Hunting and Conservation of Turtle Dove in Europe

FACTS AND FIGURES

What's happening with the Turtle Dove population in Europe?

The Turtle Dove (*Streptopelia turtur*)[1] has decreased over the past decades in Europe (Figure 1). The Pan-European Common Bird Monitoring Scheme (PECBMS) assessed the trend of the species as undergoing a **'moderate decline'**, which means a significant decline, but not significantly more than 5% per year (PECMBS, 2019).

As can be seen in Figure 1, a steep decline in Turtle Dove population occurred in the 1980s. Since then, the decline has slowed from the 1990s onwards.

Over recent years, the population trend seems to **stabilise**, although still declining. Indeed, since 2013, the Turtle Dove population has stabilised in Spain (Moreno-Zarate *et al.*, 2020) and its population size in the Western Flyway (which includes Spain) has only decreased by 3% between 2013 and 2019 (Bacon *et al.*, 2021).

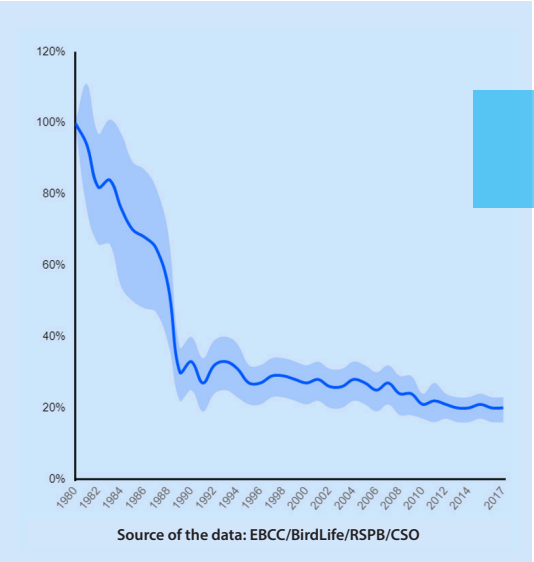


Figure 1
PECBMS Population index (%) 1980 - 2017, Europe (list of 22 countries).

The recent Article 12 reporting assessment (2013-2018) estimated the European Turtle Dove population (EU28) at about 1.980.000 to 3.440.000 breeding pairs. As a rule of thumb, the number of breeding pairs multiplied by three[2] could be used to give an idea of the population size (i.e. 1 pair = 2 birds plus 1 non-breeder/offspring), this would correspond to about 5.940.000 to 10.320.000 individuals. Thus, **the European population remains large**, although declining.

[1] The Turtle Dove (*Streptopelia turtur*) is listed in the Annex II, part B of the Birds Directive, therefore, according to the Article 7(3), it may be hunted only in the Member States in respect of which they are indicated. These Member States are BG, GR, ES, FR, IT, CY, MT, AT, PT and RO.

[2] This method is used to estimate population sizes from estimated number of breeding pairs (e.g., Wetlands International (2021), as suggested by Meininger *et al.* (1995), Schekkerman (2012)).

How are countries performing in conserving the Turtle Dove?

While the species is declining at the EU scale, it is important to note that **the rate of decline is not similar in all countries**. Some countries are performing better than others with respect to Turtle Dove conservation, and this is best shown by analysing the recent Article 12 reporting data. Figure 2 shows the Turtle Dove long-term breeding population trends per Member State. Note that the Member States represented on the map below are most of the Member States for which a best single value magnitude was available from the Article 12 reporting data.

