

19-21 de Octubre 2022 | Granada

## INTERNATIONAL CONFERENCE ON REGIONAL SCIENCE

Challenges, policies and governance of the territories in the post-covid era

Desafíos, políticas y gobernanza de los territorios en la era post-covid

XLVII REUNIÓN DE ESTUDIOS REGIONALES  
XIV CONGRESO AACR



## EXTENDED ABSTRACT

**Title:** Maintaining population with water? On the evolution of the population in the Spanish municipalities and its relation to irrigation

**Authors and e-mail of all:** Ana Serrano<sup>1</sup>, Miguel Martín-Retortillo<sup>2\*</sup>, Javier Silvestre<sup>3</sup>, Guillermo Rodríguez<sup>1\*</sup>, Ignacio Cazcarro<sup>4,5</sup>,

- 1) Department of Economic Analysis, Faculty of Economics and Business Studies, Universidad de Zaragoza, 50005 Zaragoza, Spain. asergon@unizar.es; guillerodlopez96@gmail.com
- 2) Department of Economics, Faculty of Economics, Business and Tourism, Universidad de Alcalá, 28802 Alcalá de Henares, Spain. miguel.martinr@uah.es
- 3) Department of Applied Economics & IEDIS, Faculty of Economics and Business Studies, Universidad de Zaragoza, 50005 Zaragoza, Spain. javisil@unizar.es
- 4) ARAID (Aragonese Agency for Research and Development). Agrifood Institute of Aragon (IA2). Department of Economic Analysis, Faculty of Economics and Business Studies, University of Zaragoza, 50005 Zaragoza, Spain. icazcarr@unizar.es
- 5) Basque Centre for Climate Change, Parque Científico de UPV/EHU, 48940 Leioa, Spain.

**\* Presenting author: Miguel Martín-Retortillo**

**Department:** Department of Economics

**University:** Universidad de Alcalá

**Subject area:** *S07 - New approaches to the historical economic geography of Spain*

**Abstract:** *(minimum 1500 words)*

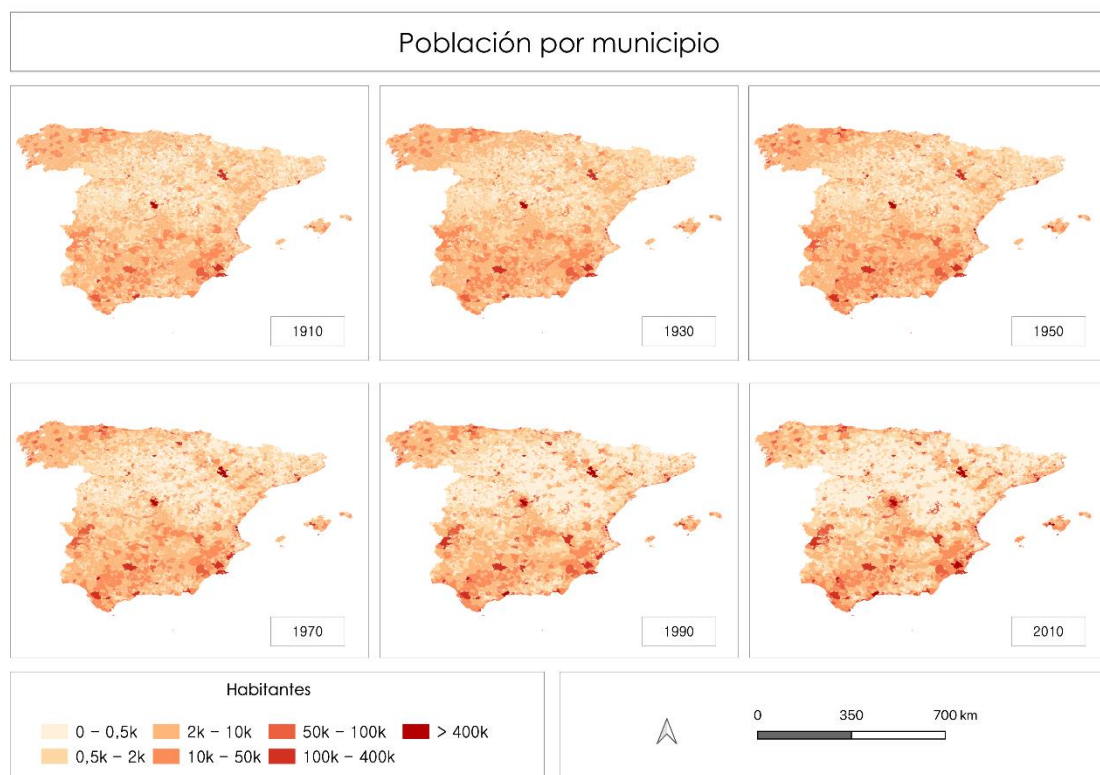
In the 2021 Call, the research team obtained a grant from the Ramón Areces Foundation for the project "[A historical approach to the economic development of Spanish municipalities: the rural-urban dichotomy during the 20th century to the present](#)". Its general objective is to analyze and evaluate the factors that have affected the evolution of the population in Spanish municipalities in the 20th century to the present, as well as the implications and consequences that may derive from it. The project tries to deepen especially in the face of demographic challenges, such as the depopulation of a good part of the territory, mainly rural. This implies covering a certain lack (gap) in terms of coherent databases and literature, and specific objectives such as the following.

