

Linking socio-economy to biodiversity in farmland

Deep biodiversity crisis has been observed during recent decades, with many species went locally or globally extinct and many more declining in number. Increasing land use intensity by humans belongs to the most important drivers of these negative changes. Agriculture production and farmland areas are good example of such intensification. Farmland, covering arable land, pastures and grasslands, in many regions of the world remains the most common type of land-use. These agriculture landscapes were extensively used for food production for centuries, thus – as a side effect – providing numerous animal and plant species with preferred habitats and necessary resources. However, after recent development of technology and increasing needs for food, agriculture production has become much more intensive. In modern agricultural landscapes increasingly often extensive monocultures predominates, and these habitats are managed with the help of fertilizers and pesticides. As an effect of these intensification trends, resources necessary for wildlife (e.g. foraging sites for rodents, breeding sites for birds) are less and less available, and therefore many species previously common in farmland now are rare or went extinct. In such intensive landscapes, human settlements (i.e. villages and single farmsteads) appear to be relatively less intensively managed and still provide many species with preferred habitats and resources. Within villages and farmsteads different microhabitats are present, with large trees, orchards, gardens, patches of tall herbaceous vegetation and flowers, and old buildings providing many species (e.g. birds and bats) with shelters and nesting places. As an effect, many species absent or uncommon in open fields are aggregated within rural settlements.

However, occurrence of many species in villages, in close vicinity to humans, cause that human activity within these habitats may affect populations of these species. It is very important, therefore, to understand relationships between lifestyle of humans living in villages and biodiversity related with these villages. The proposed project aims to investigate these relationships and to check how socio-economy of local human societies is associated with occurrence and abundance of bird and mammal species. In the project, I plan to collect sociological data on local human societies or even single farmers (e.g. age structure, health, education, ecological awareness, attitude toward nature, etc.) and their economy (unemployment, average income, poverty, subsidies to agriculture, etc.). At the same time, I plan to count birds and mammals in selected villages and farmsteads (in both winter and spring/summer periods) with the help of recording devices and camera-traps. As an effect, it will be possible to correlate local biodiversity with local socio-economy. For instance, it will be possible to check if levels of biodiversity are higher in poorer regions or poorer farmsteads. The proposed study also aims to select bird and mammal species potentially useful as indicators of overall health condition of local citizens or prevalence of certain diseases in the local human populations. The project will also explain whether environmental awareness of farmers correlates with biodiversity level observed at their farmsteads. Finally, it will be checked whether landscape type (e.g. intensively vs extensively used) around villages affect how intensively birds and mammals occupy these villages.

We expect that the proposed project will generate high-quality and detailed data on the relationships between local human societies and species present in human settlements. Understanding these relationships will be important for better understanding of the present distribution of species and their population trends in farmland, and can indicate unknown ecological mechanisms determining biodiversity patterns. With the help of data provided by the proposed project it will be possible to address a question on the sustainable development: if and under which circumstances the development of human civilization can be beneficial also for biodiversity. From the perspective of conservation science, the project can importantly support decision making on the conservation strategy - data provided by the project will show specific subset of human societies most often co-occurring with high biodiversity, and thus it will be possible to adjust conservation measures to opportunities and needs of citizens.