APR 2021 Num. 23

Explorador Social: Actionable Data Made Real

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Public agencies regularly produce and publish large volumes of information in the form of disaggregated empirical data at different geographic levels. However, access to this information is limited by the dispersion of data across a diversity of sources, formats, and means of access. Here at the Center for Demographic Studies (CED) we have promoted a project to collect, harmonize, and disseminate present and historical geo-referenced data on different topics such as demography, economics, politics, society, and the environment. In this issue of *Perspectives Demogràfiques* we present Explorador Social: a location intelligence platform for the social sciences created to facilitate access to information, and ultimately, the exploration of the reality and social change of the Spanish population through mapping and statistical tabulation. Designed to meet the needs of a diverse user base, Explorador Social will interest educators, researchers, public administrators, and journalists, as well as the general public. (Throughout this article we refer to the Spanish application as Explorador Social, the US application as Social Explorer, and the eponymous US corporation as Social Explorer, Inc.)

Introduction

Spain is a diverse society throughout its geography. The population is not distributed homogeneously among its 8,131 municipalities, nor are crops (Figure 1), economic activity or the political choices of its voters. Empirical data help to symbolically represent this diversity. The Spanish statistical system, led by the National Statistics Institute (INE), produces and publishes large volumes of data at different geographic levels and on a wide variety of topics. However, access to this information is limited for three reasons.

First, the data are dispersed in multiple repositories and this makes comparison difficult. Although the INE performs an important task of data production and collection, not all the information produced by public administrations or other agencies is channeled through this Institute.

Second, the format and characteristics of the data are not harmonized. The lack of harmonization requires users to have a certain amount of experience in data processing. This is a deterrent to non-expert users.

Third, access to information is not user-friendly. It is not always possible to visualize the data in its entirety. Sometimes the data access channels are labyrinthine and the way they are presented does not arouse users' curiosity. Data about the data (metadata) often precedes the presentation of the data and this often deters many potential users. Despite the progress made by public agencies to facilitate access, processing, and visualization of data, there is still a significant gap between the data and the user that new technologies can mitigate by disseminating information in a user-friendly and interactive way, as is done by digital versions of newspapers and other platforms on hot topics (e.g., covid contagions, election results).

Explorador Social helps reduce this gap between the data and the user: on one hand, it provides access to the data in an agile, flexible, and user-friendly form, and on the other, it offers maximum thematic, historical, and territorial cover-

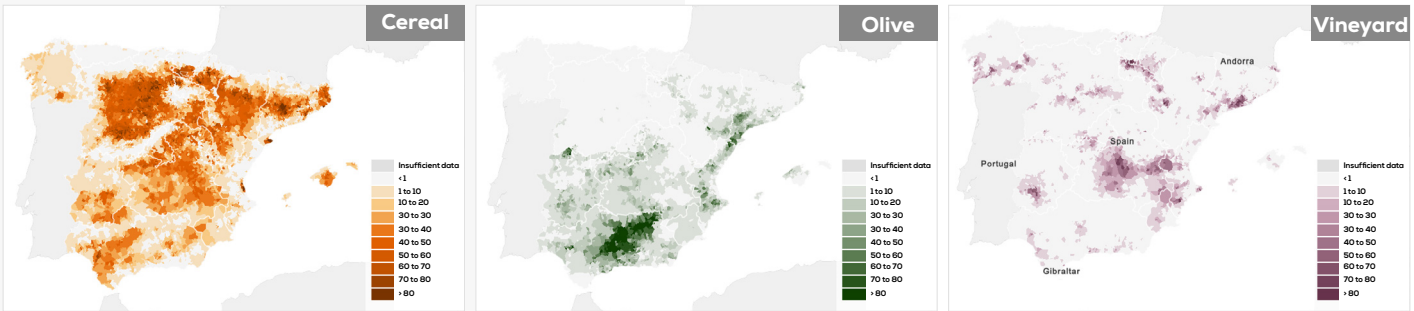

Figure 1. Proportion of cultivated hectares of cereals, olives, and vineyards in Spain by municipality. Note: Social Explorer. Data from the 2009 Agricultural Census (National Institute of Statistics). Selection of the three main crops: Cereal (6.3 million ha cultivated), Olive grove (2.15 million ha cultivated), Vineyard (0.8 million ha cultivated). The advance results for 2019 (Yearbook of the Ministry of Agriculture, Fisheries and Food) gives a -5% drop in cereal, 21% increase in olive grove, and 10% increase in vineyard.