- 1) Preparation and analysis by municipalities of Spain of a historical database of the population, irrigated, rainfed and pasture areas, as well as associated climatic and geographical variables during the 20th century to the present (1900-2020).

2) Elaboration and analysis of variable/s that quantify economic activity in municipal terms during the 20th century to the present.

3) Analysis and evaluation of the explanatory factors of the evolution of the population in the different municipalities in Spain, with special emphasis on the role of the development of irrigation, as well as the installation of other industries and developments in the long term. Development proposals and future options, to understand and project the main phenomena and proposals of interest (e.g. the demographic challenge).

The present work covers the third of the objectives, i.e., the analysis and evaluation of the influencing factors in the evolution of the (~8000) Spanish municipalities population, from the beginning of the 20th century to the present. Below we show the visualization of the evolution across decades.



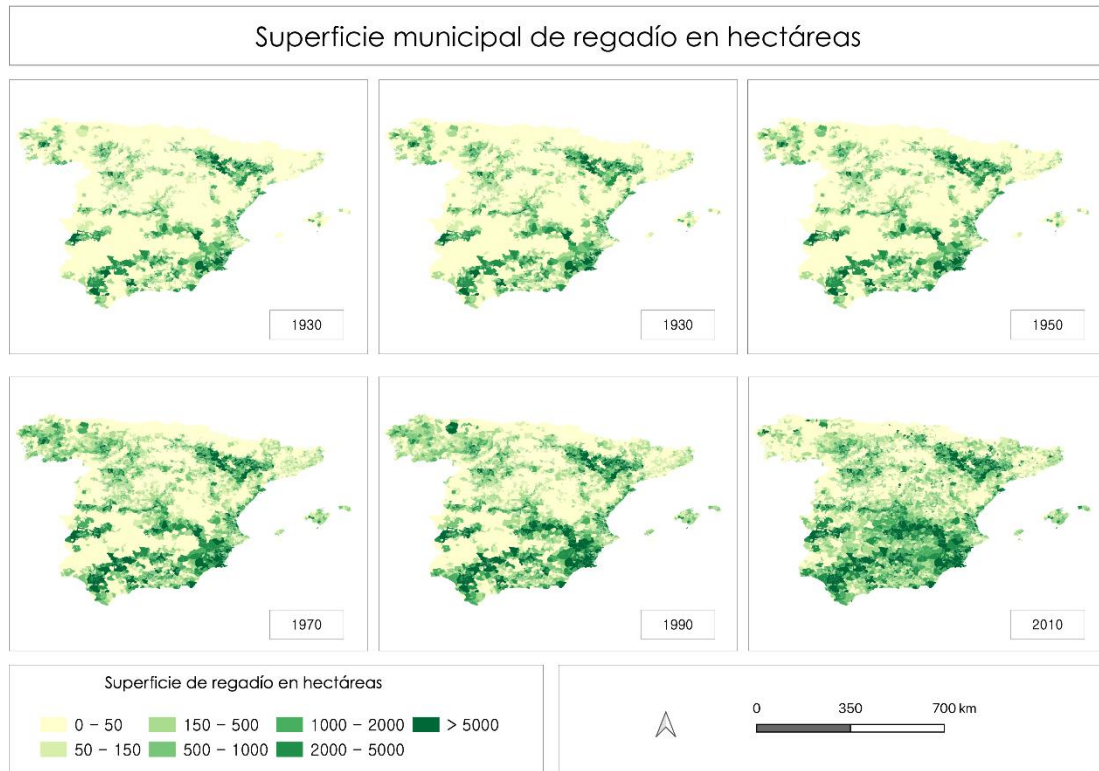
Interestingly, when discussing the reasons for population settlement, maintenance of the population in rural areas, it is common to read from some politicians and other agents that there is a strong link with the development of irrigation farming. E.g. in the region of Aragon, the modernization of irrigation systems and the creation of new ones has been defended as an instrument to combat climate change and the depopulation of rural areas (EFE-HA, 2021). Similarly, in the academic literature, we may read, e.g., among many others:

