πανδώτειρα

NATURA2000 ● Η ΦΥΣΗ ΜΑΣ ΖΕΙ

ACTION A5.2: REPORT ON RECOMMENDATIONS OF MEASURES TO BE INCLUDED IN THE CYPRUS CAP STRATEGIC PLAN (Cyprus CSP).

LIFE IP PHYSIS (PANDODEIRA): Managing the Natura 2000 network in Cyprus and shaping a sustainable future
(LIFE18 IPE/CY/000006)

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Introduction

About the project

Life IP Physis (*Pandoteira*) is a LIFE Integrated Project that aims directly at the improvement of the conservation status of species and habitats of community interest through actions in the whole Natura 2000 (N2K) network in Cyprus for the areas under effective government control. The project includes actions affecting the whole network and other actions affecting certain species and habitats in specific N2K sites.

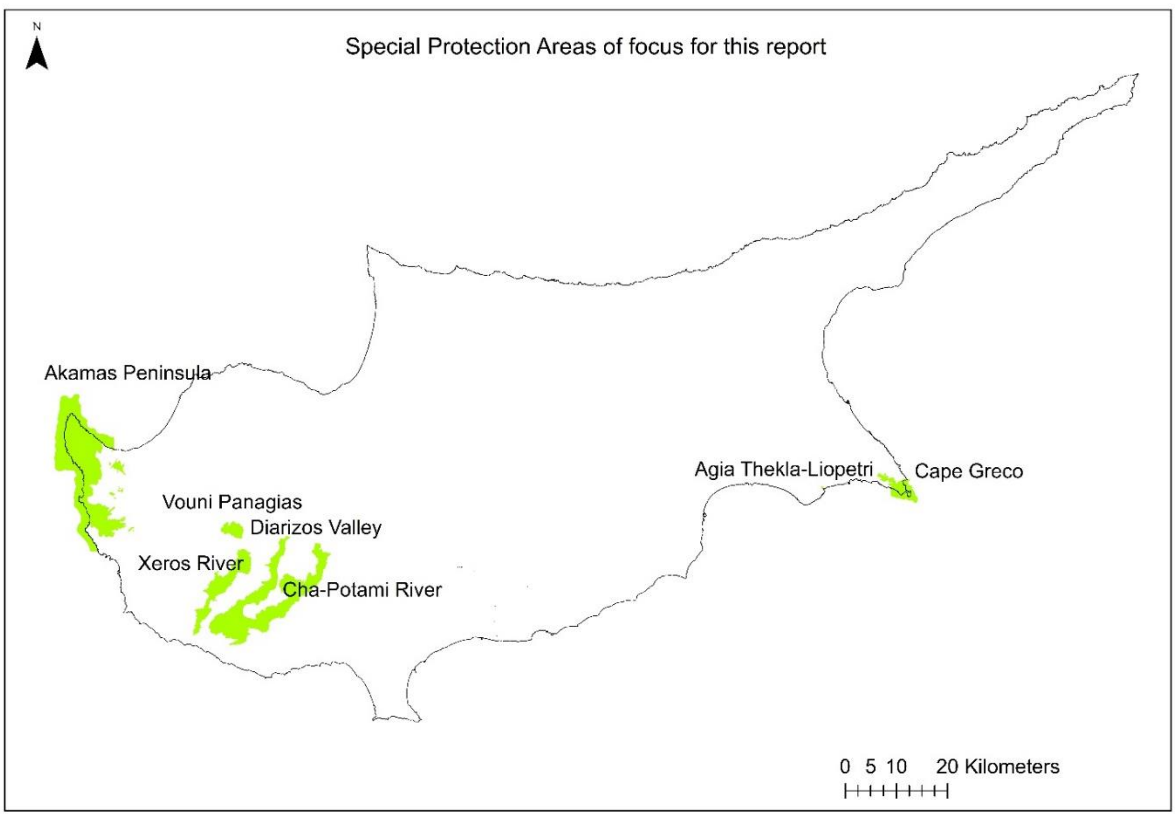
Action description

Action A5 is a preparatory action under the LIFE IP PHYSIS programme. The responsible partners for this action are the Game & Fauna Service (GFS) and BirdLife Cyprus (BC). Under this action, six studies will be carried out (between 2021 and 2024), with the overall objective of informing conservation actions in the second Phase of the project (2023-2030). The current report comprises one of these studies, and provides background information relating to current knowledge and understanding on birds and farming, to inform specific bird-friendly farming measures recommended here. The specific measures identified and outlined are proposed to be included in the EU Common Agricultural Policy (CAP) Cyprus Strategic Plan (CSP) for 2023 - 2027 to support local farmers and bird-friendly farming and grazing practices both within target SPAs and more widely. The main focus will be on specific Special Protection Areas (SPAs), designated for qualifying avian species that are to a significant extent dependent on farmland and grazed scrub ecosystems.

