



SUPPORT THE DESIGN AND JUSTIFICATION OF THE PROJECT'S PILOT AES AS PART OF THE NATIONAL AGRICULTURAL ENVIRONMENTAL PROGRAM. COMPARATIVE ANALYSIS BETWEEN THE NATIONAL AE SCHEMES ON WINTERING GEESSE AND THE PROJECT'S PILOT AES

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Geography

The areas surrounding the lakes of Shabla and Durankulak, in the northern part of the Black Sea coast of Bulgaria, are among the most important wintering grounds for the globally threatened Red-Breasted Goose (*Branta ruficollis*). This provides an ideal setting for testing the pilot agri-environment scheme foreseen within the LIFE09 NAT/BG/000230 project.

The study area is located in the southernmost portion of Dobruja, a region situated between the lower Danube River and the Black Sea. The region comprises Northern Dobruja, today part of Romania, and Southern Dobruja, belonging to Bulgaria.

In addition, another important site, the Srebarna lake, along the course of the Danube, is the first roosting place for geese when they migrate to winter in Bulgaria. Geese occur primarily in late autumn. They roost on the lake and feed in surrounding agricultural land, with flocks generally moving on toward Shabla and Durankulak later in the winter.

Terrain morphology in Shabla and Durankulak varies from flat to slightly undulated, with steeper inclination in the proximity of few gullies that occasionally convey rainwater into the lakes.

The coordinates of the study area are approximately:

- Latitude 43°-44° north;
- Longitude 27°-29° east;
- Elevation 20-30 m.

The latitude is comparable to that of the US Corn Belt, an extremely productive agricultural region characterised by chernozem soils.