“Irrigation is one of the basic pillars of rural development and regional development. Irrigation dynamizes a territory, which is observed from the various effects it causes both economic and social and anthropic. It contributes exceptionally to social cohesion and stability as it generates a strong demand for labour and favours the commercial exchange of products and inputs, with the consequent economic flows (consumption and savings). It affects the income and the economy of a territory, population settlements, employment, quality of life, business creation or product valuation.” (Melián & Melgarejo, 2020).

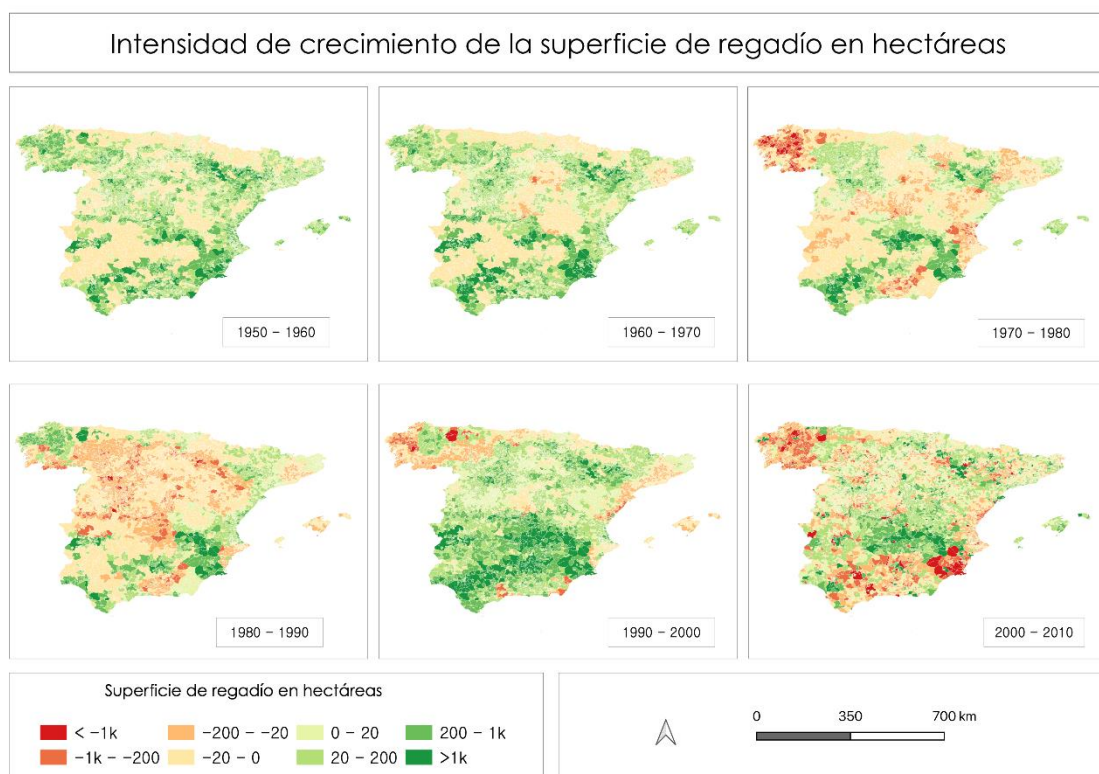
“As an average for the whole of Spain, compared to dry land, it can be stated that irrigation multiplies the generation of wealth by 4.8 and the generation of employment

by 4.5. In this way, irrigation is an effective instrument for establishing the population in rural areas, favoring thereby the structuring of the territory” (Gómez-Limón & Martín, 2020).”

