

“A step forward”. Economically viable farming and conservation of threatened bird species

This project was created with the goal of making conceptual progress on the design and implementation of new approaches to the conservation of endangered species, aimed at improving their conservation in highly humanised landscapes such as steppe regions.

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For many people, steppe habitats remain inhospitable, arid, uninteresting and lifeless areas.

Those of us who have devoted ourselves to studying and disseminating their natural value are accustomed to the expression of surprise, if not scepticism, that appears on many people's faces when we explain the incalculable value of the steppe land-

Natural and man-made arid and steppe lands have remained relatively unchanged until recently

scapes and the vast array of specific organisms that inhabit them.

Arid and steppe regions, whether natural or the product of human action (pseudo-steppes), have until recently remained relatively undisturbed or have been subjected only to low intensity farming. In these areas, the harshness of conditions led to land uses, customs and insti-

tutions being retained that have disappeared from many other places, as a result of more intensive farming techniques, greater population density, or changes in traditional practices.

Interest in the study of the ecology and conservation of steppe habitats and their associated birdlife has risen in parallel with a growing awareness of the increasing threat

to these environments and their gradual disappearance. Currently, the most threatened bird assemblages in Europe inhabit farmland, with the conservation status of more than 80% of species a cause for concern. In this context, its bio-geographic and taxonomic singularity means Spain has a huge conservation responsibility, as many of the Spanish farmland birds are steppe birds, and our country is home to most if not all Europe's populations of them. These species include the great bustard (*otis tarda*), little bustard (*tetrax tetrax*), the pintailed sandgrouse (*pterocles alchata*), the black-bellied sandgrouse (*pterocles orientalis*) and a large community of various types of larks, and other birds.

Halting the decline of steppe bird populations

Much of the Spanish steppe is the result of man's action over the centuries, produced by extensive livestock farming (ranching) and dry-land farming, and it is precisely recent changes in these practices which are leading to a decline in bird populations. Various aspects of more intensive farming have been, and remain, one of the most important factors in the loss of biodiversity in the farmed steppe environment. Halting

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or reversing the decline of steppe bird populations in a highly humanised setting such as farmland requires a major effort on the part of all actors (government, farmers, scientists, civil society, etc.) to enable management and conservation in the immediate future.

Conservation efforts in these areas often fail when they take the traditional approach based on creating protected areas with strict limitations on human activities and resource usage. In the case of steppe birds whose habitat is extensively farmed land, long-term conservation will only be feasible if we are able to integrate species' ecological requirements into agricultural practices and that these practices are economically viable so that farmers agree to them and adopt them.

The European Union's Common Agricultural Policy (CAP), and its associated measures, have been identified as the main driving force behind the processes of intensification and neglect suffered by many European agricultural systems of high conservation value. Paradoxically, and especially since the last round of reform in 2003, the CAP is also expected to have a decisive role in improving and enriching the environment and enhancing the quality of the

systems affected. However, the environmental measures intended for implementation in agricultural areas have to be put into practice by farmers, who are the landowners and beneficiaries of the funds.

This makes assessment of the environmental, economic and agronomic consequences of possible environmental measures essential to maintain their impact over time and implement them successfully.

It is against this backdrop that the "Un paso adelante" project has been set up, with the explicit goal of making conceptual progress towards the design and implementation of new approaches to the conservation of endangered species, with a view to improving the conservation of highly humanised landscapes such as steppe regions. The project will be implemented in two pilot areas, one in the Ebro valley and the other on the 'meseta' or plateau of Castile La Mancha, both of which are home to a rich community of steppe birds and similar landscapes, dominated by the cultivation of rain-fed winter cereal. The work is based on formulating various different agricultural and landscape scenarios, drawing upon local farming know-how, which will be evaluated in terms of their agro-economic viability and



One of the project's main innovations in the field of conservation is that it takes farming practices into account explicitly in an integrated way. / Photo: Carlos Cantero.

suitability to provide a home for threatened steppe bird populations.

The “Un paso adelante” project

The aim of this project is to address two challenges currently being faced by conservation biology. The first is conceptual and refers to the integration (explicit and from the outset) of human activities

influencing the landscapes into conservation strategies. The second is methodological and aims to develop models that integrate key ecological processes so as to determine changes in the distribution of species, resulting from the impact of the different agronomic scenarios formulated.

Predictive modelling of species is based on the use of

representative biotic information and the availability of spatially continuous environmental variables for a particular area of interest. The integration of biotic information and environmental variables using specific statistical techniques and GIS tools (Geographic Information Systems) enables the generation of high-resolution mapping, in turn making it possible to

evaluate the spatial variability and quality of habitat for the modelled species and identify the environmental variables that determine them. These techniques have enjoyed considerable success in recent years, helping us to understand the distribution and current status of various different biotic groups (birds, mammals, arthropods, plants, etc.), but only recently

have they been evaluated in terms of their potential to generate scenarios describing changing environmental conditions in a given area.