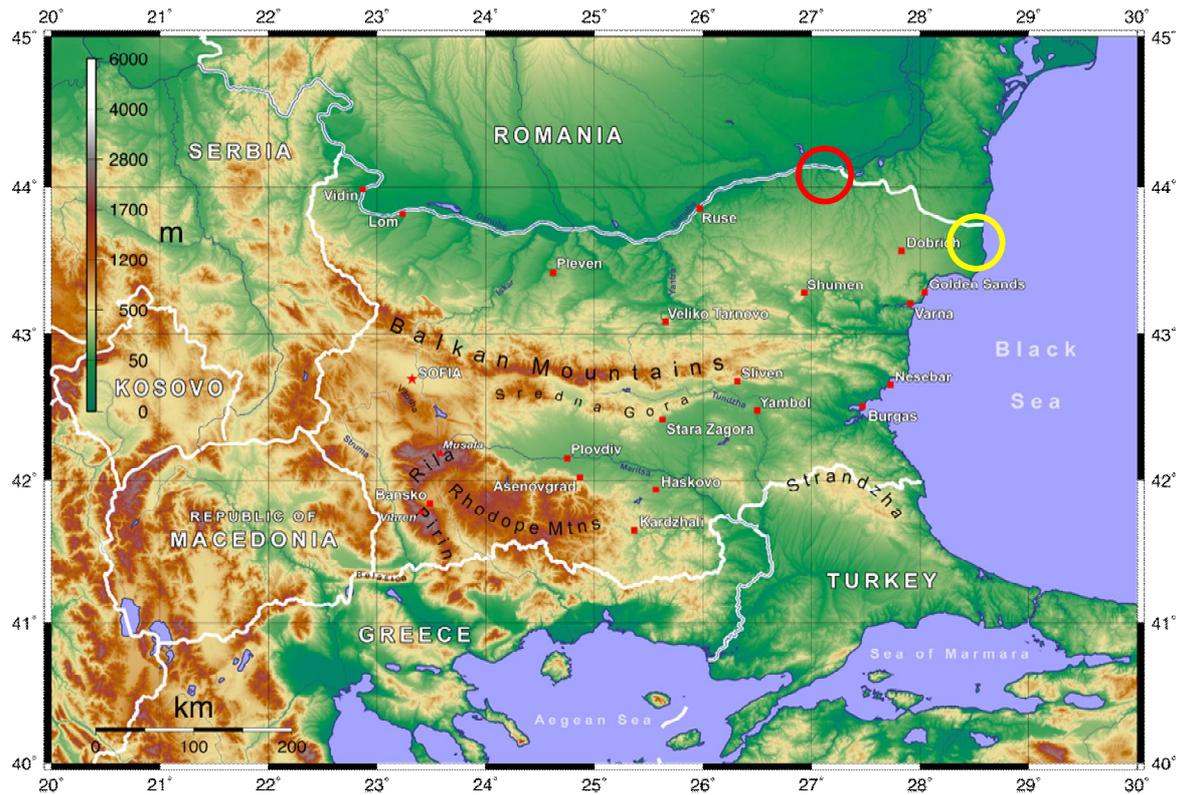


Fig. 1. Location of the study area (Shabla and Durankulak, yellow circle; Srebarna, red circle).

Pedo-climatic conditions

The climate in the northern part of the Bulgarian Black Sea coast is continental and can be classified as *Cfa* (warm temperate, fully humid, with hot summer) according to the Köppen–Geiger climate classification (Hamnett, 2006; Kottek et al. 2006).

Although the climate is strongly influenced by continental air masses coming from the north and northeast, the average January temperature is positive. Average minimum temperature in winter months is approximately -1°C - $+1^{\circ}\text{C}$, while average maximum temperature in summer months is approximately 24°C - 27°C .

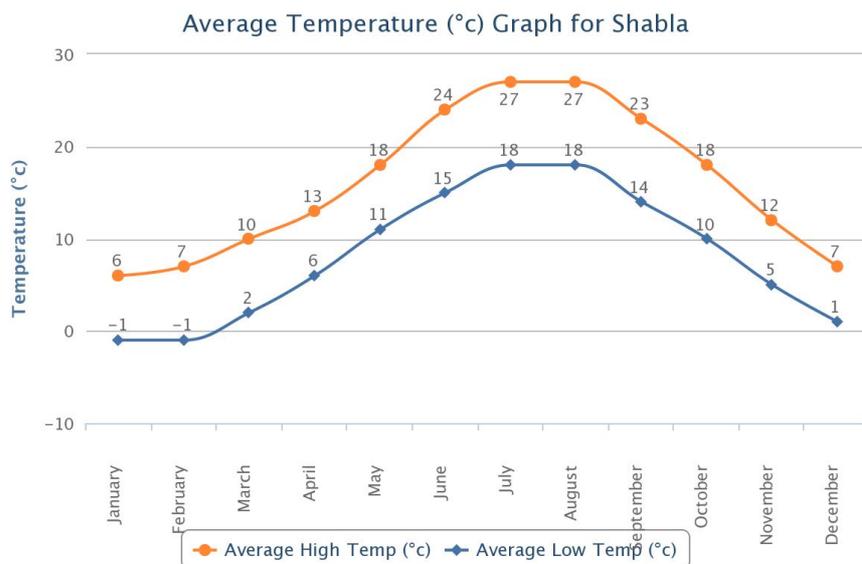


Fig. 2. Average temperature graph for Shabla (<http://www.worldweatheronline.com/>).

Total annual precipitation ranges approximately between 420-500 mm depending on the year and the site. Rainfall is quite evenly distributed across the year, with monthly precipitation ranging from approximately 10-30 mm per month in winter to approximately 50-70 mm per month in summer. The 1997- 2009 period has been characterised by a warm and relatively dry climate, with increasing trend of extreme events (Ivanova Todorova, 2013).

Average monthly minimum temperature is higher than the growing threshold temperature for wheat (0°C) throughout the whole year, except for January and February. From May to October, the average monthly minimum temperature is higher than the growing threshold temperature for sunflower (6.7°C) and maize (10°C). Therefore, temperature is not a limiting factor for the completion of one full production cycle per year of these crops. However, in some years, rainfall may not be sufficient for an economically viable maize harvest.

The climate of Srebarna is quite similar, but winter temperatures tend to be slightly lower (average minimum temperature -1°C - -3.9°C) and rainfall is higher, on average 528 mm per year (source: en.climate-data.org/location/194954/).