Special Protected Areas (SPAs): Focus Areas of this report

Special Protection Areas (SPAs) are sites designated under the European Union (EU) Directive on the Conservation of Wild Birds (2009/147/EC). Under this Directive, every Member State of the EU has a duty to safeguard the habitats of migratory birds and certain particularly rare, localised or threatened bird species.

Cyprus has so far designated thirty SPAs across the island and this report focuses on seven of these sites that are of particular importance for bird species that are to a great extent dependant on farming or grazing. These are the following: Xeros Valley - CY4000007, Zoni Eidikis Prostasias Cha–Potami - CY5000010, Zoni Eidikis Prostasias Koilada Diarizou - CY4000020, Zoni Eidikis Prostasias Chersonisos Akama - CY4000023, Vouni Panagias - CY4000004, Periochi Agias Theklas–Liopetri - CY3000009 and SPA Kavo Gkreko - CY3000005 (Map 1). Apart from focusing on measures suitable for these sites, this report also has a horizontal character, in the sense that the measures proposed through it can be applied to all Natura 2000 sites where there are areas of farmland and / or grazing land. The proposed measures are also applicable beyond designated Natura 2000 sites.



Map 1: Target SPAs that this report is focusing on.

SPA Qualifying species: Focus bird species of this report

This report focuses on 12 species of conservation concern, listed under the Annex I of the Birds Directive 2009/147/EC, which Cyprus therefore has an obligation to take specific measures to conserve, such as designate sites such as the ones shown in Map 1. These 12 species are to a greater or lesser extend associated with and dependant on farmland habitats (including grazed habitats). These SPA qualifying species are: the Long-legged Buzzard (*Buteo rufinus),* the Red-footed Falcon *(Falco vespertinus),* the Eleonora's Falcon *(Falco eleonorae),* the Bonelli's Eagle (*Aquila fasciata),* the Griffon Vulture *(Gyps fulvus),* the Cyprus Wheatear *(Oenanthe cypriaca),* the Cyprus Warbler *(Sylvia melanothorax),* the Masked Shrike *(Lanius nubicus),* the European Roller *(Coracias garrulus),* the Eurasian Thick-knee *(Burhinus oedicnemus),* the Cretzschmar's bunting *(Emberiza caesia)* and the Calandra Lark (*Melanocorypha calandra)*.

Objectives of current report

This report will focus on building on existing knowledge to identify the features of farming and grazing practice that are beneficial for these SPA qualifying bird species (and also for wildlife in general). This will allow appropriate management actions to be identified for inclusion in measures for rewarding and compensating farmers and shepherds within Natura 2000 areas, to be drawn up for inclusion in the Cyprus CSP. The objective of this report is to come up with specific Agri-environment-climate or other suitable CSP measures (such as Natura 2000 payment measures) to effectively support local farmers to maintain bird-friendly practices. The involvement of the Cyprus CSP authority in the process of drawing up these schemes is vital, with the objective of ensuring these measures are implementable. The objective will be to design schemes and have them agreed with the CSP authority in time for inclusion in the 2023-2027 CAP programming period.

Description of sections of the report

This report will provide information on the impacts of current agriculture practice on biodiversity and birds in Europe, as well as the potential for wildlife-friendly agriculture to support biodiversity, to help the current biodiversity crisis, while also helping to reverse the growing climate crisis.

In addition, the report will explore examples where agriculture and biodiversity are supporting each other, with a county case study from Spain. Furthermore, we will analyse the implementation of the Common Agricultural Policy (CAP) in general, as well as in Cyprus in particular, since 2014.

Finally yet importantly, the report will present the recommended agri-environment and eco-scheme measures for inclusion in the next CAP implementation period (2023-2017), which the project team has collated. We believe that these measures will have a lasting positive impact on the island's biodiversity and farmland birds in particular, as well as provide support to our farmers, in order to reduce land abandonment.