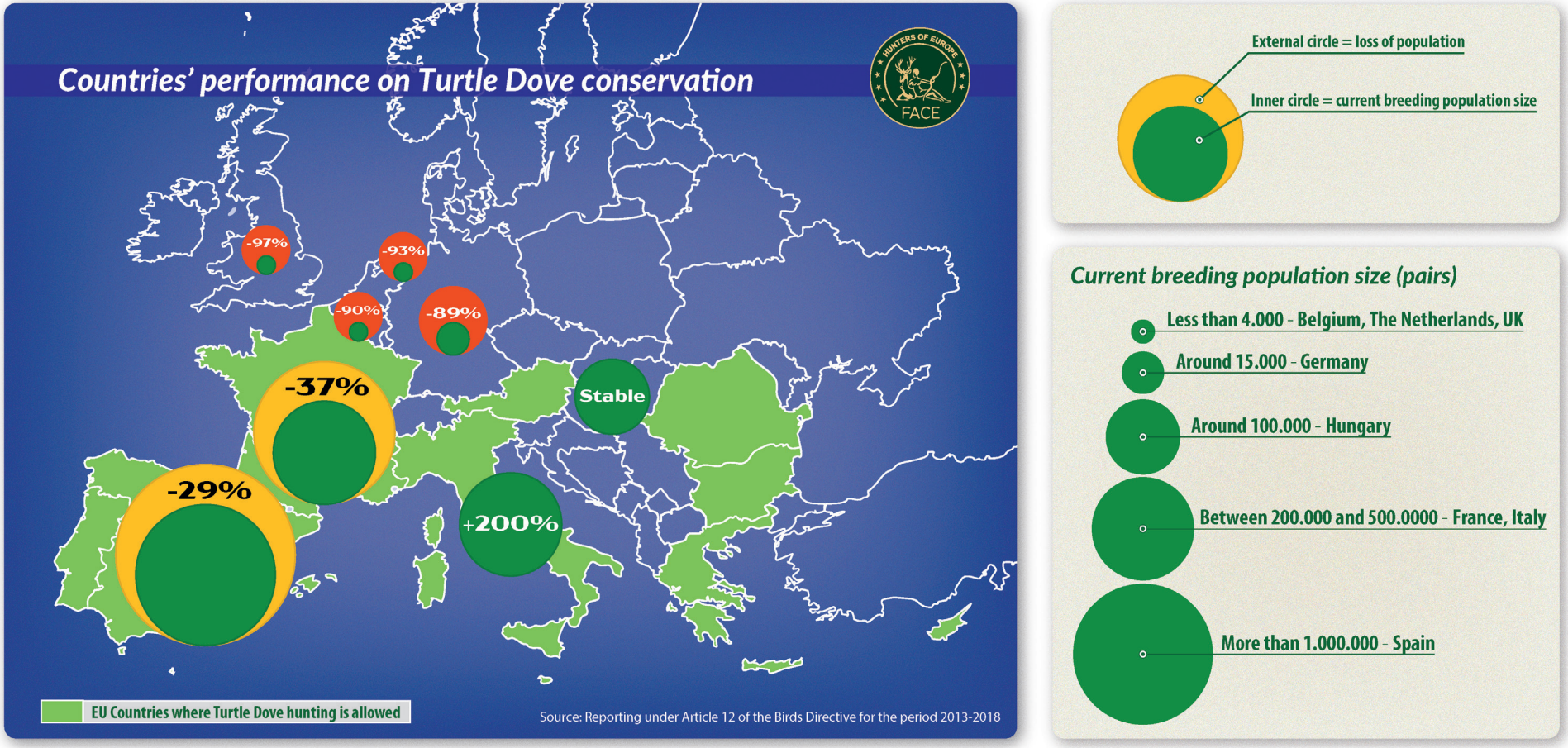


Figure 2
Turtle Dove long-term breeding population trend magnitudes per Member State for which a figure is available (Article 12 reporting, 2013-2018). The Article 12 reporting data (i.e., long-term trend period, population size and trend magnitude) displayed in this Figure is summarized in Annex 1.

The steepest declines are observed in countries such as the Netherlands, Belgium, Germany or the United-Kingdom, where the Turtle Dove is not huntable.

On the other hand, France and Spain are performing much better, although losses also occurred, while data shows an increasing trend for Italy for the period 1993-2018.

Hunting the Turtle Dove is permitted in these three countries. Another scenario is found with the case of Hungary where the population is stable but not huntable.

Although the same obligation to conserve the species equally applies to all Member States in the EU, legal infringements have been targeted at France and Spain where the population has declined the least (see Figure 3).

This highlights a strong contrast regarding the other countries where the species has almost disappeared and where there were few, if any, conservation efforts for the Turtle Dove undertaken over recent decades.

Thus, it appears obvious that the motivation for these infringements is biased towards hunting rather than on the declining trends in national populations and related conservation efforts.

