❑ 500 farmers were interviewed (100 farmer in each region) (Fig2);
- ❑ Prior to the survey 3 focus groups were held: 2 with Farmers and 1 with experts (Fig1).

Research objectives

1. Explore farmers' economic preference for the benefits of insect pollination and estimate the value they attribute to these benefits;
2. Identify and assess the impact of the level of aridity on farmers' preferences and the value that farmers attribute to the benefits of insect pollination.

Results

- ❑ More than 80% of farmers know of the process of pollination;
- ❑ The most known insect pollinator is the honey bee (*Apis Mellifera*);
- ❑ Farmers highly value the benefits of insect pollination to their agricultural production and well-being;
- ❑ The economic value stated by farmers for the protection of insect pollination and its benefits is eq. to **176,85 €/farmer/year**;
- ❑ Farmers' preferences for the different benefits of insect pollination vary across the different climate ranges.

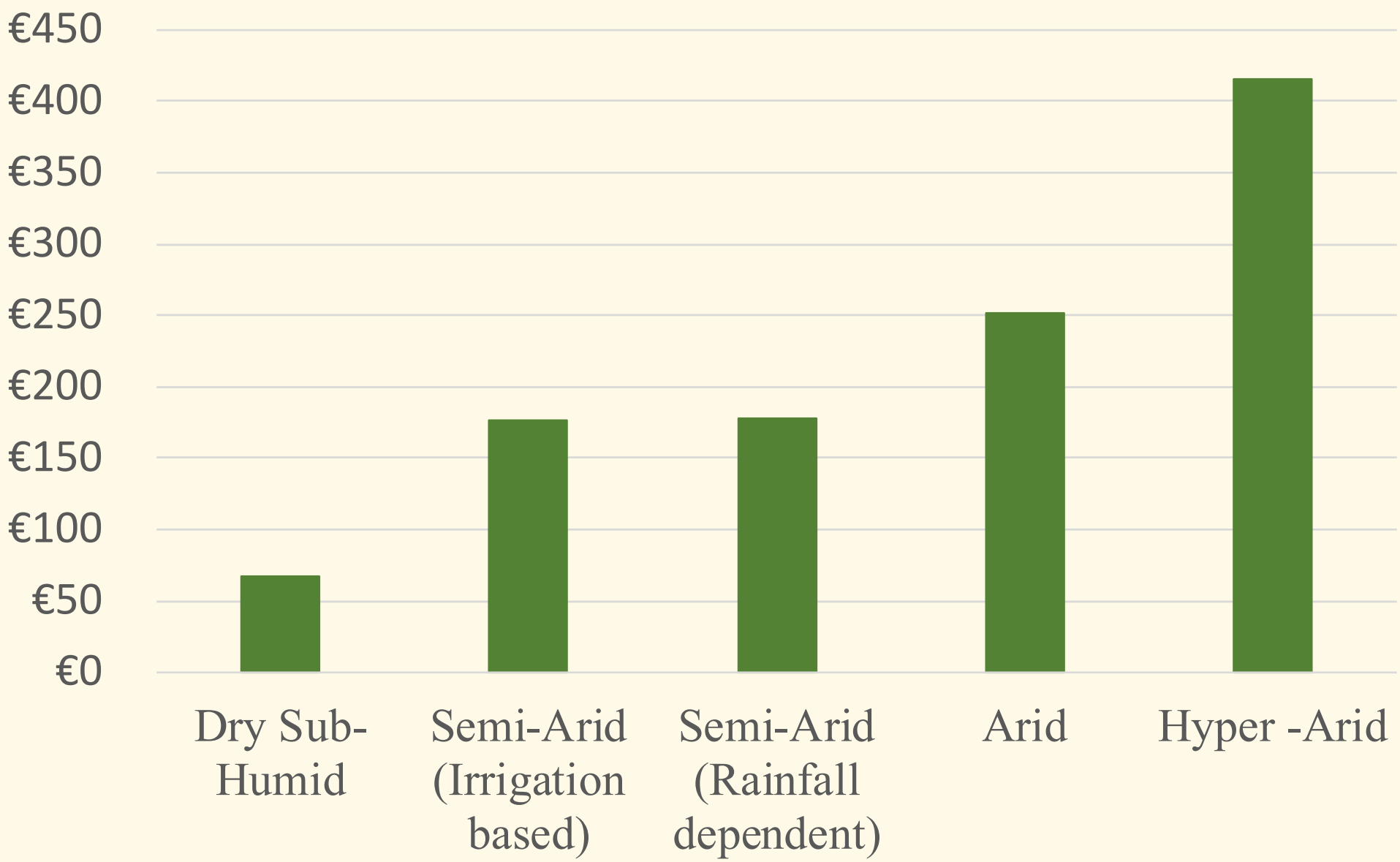


fig 3: the economic value stated by farmers for the protection of insect pollinators and their benefits

- ❑ Fig 3 shows that the economic value of insect pollination is positively correlated with the level of aridity; Farmers in regions with high levels of aridity are willing to pay more for the protection of insect pollination and their benefits.