Impacts of agricultural practices on birds & biodiversity – Europe wide

Agriculture has had a significant influence on ecosystems for millennia (Blondel & Aronson 1999, Grove & Rackham 2001, Allen 2001, Arga & Ne'eman 2009, Stoate et al. 2009, Oppermann et al. 2012) and the intensification of agriculture is considered the major driver of the current loss of biodiversity in Europe (Emmerson, M. et al. 2016). In fact, agriculture features in around 40% of all European landscapes (Navarro & Lopez-Bao, 2018; Pe'er et al., 2020). Low intensity farming systems - often associated with traditional practices and more marginal land - create important habitats for wildlife in Europe and biodiversity conservation is to a large degree dependent on the continuation of such systems (Tucker & Heath 1994, Tucker & Evans 1997, Beaufoy et al. 1994, Bignal & McCracken 1996, 2000, Donald et al. 2002, BirdLife International 2004, Stoate et al. 2009, Oppermann et al. 2012, Lomba et al. 2015).

Studies in four European countries have shown that intense agriculture resulted in lower soil food web diversity and complexity, as well as resulted in smaller bodied organisms in the soil (Tsiafouli et al., 2015). Changes in soil food web can bring changes in diversity in another food web group through bottom-up or top-down effects (Gessner et al., 2010).

Abandonment of active farming in low intensity systems or conversion to more intensive agriculture have both been identified as major threats to many species of conservation concern and notably bird species that are open-country specialists, mainly because abandonment and intensification lead to shifts to mostly homogenous habitats (Tucker & Heath 1994, Tucker & Evans 1997, Benton et al. 2003, Green et al. 2005, Suarez-Seoane et al. 2002, Donald et al. 2002, 2006, Sirami et al. 2008, Stoate et al. 2009, Doxa et al. 2010). This loss of heterogeneity can occur at both farm and landscape scales, through crop specialisation and loss of landscape features such as hedgerows and fallows and it has an impact on biodiversity (Benton et al. 2003). Abandonment of traditional land use systems results in biodiversity loss, soil erosion and can threaten vulnerable species (Bernáldez, 1991). Furthermore, studies in grasslands have shown that abandoned fields do not fully recover back to their original plant diversity and productivity state, even after 90 years of abandonment (Isbell et al., 2019). Throughout Europe, farmland dependent species have suffered significant declines since 1970 (Donald et al. 2006). Farmland species have declined by approximately 50% between 1980 and 2006, whereas species associated with forests or generalist species have seen a relative small decline during the same period (Voříšek et al. 2010). The combination of intensification and abandonment of agriculture, have also been demonstrated to cause a decline in both insect and plant diversity (Uchida and Ushimaru, 2014).

Furthermore, intensification of agriculture can often be associated with an increase in chemicals use, such as biocides. These chemicals affect bird survival, reproduction, food availability and quality as well as affecting the suitability of habitats (Geiger et al., 2010; Hallmann, Foppen, van Turnhout, de Kroon, & Jongejans, 2014; Lopez-Antia, Feliu, Camarero,Ortiz-Santaliestra, & Mateo, 2016). The high quantities of pesticide and rodenticide used in agricultural production has had a detrimental effect on bird populations' worldwide (Boatman et al. 2007, Isenring 2010). Rodenticides present a direct threat for many bird species, but especially to raptor species, since a significant amount of their diet is usually rodents. It is worth noting that even if the amount of rodenticide consumed is at a sub -lethal level; this can still cause significant negative effects on the animals' behaviour (Walker, 2007). As animals accumulate large amounts of pesticides and insecticides through their diet, poison accumulates and makes its way up the food chain. This is not a newly discovered effect, since Rachel Carson provided evidence of the damaging effect of pesticides 60 years ago (Carson 1962). A study in eight European countries compared biodiversity within intense farmlands with organic fields and observed that when cereal yield doubled, this was combined with a loss of half the plant species and one-third of carabid beetles and farmland bird species (Geiger et al., 2010). These declines in species diversity were mainly because of agricultural intensification and the use of biocides, especially insecticides and fungicides. It is also worth noting that insecticide use is also reducing the potential for natural biological pest control (Geiger et al., 2010, Walker, 2007). Another study in 21 European countries, on bird population trends between 1980 and 2018, showed that whereas forest birds saw a decrease of around 3%, farmland birds experienced a decline of 57% (PECBMS, 2020). In addition, for 187 globally threatened bird species (out of the 1,469 globally threatened species worldwide), the primary stressor is chemical pollution such as heavy metals, pesticides and fertilizers (BirdLife International 2004).