The respective loss and current breeding population of Turtle Dove per countries can be easily appreciated in Figure 3, although it should be noted that the Article 12 data may be significantly underestimating the size of the Italian population, as it was highlighted by Puglisi *et al.* (2013) that the region of Tuscany alone was hosting around 250.000 breeding pairs which is much higher than the number reported in the breeding bird atlas of 1997 (Tellini Florenzano *et al.*, 1997).

Comparison between long-term loss and current levels of breeding population of Turtle Dove

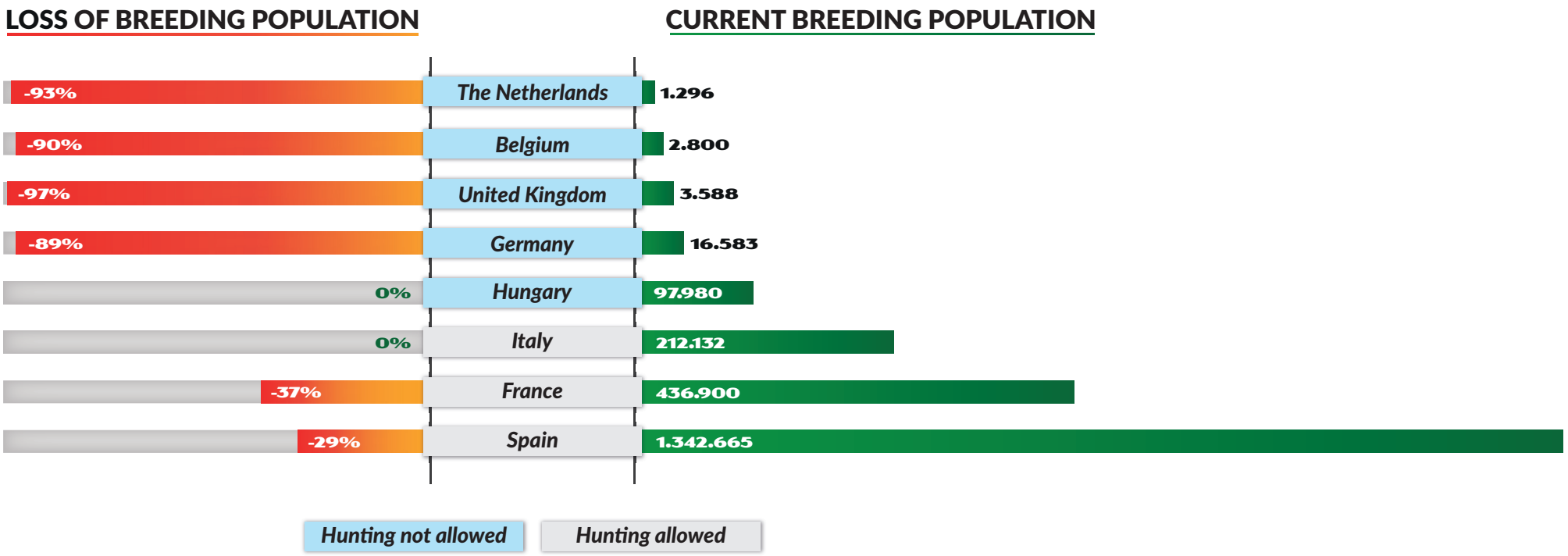


Figure 3
Loss (long-term best single value magnitude, in %) and current population estimates (breeding pairs) per countries (Article 12 data, 2013-2018).

Why is the Turtle Dove declining?

The Turtle Dove population decline across Europe is **driven by the loss of both nesting habitats, i.e., tall, overgrown bushes, and foraging habitats, i.e., short weed-rich areas** (Browne and Aebischer 2005, Browne and Aebischer 2003, Dunn & Morris 2012, Browne *et al.* 2004).

Agricultural intensification has been a key driver in reducing the availability and suitability of such habitats (Browne and Aebischer 2005, Moreno-Zarate *et al.* 2020), via mechanisms such as the large-scale removal and alternation of hedges in the last decades.

The prominent role of agriculture in the species decline is reflected by the Article 12 reporting of pressures and threats by Member States (2013-2018) in which they considered it as the main category generating pressures/threats to the Turtle Dove (66%).

While hunting represented 7% of the reports, it is also considered as a pressure in the Turtle Dove International Single Species Action Plan (ISSAP) published in 2018, and, since then, the **harvest levels have decreased dramatically** in the Western flyway and several other countries in recent years following the publication of the ISSAP.