One of the main innovations of the project in the field of conservation is the explicit consideration of farming practices in an integrated way. This integration includes those practices based purely on agricultural principles as well as those based on conservation. This approach will enable farmers to propose farming practices that reconcile their activities with the preservation of the species in the best way possible and on an affordable basis.

Thus, the multidisciplinary nature of this work not only adds value, but is also forms the core of the conceptual approach. Measures aimed at preserving endangered species in highly humanised settings that fail to take social and economic factors into account have a high likelihood of failing to achieve the conservation goals for which they were designed. In this conceptual framework a genuinely multidisciplinary team is required, bringing together ecologists, agronomists, economists and modellers to construct and assess the various different farming scenarios and assess their implica-

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tions. Scenario building requires detailed knowledge of a particular region's potential and its future prospects in both social and economic terms.

The definition and analysis of these farming scenarios for each of the study areas will be based on information already in the public domain together with that provided by local farmers and various other stakeholders.

This multidisciplinary approach has required the participation of research groups working in various areas, ranging from conservation biology of birds in agricultural environments, to agricultural and rural economics.

Obviously, the “*Un paso adelante*” project does not purport to solve all the problems of species conservation in the areas described. The ideas, approaches and efforts put forward in the proposals described here should be interpreted as a first attempt to develop new approaches that integrate disciplines and yield a return in the form of more effective conservation measures. Thus, the expected outcomes of the project will revolve around a quantitative evaluation in space and time of the impacts of each of the different farming scenarios

considered on the species under study, together with information about their viability and costs in both economic and farming terms. The results of these scenarios will be integrated into a decision-support tool so as to allow detailed prior evaluation of the impact of subsequent agronomic decisions. It will culminate in a variety of communication activities aimed at promoting the use of these tools by local actors in each of the areas in which the study is due to be run.

The project also is expected to have important scientific impacts on various fronts. Firstly, the explicit integration of different approaches adds considerable value, such that the products generated from both the ecological and from an agronomic point of view is likely to arouse interest in the scientific community. The conservation of endangered species of steppe birds has not always been addressed from a broad approach that takes into account the constraints imposed by the reality of farming in the areas in which they live. The value of this approach is further enhanced by its focus on a Mediterranean area, with a range of constraints and opportunities for agriculture that are very different from those in central and northern



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Europe, where most previous studies of this type have taken place.

Finally, the spatial modelling methods proposed in this project, and more specifically the planned developments in the field of the dynamic modelling of species distribution and development of landscape scenarios, are identified as areas of research in which

“*Un paso adelante*” stands out as being particularly innovative. Given the need to generate predictions of the impact of environmental change on biodiversity, this project will allow these emerging techniques to be adapted to the study of threatened steppe birds. We hope therefore that completing the “*Un paso adelante*” project, funded by the Fundación General CSIC in the

first round of Proyectos Cero on Threatened Species, will provide the tools and solutions needed to successfully meet the challenges of conservation of Spanish steppe regions and that the methodologies developed may be helpful in other areas and habitats where there is a need to reconcile biodiversity conservation and sustainable economic development. ■

Research Group

The project's multidisciplinary approach requires the participation of research groups from various different areas. Lluís Brotons, Gerard Bota and David Giralt are experts in conservation biology of farmland birds working in the Biodiversity Area of the Centre Tecnològic Forestal de Catalunya (Catalonia Forest Technology Centre, CTFC). Beatriz Arroyo and François Mougeot belong to the Wildlife and Hunting Fauna Ecology and Conservation Group at the Instituto de Investigación en Recursos Cinegéticos (CSIC Institute for Hunting Resources Research). Agronomy is represented by Carlos Cantero, a member of the Sustainable Agriculture for Arid and Semi-arid Farming Systems Group in the Department of Plant Production and Forestry Science at the University of Lleida (UDL). Finally, Lourdes Viladomiu is an expert on rural economics in the Research Team on Rural Development, at the Department of Applied Economics at the Barcelona Autonomous University, UAB.

The project coordinator, Lluís Brotons (CTFC) has run lines of research on landscape ecology, focusing on determining the impacts of land use change on biodiversity in the Mediterranean region. In this project his work in the field of spatial modelling of biodiversity is complemented by the experience of other members of the group in analysing ecological, agronomic and economic development of rain-fed farming systems prevalent in large regions the Iberian Peninsula.