The lower Danube floodplain is characterized by Chernozems, dark-coloured soils rich in humus and in available calcium ions bound to soil particles. Chernozems are the commonest soil types in Dobruja. In addition to peat soils located within a short distance from the lakes, the following soil types are found in the study area (Koinov et al., 1968):

Shabla area

- Leached chernozems, heavy loamy;
- Slightly leached chernozems, loamy;

Durankulak area

- Calcareous chernozems, loamy;

- Typical chernozems, loamy;
- Eroded calcareous and typical chernozems.

Srebarna area

- Leached chernozems, heavy loamy;
- Eroded leached chernozems;
- Alluvial, sandy and loamy.

Soils in the study area have optimal fertility, texture and hydrological properties (water retention and drainage of excess water) for the cultivation of most species of arable crops, including winter cereals and maize.

Land use

Arable land, with variable field size, is the dominant land use in the area of Shabla and Durankulak lakes. Some remnants of steppe vegetation, generally overgrown and in transition towards shrubland, are found along the banks of temporary rivers. Built-up areas are relatively scarce, and only one main road (road n. 9 – E87) crosses the whole area. Several wind turbines are located in the Shabla area.



Fig. 3. Aerial photos of the areas of Shabla (above) and Durankulak (below) lakes (source: Google Maps, January 2014).

Agriculture

Farm size in the study area is quite variable, but farms tend to be relatively large (up to 100 ha or more). In general, in each farm part of the land is directly owned (by property) by the farmer, and part is leased from other owners.

As lease fees are high for the country, the land lease market is quite dynamic. Land owners very often withdraw from lease contracts, with repercussions on the structure of farms. Due to this, investments in farm infrastructures (e.g. for irrigation) and in permanent crops are very rare.

The main crop in the area is common wheat, which is usually sown in September and harvested in July. Oilseed rape is another winter crops frequently cultivated in the area. The commonest spring-sown crops are sunflower and maize. The latter is becoming less common because of insufficient rainfall experienced in recent years during the crop growing period. All cereal crops are cultivated for grain production.

Livestock is very scarce and consists mainly of small herds of sheep and goats.

Common farming practices in wheat production include the use of seeds treated with fungicides and insecticides and the post-emergence application of herbicides. Less frequently, farmers apply also rodenticide baits (when sowing), fungicides and insecticides (in post-emergence). All post-emergence treatments are applied in March-April.

Red-Breasted Geese on their winter feeding grounds: needs and threats

Red-breasted Geese arrive in the study area in small flocks in November-December, while larger numbers are recorded later in the winter, depending on the weather conditions. The Red-breasted Geese are usually mixed with Greater White-fronted Geese (*Anser albifrons*) flocks. The spring migration starts in March.

On the main wintering sites in Romania and Bulgaria the geese feed on agricultural land dominated by winter wheat and barley, maize stubble, pasture grasses and oilseed rape. The birds periodically fly to coastal lakes to drink. These lakes, situated up to 50 km from the feeding areas, are also used as night-roosts. The proximity of drinking and roosting sites to feeding areas may influence winter distribution. In Bulgaria, Red-breasted Geese roost on water; usually in the middle of lakes, but occasionally, or in times of high hunting pressure and calm conditions, on the sea. When the lakes freeze, they roost on the ice. At present 80-90% of the wintering population is concentrated at five major roost sites around the northwest Black Sea coast. These include two of the Project sites, the IBAs of Shabla and Durankulak in Bulgaria.

In analogy to what has been described for other goose species wintering in Europe (Mooij, 1992), it can be assumed that the main threat to the wintering Red-breasted Goose population lies in disturbance at feeding and resting sites. Disturbance at feeding sites is associated with legal and illegal hunting (Greater White-fronted Geese can be legally hunted), as well as agricultural activities. In particular, farmers may scare the geese from their fields in order to prevent damage to the crops. Disturbance can heavily affect the energy balance of the wintering birds.