age. With this dual purpose the project has three specific objectives:

First, collect and store as much information as possible in a single data repository so that users can compare information over time and space. The interest and potential use of a database grows as its contents increase and diversify. Explorador Social primarily contains public statistics (INE and regional statistics institutes), but also includes administrative records and demographic calculations made by CED.

Second, harmonize the format and presentation of data, along with metadata, to facilitate access, understanding, and insight by users. This involves harmonizing the underlying geographies, the structure of the databases, variables, and labels, and the content of the metadata.

Third, promote access to information through a powerful data visualization and dissemination tool that allows the user to select variables, observe change over time, view data at different geographic levels, customize maps, combine different visualizations, and download information. The success of the project depends on the way the data is disseminated. It has to be intuitive, straightforward, and agile. The platform developed by Social Explorer, Inc. meets this requirement.

What is Explorador Social?

Explorador Social is the implementation and adaptation for Spain of the Social Explorer platform of the United States of America. The project is an initiative of the Center for Demographic Studies in collaboration with Social Explorer, Inc. and with the support of "la Caixa" Foundation. After two years of work, Explorador Social is now a reality at www.exploradorsocial.es. We have developed a Spanish version of the platform and an independent access and management system. CED is responsible for the compilation, harmonization, and dissemination of the contents, and Social Explorer, Inc. is responsible for the maintenance and improvement of the software.

To date, Explorador Social contains more than 1470 variables organized into 140 categories. The original variables are organized into categories for ease of access (e.g., population, housing, elections). The data are aggregated at different geographic levels depending on the variable, from the census section (e.g., census and income) to the Autonomous Community. The temporal reference of the data ranges from 1900 (e.g., historical censuses) up to the present for most of the variables. Explorador Social is an open access application with an option for individual users to register for a more personalized experience. Registered users can save and share maps, reports, and other types of content.

Explorador Social uses maps as a principal way to access data. Users can create maps to visualize data at different geographic levels, and they can move from one level to another with a simple click. They can also customize their maps in myriad ways by selecting different map typologies, colors, symbols, and layers. Additionally, users can share their maps on social networks and embed them in websites.

Explorador Social is a research infrastructure designed for a wide range of users. High school and university teachers and students, especially in the social sciences, will be able to count on a tool that complements their