EU agricultural policies that have rewarded higher yields and encouraged both agricultural intensification and abandonment in recent decades, are recognized as the key policy-level driver of farmland biodiversity loss in Europe (Donald et al., 2002, Emmerson et al., 2016, Navarro & Bao, 2018).

The SPA qualifying species named above are, to a greater or lesser extent, specialised to live in farmland areas and their ecological requirements are deeply intertwined with agriculture practises (Isenring 2010, Walker, 2007). Therefore, the degradation or loss of habitat due to intensification or abandonment of agriculture displaces them or reduces survival and reproductive success (Hume et al., 2020). The main ways that agricultural practices are affecting the SPA qualifying species are changing landscape (through either intensification or abandonment), altering food availability and quality (through extensive use of chemicals such as biocides), thus making habitat less suitable or usable for them.

Intensification of agriculture can significantly alter the habitat, for example through loss of fallow land, loss of hedgerows, mosaic and conversion to monoculture. This can cause loss or degradation of habitat in the long-term and thus negatively affecting farmland birds (Isenring 2010, Walker, 2007), such as the Eurasian thick-knee. Another way that agriculture can alter the habitat is the decrease in grazing, which can reduce habitat heterogeneity and 'patchiness'. Agriculture abandonment, intensification, as well as decrease in grazing activity, negatively affect species such as the Calandra Lark and the Eurasian thick-knee (de Juana et al., 2020) through woodland encroachment that can decrease their available habitat. This encroachment can also increase habitat for rodents, which can put predation pressure on nesting birds. Furthermore, these two species nest on the ground in farmland areas. They are therefore directly affected by agriculture activity and are highly susceptible to nest destruction or accidental persecution of their young, since the crops could be harvested before the breeding cycle is over.

Rodenticides and insecticides also affect qualifying species survival negatively. In the UK, a study was performed on thirty dead birds (twenty Barn owls (*Tyto alba*) and ten Common kestrels (*Falco tinnunculus*)) and a third of them had residues of six different types of rodenticides at potentially lethal levels (Walker et al, 2007). The diet of the Long-legged Buzzard and the Red-footed Falcon consists mainly of rodents, reptiles, small birds, but also Hymenoptera, Coleoptera and other insects (Baker et al. 2018, Ferguson-Lees and Christie 2001, Alivizatos and Kassinis 2021). The European Roller has similar diet, consuming mainly beetles, crickets, locusts, grasshoppers, but also occasionally shrews and voles (Fry et al, 2020). Another SPA qualifying bird species for Cyprus is the Bonelli's Eagle, who's diet consists mainly of birds (dove species and Galliformes) and rodents (mainly black rats) and hares (Iezekiel et al. 2004).

Supporting nature-friendly farming and grazing practices in the EU

The potential of the CAP mechanism and the current challenges

In the sections above, the report analyses the problem and the impact of agriculture intensification and abandonment on biodiversity in general and their effects on birds in particular. However, agricultural landscapes have the potential to support biodiversity and the EU Green Deal Targets provide a promising opportunity for agriculture to provide value for nature. The EU Green Deal Targets are an ambitious set of objectives aiming to fight climate change across Europe (European Commission, 2021c). Green Deal objectives include halting biodiversity loss, achieving 'zero pollution' and climate neutrality.

The Farm to Fork Strategy and the Biodiversity Strategy are central to the EU Green Deal Strategy, since they aim to make the food systems fairer and friendlier to the environment. Some pillars of the Farm to Fork Strategy are reversing biodiversity loss, mitigating climate change and adapting to its impacts (European Commission 2021a). One of the pillars of the Biodiversity Strategy is to restore nature in the EU and there is a specific target to bring nature back to agricultural land. More specifically, among others, it aims to transform at least 10% of agricultural land into "high-diversity landscape features". These include buffer strips, ponds and non-productive trees (European Commission, 2021b).