Disturbance promotes activities with a high energy consumption and reduces all activities that save energy. In addition, disturbance prevents food intake and thereby energy intake and fat deposit accumulation.

Food-rich and safe feeding grounds are therefore necessary for the conservation of the species.

The national agri-environment scheme for wintering geese

Since 2012, the 2007-2013 Rural Development Programme for Bulgaria includes an agri-environment scheme for wintering geese, available throughout the whole of the country. The scheme is based on the following commitment: winter cereals have to be sown and grown on minimum 50% of the farm area in order to ensure food for the wintering geese species. The application of rodenticides in the period 15 October – 1 March is forbidden.

However, this scheme is considered not sufficient for the conservation of the Red-breasted Goose in the wintering sites in Bulgaria. Therefore, one of the conservation actions included in the LIFE09/NAT/BG/00023 project aimed at designing and testing a pilot agri-environment scheme.

The pilot agri-environment scheme developed in the LIFE+ project

The scheme has been designed and rolled out in the area of the municipality of Shabla since winter 2013-2014. The objectives of the scheme are:

1. To ensure adequate quantity and quality of food for the Red-breasted Goose in the period in which the species is wintering in Bulgaria (December to February);
2. To prevent / reduce the disturbance to the Red-breasted Goose during the winter period;
3. To encourage the participation of farmers in agri-environmental land management aiming at better protection of the biodiversity in agricultural lands and reducing conflicts with species of global environmental concern.

The scheme is based on the following commitments:

1. 50% of the land has to be cultivated with common wheat or other winter cereals, and the remaining 50% has to be cultivated with maize (therefore maize stubble has to remain on the surface during winter), in rotation with winter cereals;
2. on winter cereal plots that are not preceded by maize, 40 kg/ha of maize kernels should be spread in November;
3. in order to reduce disturbance to the species, during the period 30 November - 15 March it is prohibited to enter the farm block more than twice;
4. the treatment with rodenticides is forbidden during the period 15 October - 1 March.

Two additional options have not been tested insofar: (1) creating 20 m alfalfa buffer strips along water bodies, and (2) applying biostimulants to the crop (in order to increase the available biomass).

The basic payment rate is set at 97 €/ha. Additional 68 €/ha are paid for the spreading of maize kernels. In order to involve as many farmers as possible, the maximum amount per farmer has been set at € 5,000 per year.

The payment rate is calculated based on an estimation of 15% production loss in common wheat due to the damage caused by the grazing geese. However, this estimation has not been backed by dedicated studies in the Red-breasted Goose wintering range in Bulgaria.

The minimum area land block size has been set at 1 ha, while the maximum has been set at 45 ha.

As collision with wind turbines is considered to be a significant cause of mortality for the species, land blocks with wind turbines and land blocks within a distance of less than 500 m from wind turbines are not eligible.

A GIS layer of eligible land parcels is currently in preparation.

Evaluation of the pilot agri-environment scheme

The scheme does not seem to bring significant additional burden to normal farming operations in the area, because:

- winter cereals, and to a lesser extent maize, are among the main crops grown in the area;
- pesticide treatments and other farming operations are normally not carried out during late autumn and winter.

Therefore, the main justification to the payment lies in the estimated crop damage and income loss caused by the geese grazing on the winter cereal fields. In order to provide a more robust justification to the payment rate, the actual damage caused by the geese would need to be evaluated based on solid evidence.

As the scheme has been rolled out in the current winter, a quantitative evaluation of its effectiveness has not been performed yet. Nevertheless, Red-breasted Goose flocks have already been seen grazing on some of the fields under contract, thus indicating that the scheme can provide attractive feeding grounds for the geese.

However, the scheme does not address the disturbance caused by hunters. Hunting is allowed in most of the farmland area in Shabla and Durankulak, and the Greater White-fronted Goose can be legally hunted and is actually among the main target species. Therefore, the disturbance and mortality caused by hunting could probably frustrate the benefits of appropriate land management.