An **interesting point** to note is that even while higher historical levels of hunting were still taking place, the decrease of Turtle Dove population in Europe strongly slowed down from the 1990s onwards following a drastic decline in the 1980s (Figure 1).

Intensive research on Turtle Dove by Browne and Aebischer (2004) highlighted no change in nesting success but showed a diminution of Turtle Dove nesting attempts, which could explain a decline in population, if productivity has played a role in it (Browne *et al.*, 2005).

A diminution of the number of nesting attempts undertaken per year (rather than the success of each individual attempt) has been found to contribute to the decline of other farmland birds, such as the Corn Bunting (*Miliaria calandra*) (Brickle & Harper 2002), Skylark (Alauda arvensis) (Donald *et al.* 2002), Barn Swallow (*Hirundo rustica*) (Møller 2001), Song Thrush (*Turdus philomelos*) (Thomson & Cotton 2000) and Linnet (*Carduelis cannabina*) (Moorcroft & Wilson 2000). Brown *et al.* (2005) reckoned that reduced food availability affecting diet (Browne & Aebischer 2003) and reduced nesting habitat availability (Browne & Aebischer 2004), brought about by agricultural intensification could be the underlying causes of the reduction in the number of nesting attempts undertaken by Turtle Dove.

Adaptive Harvest Management for the Turtle Dove

In 2018, an International Action Plan was finalised for the Turtle Dove, which recommended Adaptative Harvest Management (AHM) for Member States where the species is hunted to ensure a sustainable level of harvest. Therefore, the European Commission launched an AHM programme, which is currently in progress.

In this context, much work has been done in modelling the population at flyway scale, i.e., for the Western flyway and the Central/Eastern flyway separately.

Such models use population parameters such as survival and fecundity, population size and hunting bags to estimate a population growth rate.

The recent developments of the AHM process showed that a limited harvest level is possible and can be sustainable.

For the Western flyway, a single model was produced, which is based on a **precautionary approach** (for example, it is only considering hunting mortality as fully additive to natural mortality). **This model predicted that harvest rates up to 5.5% of the population would allow it to grow** (i.e., reach a population growth rate above 1).

What is AHM?

Adaptive Harvest Management is typically an efficient tool to guide any process of natural resource management in the face of uncertainties prevailing about the system dynamics, including the impact of management actions (e.g., harvest).

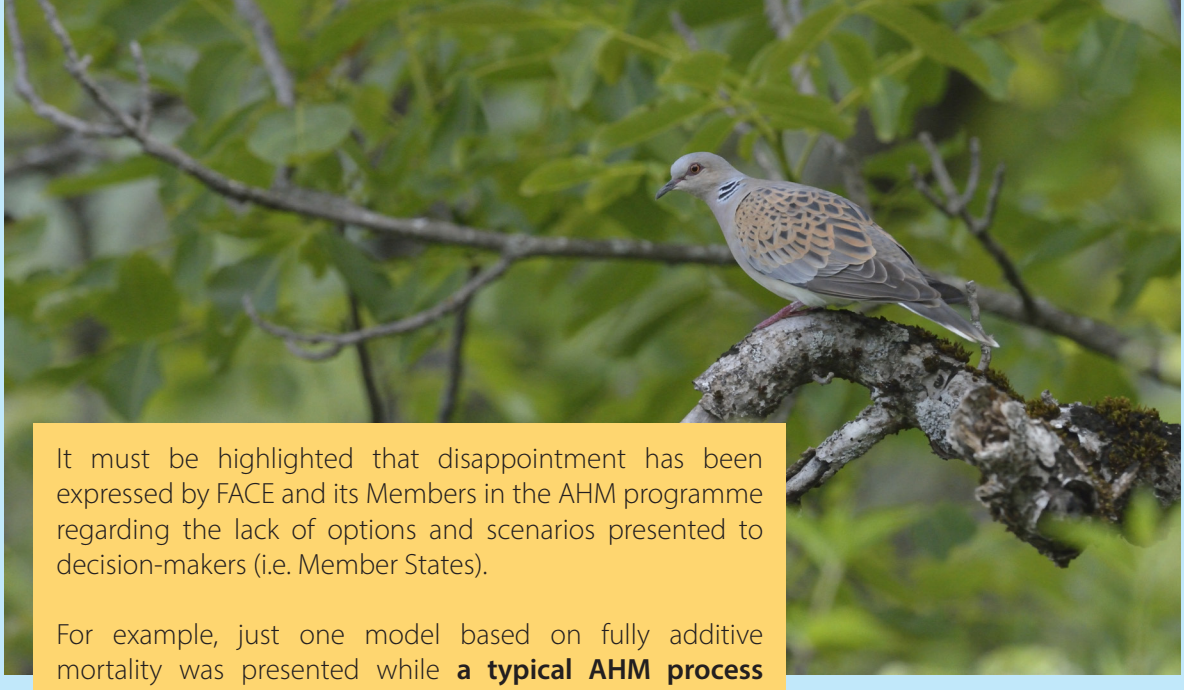
Although facing uncertainties, its implementation relies on the following basic parameters needed for modelling: population size and trend, flyways delineation, survival and productivity rates and hunting bags (Marjakangas et al. 2015).