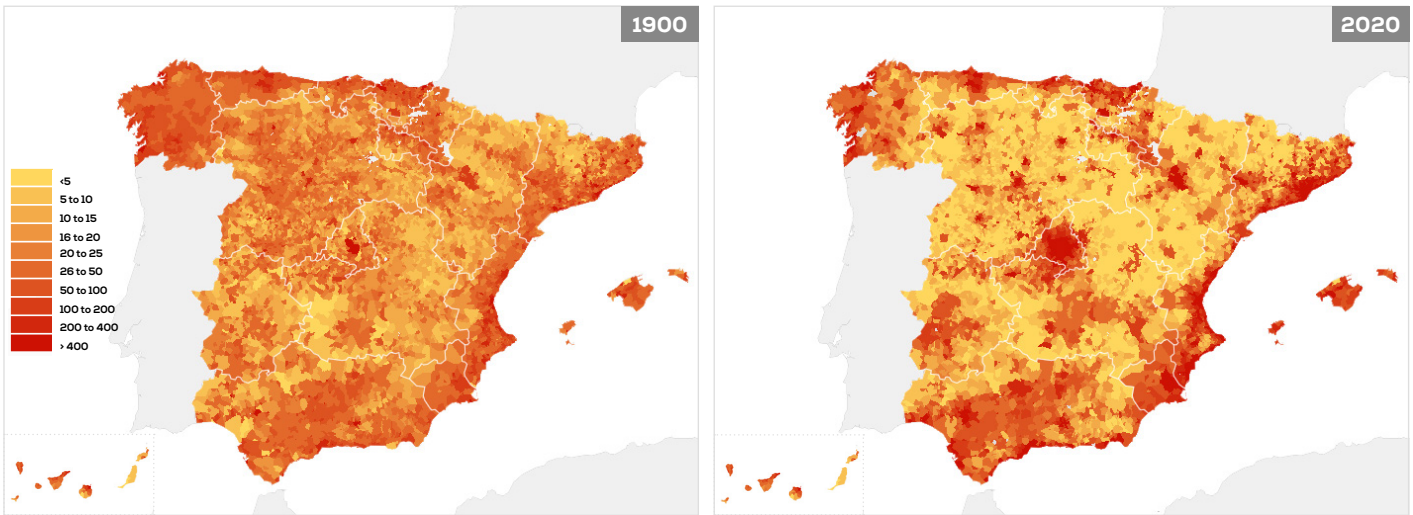

Figure 2. Density of inhabitants per square kilometer in Spanish municipalities in 1900 and 2020. Note: Explorador Social. Data from the 1900 Census and the Padrón Continuo as of January 1, 2020. The municipalities have been harmonized to the current 2011 division following the method of the Instituto Valenciano de Investigaciones Económicas-IVIE (BBVA Foundation and IVIE. Homogeneous population series, 2015).

teaching and learning. Public administrators will have centralized and personalized information from their areas of government. Businesses will be able to use the data to inform decision making. And researchers will be able to explore, download, and process the information as they see fit. Below, we illustrate the exploratory and scientific utility of the Social Explorer with two examples.

Great Data for Meeting Great Challenges

Decades of demographic, social, and economic changes have impacted Spanish society in multiple ways and unevenly across the territory. With the benefit of data, we can quantify the direction and scope of these transformations. To illustrate the possibilities of the Explorador Social, we have selected two examples related to demographic change: depopulation and international immigration.

DEPOPULATION IN SPAIN, 1900 - 2020

The depopulation (gradual loss of inhabitants) of Spain's inland towns and cities is a matter of great political and social concern. The density of inhabitants per square kilometer (hab/km2) is a good indicator to observe this phenomenon. Figure 2 shows the population density of the 8116 Spanish municipalities (harmonized according to the 2011 municipal division) in 1900 and 2020. The data come from the 1900 Population Census and the Municipal Register of Inhabitants as of January 1, 2020. During this period, Spain's population has grown from 18.8 to 47.5 million inhabitants and the average density of inhabitants per square kilometer has increased from 90 to 390. In 1900, there were 73 municipalities in Spain with a density of less than 5 inhabitants per square kilometer. One hundred and twenty years later, in 2020, the number of municipalities with a density of less than 5 inhabitants per square kilometer was 2173.

The provinces with the highest number of low-density municipalities are Guadalajara, Burgos, Teruel, Salamanca, and Soria. In contrast, population density has grown significantly in Spain's major cities and metropolitan areas and in coastal municipalities. In 2020, the density of Madrid and Barcelona reached historic highs,