Perhaps, the feasibility of limiting the scheme to few hunting-free land blocks should be assessed. In this case, a minimum land block size should be identified, along with techniques to increase the attractiveness of these selected land blocks (e.g. supplementary feeding, use of decoy birds etc.).

The ongoing GPS radio tracking of a number of tagged geese is expected to better highlight the causes of mortality and disturbance, along with giving more insights into local movements, reaction to disturbance and energy balance. All this information will be useful to assess the effectiveness of the pilot agri-environment scheme, possibly leading to an improvement of the scheme design.

Transposition of the pilot agri-environment scheme into the 2014-2020 Rural Development Programme of Bulgaria

EU Regulation n. 1305/2013 on "Support for rural development by the European Agricultural Fund for Rural Development (EAFRD)" sets out the main rules on design and implementation of the 2014-2020 Rural Development Programmes.

As for the previous programming period, agri-environment payments, now called agri-environment-climate, are a mandatory measure for Member States.

Agri-environment schemes for an appropriate management (including the compensation of income losses) of the wintering grounds of geese have been in place in a number of 2007-2013 Rural Development Programmes (e.g. Bulgaria, Northern Ireland, Romania). In Romania, an agri-environment scheme targets the management of the feeding grounds of the Red-breasted Goose, and its prescriptions are relatively similar to those of the pilot agri-environment scheme developed under the LIFE+ project.

In order to address the conservation of the globally-threatened Red-breasted Goose, and to ensure the continuation of the benefits for this species generated with the pilot agri-environment scheme, a dedicated agri-environment measure should be introduced as part of the 2014-2020 Rural Development Programme of Bulgaria.

The design of the pilot agri-environment scheme matches all the requirements for agri-environment-climate payments as laid down in Art. 28 of EU Reg. 1305/2013. However, the scheme design could be better adjusted as follows:

- in order to ensure sufficiently large feeding blocks, the minimum block size could be increased, e.g. up to 5 hectares;
- as the available budget is likely to be higher, the maximum block size and the maximum amount per year should be removed.

Additional adjustments could be introduced later on, based on the final outcomes of the LIFE+ project and on specific evaluation of the pilot agri-environment scheme.

Art. 47 of EU Reg. 1305/2013 lays down rules for area-related payments. In particular, some provisions seems particularly useful to address the problem of short-term land lease contracts of arable farms in the study area:

- it is possible to introduce agri-environment-climate payments that are not based on fixed land parcels. These are non-block-bound commitments, i.e. commitments which can be applied every year on different parcels without causing any risk to the fulfilment of the commitments and to the achievement of the environmental objectives. However, if a RDP Managing Authority intends to use such a possibility, it has to be clearly mentioned beforehand in the Rural Development Programme, where it must be clearly demonstrated that such exchange of parcel will not jeopardise the achievement of the commitments' objectives;
- the number of hectares to which commitments apply may vary from year to year if this possibility is provided for in the Rural Development Programme and the achievement of the commitment's objective is not jeopardised.

References

Hamnett R., 2006. Country pasture/forage resource profile – Bulgaria. FAO. <http://www.fao.org/ag/agp/AGPC/doc/Counprof/Bulgaria/bulgaria.htm>

Koinov V., Trashliev Hr., Yolevski M. et al. 1968. Soil Map of Bulgaria (East Part, scale 1:400,000). Kaptproekt, Institute of Geodesis and Cartography, Sofia.
http://eusoils.jrc.ec.europa.eu/library/maps/country_maps/metadata.cfm?mycountry=BG

Kottek M., Grieser J., Beck C., Rudolf B., Rubel F., 2006: World Map of Köppen-Geiger Climate Classification updated. Meteorol. Z., 15, 259-263

Ivanova Todorova V., 2013. Climate characteristics along the Bulgarian Black Sea coast from 1970 to 2009. Conference Air and Water Components of the Environment. March, 22-23, 2013. Cluj Napoca, Romania. ISSN: 2067-743X, pp. 269-276.

Mooij JH, 1992. Behaviour and energy budget of wintering geese in the Lower Rhine area of North Rhine-Westphalia, Germany. Wildfowl 43:121-138.