Often referred to as "learning by doing", adaptive management is an approach to natural resource management that emphasizes learning through management where knowledge is incomplete and when, despite inherent uncertainty, managers and policymakers must act.

In other words, it is adapting management actions based on what is learnt (Williams *et al*., 2009). However, differentiating from "trial and error", adaptive management implies the incorporation of scientific method in the management framework.

However, the model results are associated with statistical uncertainty highlighting that there is a probability of population decline (i.e., a population growth rate below 1) of 32% even if no hunting occurs. Allowing a limited harvest would increase this figure of 32% only by a small percentage. For example, allowing a harvest of 124,000 individuals would increase the percentage to 39% and allowing 248,000 would increase the probability to 46%. It should be noted that this only represents a perceived risk generated by the uncertainty of the statistical model, while the model predicted a positive growth rate for each of these values. This shows the scope to have a small-scale harvest without resulting in sizeable changes to the probability of the population growth rate to be negative.

Regarding the Central/Eastern flyway, the research showed that, from a biological point of view, **a reduced harvest is possible**. It was therefore **recommended by the research team** that a 50% reduction of the level of harvest should be considered, as a precautionary approach. This recommendation was **supported by the national hunting associations.**



It must be highlighted that disappointment has been expressed by FACE and its Members in the AHM programme regarding the lack of options and scenarios presented to decision-makers (i.e. Member States).

For example, just one model based on fully additive mortality was presented while **a typical AHM process would encourage the creation of several models and the presentation of several scenarios from which to choose**. The results (i.e., predictions) from different models would then be compared to monitoring data over time.

How is the hunting community helping in Turtle Dove conservation?

When their ecological conditions are improved, Turtle Dove populations can be maintained. In Member States where the Turtle Dove is huntable, **the hunting community is playing a major role** through investing time, effort and funds in conservation efforts while reducing harvest of the species over the recent years (FACE, 2020). Common actions undertaken range from the creation and management of suitable habitats, providing water or food, which can have a positive effect on breeding success of the Turtle Dove (Rocha and Quillfeldt, 2015), or controlling relevant predators, such as the Magpie (*Pica pica*), one of the Turtle Dove's main nest predators. It should be noted that a proportion as high as around 45% of nests was shown to be predated in the UK for the period 1941–2000 by Browne and Aebischer (2005). Some examples of conservation efforts by the hunting community are described below.

ITALY - Leading the way in research

In 2018, the *Federazione Italiana della Caccia* started a survey to investigate the magnitude of habitat improvement put in place by local hunting departments. Evidence from a small sample of hunting departments (31 out of 212) showed that, in those departments alone, a total of 990 ha is managed by hunters for the Turtle Dove and that 25% of this area consists of no hunting zones. These habitat measures generated costs up to 397.385 euros annually, which are supported by the income of hunting taxes. This shows the **Italian hunter's community ability and potential impact in habitat restoration**.

In addition to habitat management, the Italian hunting federation is involved in **research on various migratory games species**, including the Turtle Dove. For example, wing data is collected since 2016 to provide knowledge about the age ratio (i.e., ratio between juveniles and adults). Moreover, the federation just started a VHF radio marking programme to generate data on fecundity (Figure 4), out of its own investments. Such research on the species is **crucial** to improve knowledge and management.