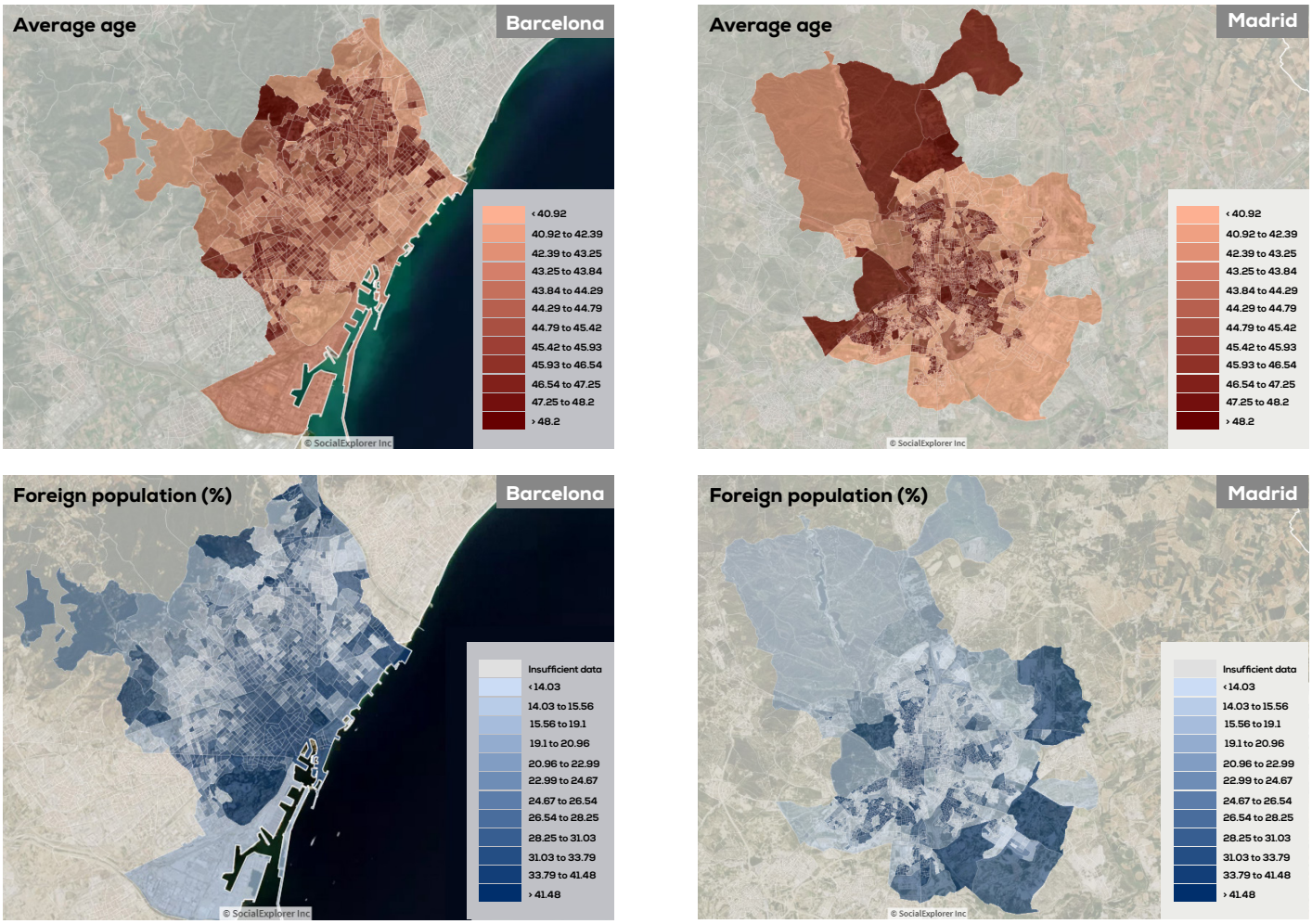

Figure 3. Proportion of foreign population and average age of the population by census section in the municipalities of Madrid and Barcelona according to data from the Padrón as of January 1, 2020. Note: Explorador Social. Data from the Municipal Register of Inhabitants as of January 1, 2020.

with 5,512 and 16,796 inhabitants per square kilometer respectively.