We may examine the surface in absolute terms:



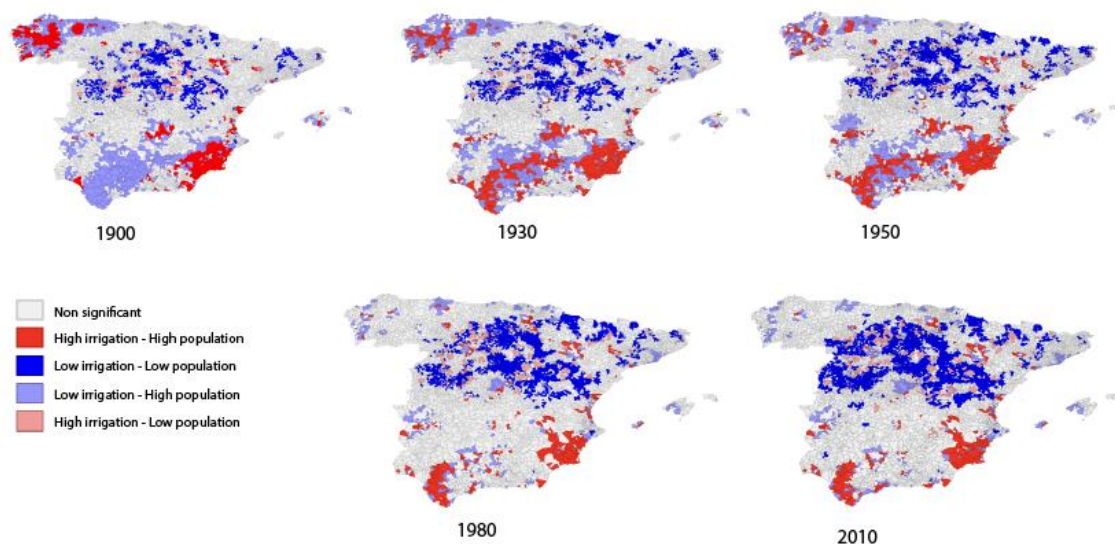
As well as its intensification:



The arguments go in line with several other books and articles as regards the role of irrigated farmland to structure the territory and fix population. Still, in our view there is a need to further examine quantitatively to what extent this is true, how important relative to other factors, how different those typically rural municipalities with irrigated land have evolved with respect to other municipalities more specialized in industries or services.



At first sights, the relationship is not straightforward in a bivariate relationship:  
 Bivariate LISA maps (Bivariate Local Moran's I): Irrigated area and Population



### Questions that motivate the investigation

- To what extent has the agricultural sector (and more particularly irrigation) influenced the population fixation and/or its attraction to rural municipalities?
- To what extent has this been the case in different decades, and to what extent is this still true?

The article evaluates the factors affecting, and the implications that may derive, from the occurred demographic challenges, such as -mainly rural- depopulation, analysed at the municipal level. This implies filling a great gap in terms of systematic and consistent analysis of those factors at a fine scale. The article uses the database explained in (Rodríguez et al., 2022), with a view of the whole XX century to the present with the cited variables and many other climatic, geographic and even some socioeconomic variables.

This evaluation, based on statistical and econometric analysis, allows to better understand the main explanatory factors of demographic change at such a fine scale, and potentially project development policies on the territories accordingly. The exploration then has a clearly applied regional economics and historical character, but it also aims to be useful for policy making, especially in the context of the challenges related to rural development. The current context reveals, for example as regard the energy transition, the growing strength in some rural areas to defend the territory...., the development mode, the way in which they want to use their resource base, etc. Informed policy making should be always based in more than impressions, guts or interested groups messages on the drivers of development, but rather on the best-informed insights. Accordingly, the article aims to fill some gaps in this understanding.

Concretely, from an econometric viewpoint this article digs into the question of a causal effect going from larger irrigation extension to a higher population size/density by constructing instrumental variable estimates for a panel of 8122 Spanish villages during the XXth century.

All in all, with this preliminary work we will aim to quantitatively evaluate jointly the population change with clear-cut biophysical, and potentially also socioeconomic (ideally also institutional) variable(s) at municipal level. The work is intended also to provide example for other methodological and empirical works at European Union at fine scale, e.g. on the economics and geographical variables elaboration and joint analysis with demographics.

**Keywords:** irrigated land, historical analysis, econometric analysis, Spanish municipalities.

**JEL codes:** J1, N94, O18, Q15, Q56

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