In order to reduce the total bag, the regions in Italy also agreed on a maximum of 3 fixed day season in early September and a daily limit of 5 birds per hunters, resulting in 15 birds maximum per hunter and per season. This is supported by the hunting federations and several are considering further restrictions of only 10 birds per season.

Figure 4
The first Turtle Dove captured and released with a VHF radio by the Federazione Italiana della Caccia on 10 May 2021.

FRANCE - Large scale restoration

Many habitat management actions benefitting the Turtle Dove are also undertaken by hunters in France.

The hunting departmental federations are **actively involved** in improving conditions for the Turtle Dove by conducting conservation actions and habitat improvements all across the country.

As a concrete example, for **20 years**, the departmental hunting federation of Vendée, has been financing **thousands of seedlings**, of a variety of species, each year to plant trees, bushes, and hedges across the department to contribute to improve biodiversity.

Since 2000, these efforts resulted in **more than 452,000 trees and shrubs planted** on 564 sites to reach the amount of 342 ha of woodland and **72.1 km of hedges** (FDC Vendée, 2020).

Figure 5
Habitat management by hunters in France.

In addition to actions on the ground, **new technologies** are being developed to ensure the sustainable harvest of the species and to enhance scientific research on the species.

The French Hunter's Federation (FNC) developed an application "ChassAdapt", which allows **real-time data collection** and information about the progress of the harvest to the allocated quota. The recording of each individual harvested is mandatory and controlled with the help of a QR code generated by the app, which can be checked by enforcement officers in the field.

Moreover, **ChasseAdapt** will contribute to scientific research by allowing the **collection of wing data** which is needed for the estimation of age and sex-ratios, crucial to better understand the population dynamics, and to which the hunting community is a key player in data collection.

SPAIN - The stronghold of the species

In Spain, the Turtle Dove decline was especially remarkable in the North, where hunting is relatively unimportant (Moreno-Zarate *et al.*, 2017).

Multiple studies were conducted in Spain and the results show that hunting reserves where Turtle Dove hunting takes place carry out **habitat management measures** as well as water provision and supplementary feeding that benefits the Turtle Dove.

Furthermore, **80-90% of the management costs are supported by hunters and managers**. In 2016, **287 million euros** were spent by the hunting managers of 5 regions on habitat management measures such as habitat improvement, feeders or water troughs (Sánchez-García *et al.*, 2020). Signs of recovery of the population resulting from the study lead by Moreno-Zarate *et al.* (2020), seen in Figure 6, are encouraging and highlight the importance of continuing to improve the Turtle Dove's habitat.

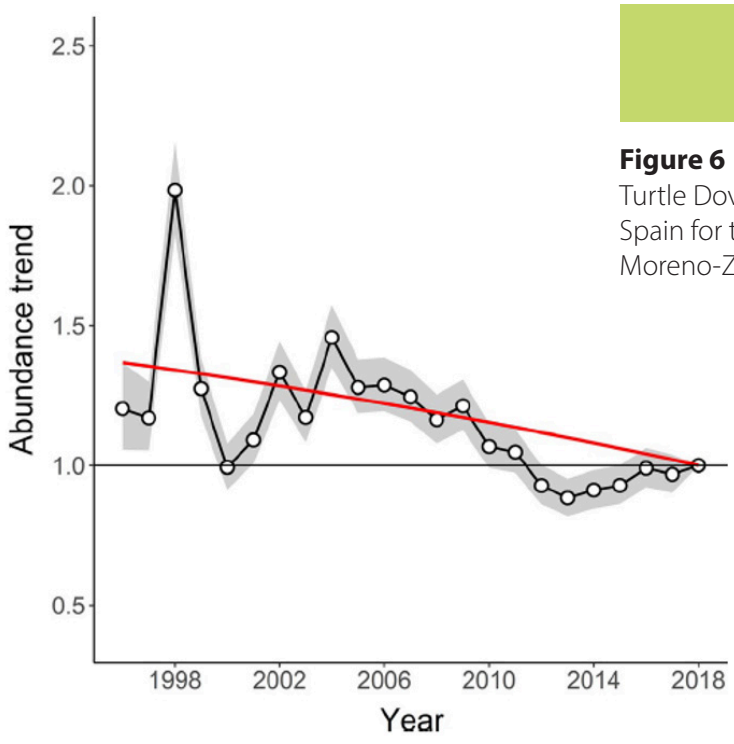


Figure 6
Turtle Dove's population trend in Spain for the period 1996-2018 from Moreno-Zarate *et al.* (2020).