The study of depopulation in Spain can be complemented with other variables of interest such as, for example, the average age of the population, the proportion of single-person households, the presence of certain services (e.g. pharmacies, bank branches, type of internet access) in the municipalities. All these variables are available in Explorador Social.

INTERNATIONAL IMMIGRATION AND AVERAGE AGE OF THE POPULATION IN MADRID AND BARCELONA

In the last two decades, Spain has received more than 10 million foreigners. Immigration has contributed to the growth and rejuvenation of the Spanish population. But its impact on the territory has been uneven. Madrid and Barcelona are the municipalities with the highest concentration of foreign population in Spain, with 788,000 and 462,000 people, respectively. Twenty-five percent of the population in both cities is foreign. The average age of the population is around 45 years old. Figure 3 shows the proportion of foreign population and the average age by census section in Madrid and Barcelona according to data from the Municipal Register of Inhabitants as of January 1, 2020.

Madrid and Barcelona are divided into 2443 and 1068 census sections, respectively. The percentage of foreign population in the census sections ranges between 2.7% and 62.6% in Madrid and between 4.6% and 83.2% of the population in Barcelona. The average age of the population in the cities of Madrid and Barcelona is very similar, but census variability is greater in the former. The average age of the census tracts in Madrid ranges from 26.7 years for the youngest, to 65.7 years for the oldest. In Barcelona, the range varies between 34.6 and 55.4 years of age. The percentage of foreign population and the average age of the population are directly related in both cities, although the association is stronger in Barcelona. The average age of the population tends to be lower where the percentage of immigrants is higher. However, in Madrid there are relatively young areas with low foreign populations.

Future Plans

With the collaboration of "la Caixa" Foundation, the alliance with Social Explorer Inc. and the talent and perseverance of the Center for Demographic Studies, we have created the Explorador Social; whose objective is to compile, harmonize, verify, and disseminate official data related to Spanish society and its territory. Explorador Social has been built on a powerful location intelligence platform based on the successful experience of Social Explorer Inc. The objectives to be consolidated in the coming months and years are the continuous updating of the database, the incorporation of new contents, the construction of new analysis tools (e.g. change over time, customized reports), the production of didactic material for schools and universities, and the expansion to other regions inside and outside Spain. At the same time, the application is designed so that data producers can share their contents. In the coming months, and among the most important new features, we will publish data related to the environment and transport infrastructures and historical data from the population census from 1900 to the present.

Citation
Esteve, A.; Zueras, P. and the Social Explorer team (2021) "Explorador Social: Actionable Data Made Real". *Perspectives Demogràfiques*, 23: 1-4 (ISSN: 2696-4228). DOI: 10.46710/ced.pd.eng.23

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ISSN
ISSN 2696-4228

DOI
https://doi.org/10.46710/ced.pd.eng.23

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Acknowledgments
To "la Caixa" Foundation for the funding provided (agreements LCF/PR/GN18/50310008 and LCF/PR/PR/CE20/50740004). To the National Institute of Statistics and the General Secretariat for the Demographic Challenge for facilitating access to the data. And to all the organizations that publish the data on which this project is based. Their reference can be found in the metadata section of each source by following the link in the Tables.

To the Social Explorer team, Andrew Beveridge and Ahmed Lacevic for their trust and collaboration in the realization of this project. And especially to Vedad Ramovic, Sejla Kumasin, Ed Parsons, Tanja Ibrahimpasic, Mersad Pasic, and Nino Cuso for their dedication and help.

For their contribution, to the internship students who have participated in the project from its inception to date: Mireia Cano, Raúl Rezmes, Jennifer Bosch, Nicolás Aros, Laura Marbán, Mireia Olivares, Anna Montfort, Lara Morcillo, Osama Damoun, Jordi Calvo and Celia Fernández.

How to cite Explorador Social
Centre d'Estudis Demogràfics (2020) Explorador Social: Versión 1.0 [dataset]. Barcelona. https://doi.org/10.46710/ced.es.201820

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