According to the EU Green Deal Targets, the aims are to decrease pesticides, nutrient losses and antimicrobial sales by 50% by 2030. Furthermore, the targets intend to increase the amount of organic farms to at least 25% by 2030. Another important target for biodiversity is one that aims to bring back at least 10% of farming areas under "high diversity landscape features" by 2030. These targets –if met- will have significant positive effects to biodiversity and for farmers, via the benefit of ecosystem services. For example, reducing nutrient losses will boost soil fertility and therefore farmers can reduce the amount of fertilisers needed (Vysna et al., 2021). The same study, estimated that ecosystem services which are provided through forestry and agriculture in the EU, amount to 234 billion euros per year (Vysna et al., 2021).

During 2020 and 2021, European Member States, bodies and stakeholders negotiated the reform of the Common Agricultural Policy (CAP) for the period 2023-2027. This is a big challenge considering the drastic action needed to tackle climate change together with the biodiversity crisis. The current CAP has been criticised by many, including BirdLife International (2021), Politico (2021) and Greenpeace, for supporting "agri-giants". It has also received criticism for being among the main drivers behind the homogenisation, intensification and abandonment of agriculture (Emmerson et al., 2016, Navarro and Bao, 2018, Robson, 1997), for not being environmentally ambitious and for not challenging the status quo of the current CAP. An example of the low ambition of the newly proposed CAP is the requirement for farmers to leave only 3-4% of their agricultural plots as “space for nature” (with some exceptions). This percentage, according to many studies across Europe (Busch et al., 2020; BIOGEA, 2020; Langhammer et al., 2017) is too low to reverse the loss of biodiversity and is not enough to support farmland bird species. Member states however, can still propose at least 10% “space for nature” in their National CAP Strategic Plan.

According to the Green Deal targets, there is a commitment to decrease pollution related to agriculture in order to tackle both biodiversity and climate crises. Unfortunately, the new CAP does not include legally binding targets related to pesticides, antimicrobials, fertilisers and it does not even include a legally binding requirement for EU countries to increase the share of organic farming (BirdLife International et al., 2021). Nevertheless, Member States with political will, can take the initiative to set ambitious targets, which would contribute towards tackling the climate and biodiversity crises.

Simple and relatively less labour intensive initiatives that have been tested in other European countries have revealed a great potential to increase biodiversity within farmland. In fact, recent studies have revealed that more biodiverse fields resulted in the production of more crop yields in comparison to less biodiverse fields (Renard and Tilman, 2019), as well as improved pollination and pest control (Martin et al., 2019). This illustrates that intensive farming is not the solution to the increasing food demand and comes to contradict popular belief that nature-friendly farming always results in lower production. Other studies have highlighted that increasing biodiversity in farmland can sometimes be a simple task. For example, it has been suggested that field boundary stone walls can provide an ecosystem where vegetation can grow, amphibians can hide and therefore can overall benefit biodiversity (Collierm 2012). Another study has highlighted the importance of flower strips, especially in combination with organic farming practices, as effective tools for increasing pollinator numbers in plots (Geppert et al, 2020).

The potential of supporting environmentally beneficial farming and grazing practices also seems to be something that Cypriots value and are willing to support. A study by Ragkos and Theodoridis (2016) indicated that Cypriots are willing to pay more for products, which are linked to reduction of pesticides, protection of the agricultural landscape, as well as actions that will maintain the culture heritage related to farming on the island. This shows the potential that products have to be competitive without the means of intensification, but rather through mitigations of environmental pressures (Ragkos and Theodoridis, 2016).

Case Study I - Spain

This report will explore the specific example of Spain, since it is a Mediterranean country characterised with high levels of biodiversity and shares climate characteristics as well as produces similar crops to Cyprus, such as olive oil.

Spain has the highest levels of biodiversity within agricultural habitats in Europe (Diaz et al, 2021). Most of Natura 2000 sites in Spain are agricultural land and their value for biodiversity depends on their use for agriculture. A study in Spain revealed that light management in fallow land provides a win-win situation to both the farmer and the farmland birds. On the contrary, however, unmanaged land, which is usually, accompanied by excessive weed growth, converted the habitat to unsuitable for the specialized farmland species (Sanz-Perez et al, 2019, Tarjuelo et al, 2020). Since farmers also dislike the excessive weed growth in fallow land because of fears of lower crop production, light management provides a win-win situation. It is worth to note that Spain has 51% of the land as fallow, which is the largest area of fallow land in Europe (Sanz-Perez et al, 2019) and is also the holder of the largest populations of European farmland birds which are of conservation concern (Burfield, 2005). Here it needs to be highlighted that studies in Spain related the decline of farmland bird species numbers to the reduction of fallow land (Traba and Morales, 2019).