Highlights

- ❑ Despite the limited means of farmers in developing countries they highly value insect pollination;
- ❑ Future mitigation strategies for the protection of pollinators should consider the impact of aridity on farmers' preferences;
- ❑ Preferences can change significantly within the same country which raises questions about the use of global guidelines for policy design;

Results

- ❑ Farmers in dry developing regions are, thus, more sensitive to the decline of insect pollinators;
- ❑ This result may help to speculate the evolution of the value of insect-pollination in the course of increasing aridity due to climate change;
- ❑ Given the predicted shifts in the climate ranges in Morocco and many other low and middle income countries, the value stated by farmers for the protection of insect pollinations would likely increase significantly by the end of the century (Fig4).

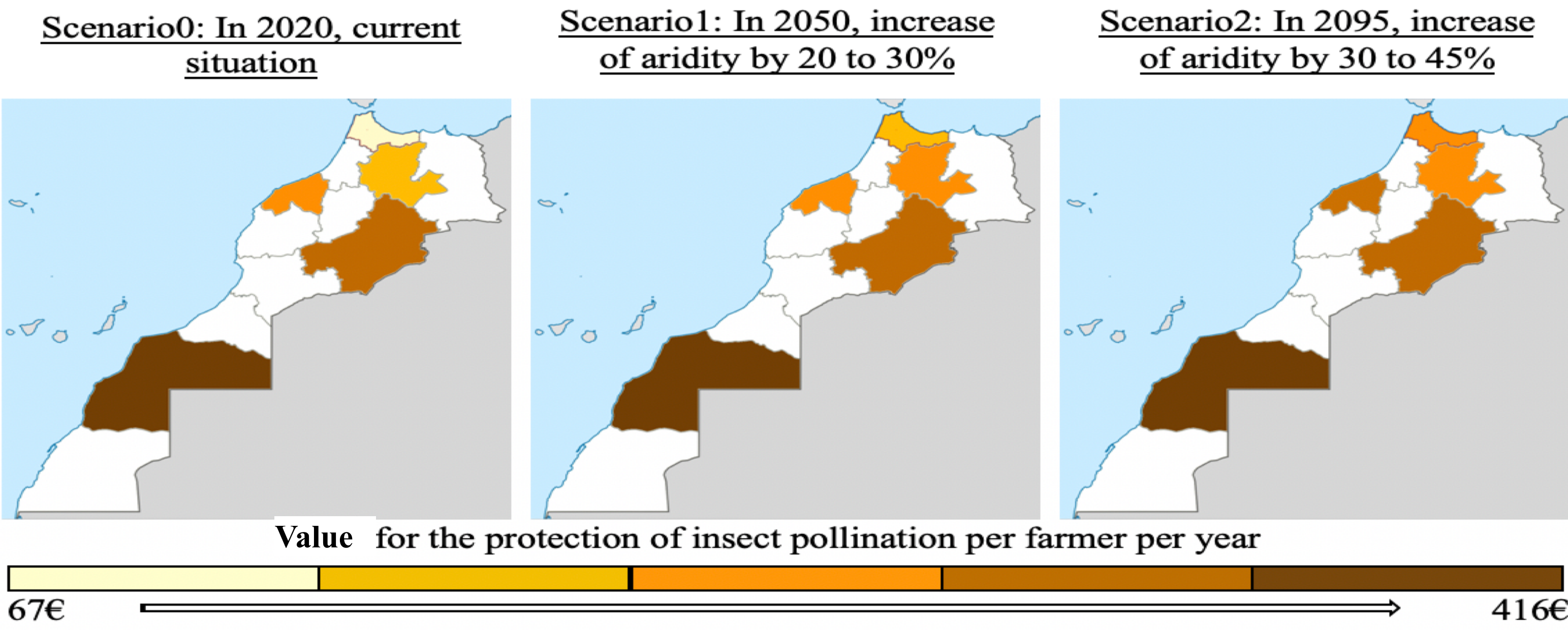


Fig4: The predicted evolution of the value stated by Moroccan farmers referring to climate change prognosis for the period 2020 to 2095

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