GREECE - More than 2 million euros invested by hunters in habitats

The Hellenic Hunting Federation is undertaking **numerous habitat measures** benefitting the Turtle Dove each year including hedgerows planting, water provision and seed-rich habitat creation.

For example, **thousands or hectares are planted with various crops each year which are left unharvested** (Figure 7). The costs of this practice reached more than **2 million euros** from 2005 to 2019, entirely supported by the Greek hunting community.

Hunting the Turtle Dove in Greece is under strict rules to mitigate any potential effect. For example, the **daily bag limit was decreased** in 2018-2019 from 12 to 10 birds, and further in 2019-2020 from 10 to 8 birds.

Their bag data regarding Turtle Dove, collected since 1995, are illustrating a **stability** in the species population in the country as the mean annual harvest per hunter remain stable with an average of 4 individuals per hunter and per year for the period (1995-2020).

Figure7
Planting of seed crops by the Hellenic Hunting Federation that are left unharvested.

MALTA - Restoring native woodland and Turtle Dove research

Under the coordination of the Federation for Hunting & Conservation – Malta (FKNK), hunters have been **engaged in safeguarding and managing the natural habitats across the country** which includes several important conservation actions for the Turtle Dove that passes through Malta in spring and autumn.

For example, the FKNK took part, together with another NGO (ACT), in a national project aiming to plant **1.000.000 trees and shrubs** from local native stocks over 10 years and across the country.

To achieve this, the FKNK has set up a nursery (over 2.500 seeds planted in 2020) and is now **distributing seedlings for free to any interested parties, including many hunters**. These seedlings are then planted throughout the country.

As the Turtle Dove does not breed in the country, the FKNK is currently investigating the possibility of restocking of the wild population and conducting research on captive-bred Turtle Doves. To do so, they started releasing specimens in 2017, and in 2021, 350 were released. Among them, 8 were fitted with **GPS Satellite Tracking Transmitters**.

This will test if captive-bred birds follow normal migration patterns, as well gathering other useful information (bird behaviour, speed of flight, altitude of flight and location, temperature of bird and location).

Lessons learnt

It is therefore important to acknowledge that, across Europe, **hunters represent an important stakeholder actively involved in maintaining the Turtle Dove's habitat** that are more than willing to put efforts into it, for example, through hunting federations' own initiatives and investment, or through agri-environment schemes, that have the potential to provide foraging and nesting habitats in close proximity, thus yielding important benefits (Dunn *et al.* 2017).

To stop the decline of the Turtle Dove population, priority should be given to restoring habitat quality rather than closing hunting where it happens, as it might support the Turtle Dove population recovery more effectively (Marx *et al.* 2016).

In summary

1. The major decline of the population happened in the 80s'.
2. Agriculture intensification has been the main driver in the decline.
3. The species' EU population status is now Near Threatened with a population size of 1.9 to 3.4 million breeding pairs.
4. FACE is involved in the ongoing AHM process to ensure a sustainable harvest.
5. The research in the context of the AHM process showed that lower levels of harvest are possible, which is supported by the hunting community.
6. Hunters are actively involved in Turtle Dove conservation across Europe.

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Annex 1

Summary of Member States'Turtle Dove breeding populations numbers, trends, and period (Article 12 reporting, 2013-2018) represented in Figure 2. Estimated breeding populations are best value (*or mean value when no best value was not provided) of the country's number of Turtle Dove breeding pairs. These values only take breeding adults into account and are not estimates numbers of the total population.

MS	Estimated breeding population	Long-term breeding trend magnitude	Long-term breeding trend period
NL	1,296*	-93	1984-2017
BE	2,800	-90	1973-2018
UK	3,588	-97	1980-2016
DE	16,583*	-89	1980-2016
HU	97,980*	Stable	1980-2018
IT	212,132*	+200	1993-2018
FR	436,900	-37	1996-2017
ES	1,342,665	-29	1980-2018

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