Spain also adopted species-specific measures, which act as umbrella species and therefore support biodiversity in general (del Terrotorios and de Andalucia, 2018). The measure that had the biggest positive impact on Lesser Kestrel Falco naumnni, and other steppic bird species, was maintaining stubble fields and zero tillage (direct drilling) (CMAyOT, 2013). This is because fallow fields contain comparatively high insect biomass and high flora diversity. Monetary support for this measure came from CAP and required farmers to set a piece of land aside in order to be eligible for the payments. The management and implementation of these measures, as well as communication with the farmers was delegated to the Regional Governments. In the region of Extremadura, the local authority designed SPAs in urban areas specifically for the Lesser Kestrels and provided specific actions and training to farmers, in order for them to manage the land in a way that was beneficial for the Lesser Kestrel (del Terrotorios and de Andalucia, 2018). An additional benefit that encouraged the farmers to take on these measures were birdwatching tours. These provided support to the local communities and an additional economic boost (CMAyOT, 2013). Such coordinated actions between European, national and regional authorities were suggested to bring the best results for biodiversity (del Terrotorios and de Andalucia, 2018).

Case Study II - Republic of Ireland

This report will also highlight the case study of the Republic of Ireland, specifically the Burren region, since it is a good example of locally led agri-environment schemes based on results-orientated solutions and payments. The area is characterised by high percentage of High Nature Value (HNV) areas and a diverse landscape and vegetation types. In this way, it is similar to the Cyprus agriculture situation.

Within the Republic of Ireland, 33% of the agricultural land is of High Nature Value (HNV) and 50% of these areas lay within Natura 2000 network. These areas are very diverse in terms of landscape and vegetation types, which made the design of successful agri-environment measures a challenge. These areas were characterized by land use intensification and abandonment (Moran et al., 2021).

A study examined the relationship between the natural heritage of the Burren with farming practices and it showed the need to actively engage farmers in conservation efforts (Dunford, 2002). Based on this, the Department of Agriculture, Food and the Marine and the National Parks and Wildlife Service funded a trial result based payment scheme during 2010 – 2015 in 160 farms. This trial was designed to avoid a solely action based approach, as this was shown in the past not to bring sufficient results either socially or environmentally. The scheme was a success and in 2016, 328 farmers were included, managing approximately 70% of the Natura 2000 network in the Burren region. The success of the scheme was among others, its simplicity. This result-based approach, relied on a simple 10 point scoring system, based on the environmental health of the fields. This system rewarded with higher payments farmers who were actively managing their land, while supporting the biodiversity within their plot. Such actions included restoring walls and removing invasive species. This approach was appreciated by farmers also because they felt it was fair and gave them the "freedom to farm" while managing their land in a more flexible manner (Moran et al., 2021).

Additionally to the environmental benefits that this approach has achieved, this has had a social impact as well. Farmers are now involved and are leading conferences and education walks for the public. More specifically, studies showed that 83% of farmers "regularly" or "sometimes" participated in walks, talks and events, such as the Burren Winterage Weekend, an event celebrating the traditions of the Burren farming community (Department of Agriculture, Food and the Marine, 2020).

Agriculture and biodiversity in Cyprus

Agriculture in Cyprus is facing many challenges, such as an ageing farmer population, farming intensification, land abandonment and high chemical use. The last three factors affect biodiversity in a negative way. In Cyprus, we observe heavy use of chemicals such as pesticides and rodenticides. These likely have a direct negative effect on the birds through their diet. According to Eurostat, pesticide use in Cyprus increased by 101% between 2011 and 2019, a greater increase than for any other EU Member State (Eurostat 2021; see Photo 1 below). In addition, the use of rodenticides is also on the rise, as data from the Department of Agriculture show (see Table 1 below). As you can see in Table 1, the only district that showed a slight decrease in the use of rodenticides between 2014 and 2019 was Paphos (-3.9%). However, the use of rodenticide in the other districts remains very high and showed significant increase. Rodenticides can cause secondary poisoning, especially in birds that have a specialised rodent diet creating a vicious cycle, where rodents are increasing, since their natural predators are decreasing due to poisoning.

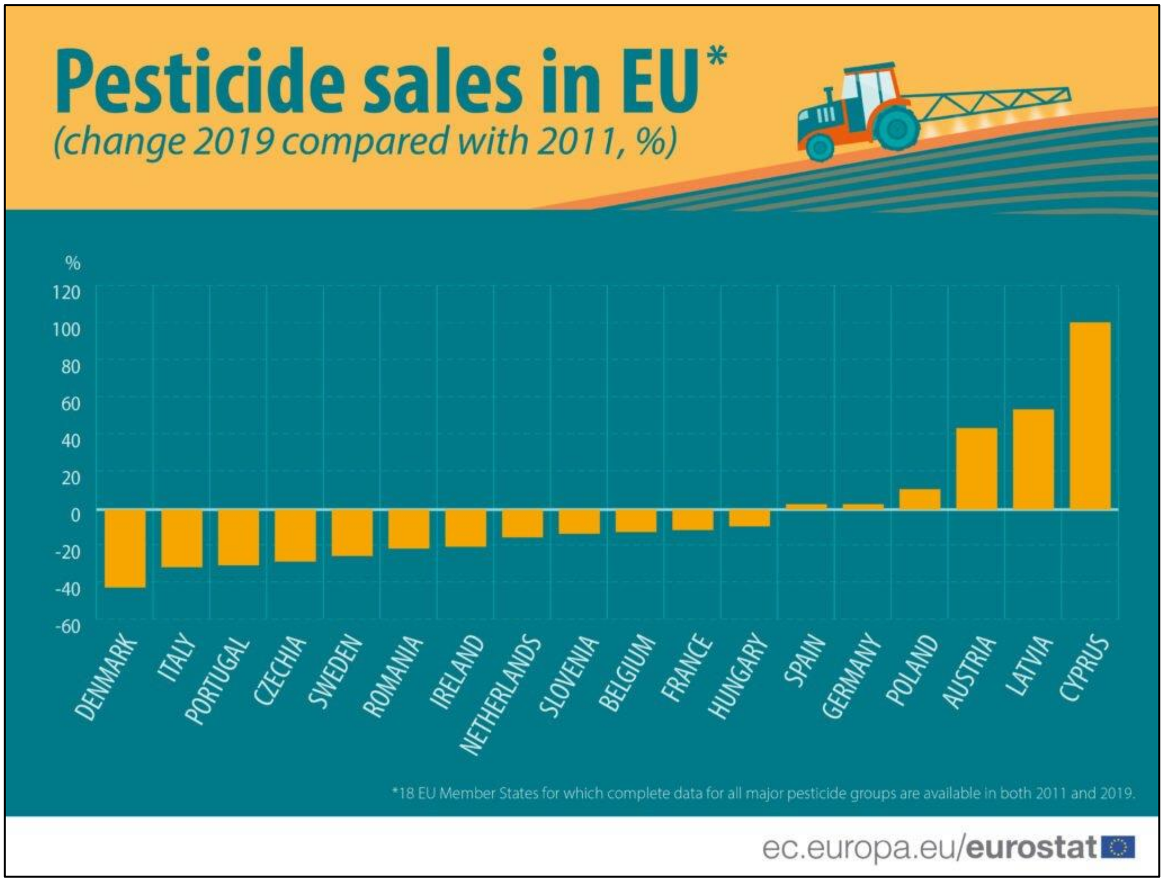
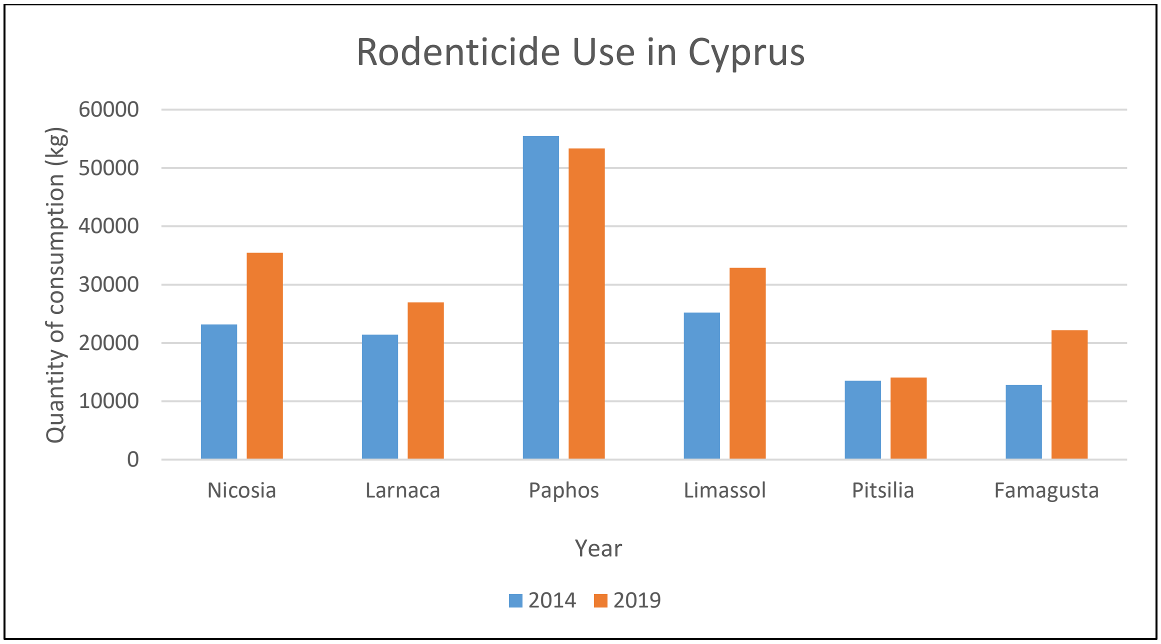


Photo 1: According to Eurostat, pesticide use in Cyprus has increased by 101% between 2011 and 2019. Source: Eurostat 2021.

Table 1: The use of rodenticides between 2014 and 2019 increased in all districts apart from one (Paphos). Source: Unpublished data, Department of Agriculture, July 2020.



A targeted study in Cyprus has shown that heterogenous farmland and low-grazed land is richer in biodiversity than more natural habitats such as forest and scrub (Ieronymidou 2012). Ieronymidou (2012) related abundance and richness within bird categories to habitat and land-use. Some land-use elements and cultivations that were found to be positively associated with more bird assemblages, were groves and vines. More research is needed to confidently correlate farmland practises and biodiversity levels in Cyprus.

The impacts that the current agricultural model has had on the farmland birds of the island is not yet absolutely certain, since systematic data has only been collected since 2006 and data prior to 2013 is not directly comparable with the data obtained afterwards, therefore drawing conclusions should be done so with caution. The Farmland Bird Indicator (FBI) is based on an analysis of 39 species of birds that depend on farmland for nesting, feeding and generally are unable to flourish in any other habitat. According to a BirdLife Cyprus study (BirdLife Cyprus 2021), the FBI for Cyprus in 2015 was calculated at 112 and dropped to 104 in 2017 (BirdLife Cyprus, 2021). This study has also shown that the overall trends of farmland birds between 2013 and 2020 is stable (BirdLife Cyprus, 2021). During these studies, it was shown that two farmland species, the European Roller and the Black-headed Bunting (*Emberiza melanocephala)* have declined yearly by 5% between 2006 and 2000, while the Cyprus Wheatear has remained stable and that species such as the Sardinian Warbler (*Sylvia melanocephala)* and the Corn Bunting (*Emberiza calandra)* have increased yearly by more than 5% between 2006 -2000 (BirdLife Cyprus, 2021).

Despite this mixed picture, it is worth noting here that just over 50% of farmland in Cyprus has been estimated to be High Nature Value (HNV) farmland, with relatively high biodiversity value (Oppermann et al., 2012 & Paracchini et al., 2008). Maintaining such HNV farmland, and avoiding abandonment in these areas, can make a significant contribution to biodiversity conservation efforts.

Application of the CAP in Cyprus

Rural Development Plan 2014 – 2020 (RDP)

The last Cyprus CAP Strategic Plan (going under the name of Rural Development Plan or RDP), for the period 2014-2020, had twenty agri-environment measures; some of them having as many as thirteen sub-measures. Some of these included actions such as training farmers, aiding in the promotion of local produce, agri-environmental and climate measures (Ministry of Agriculture and Rural Development, 2021a). The next RDP (now going under the name of Cyprus Strategic Plan or CSP) will be implemented in 2023, with Member states being given a transition period of 2021-2022, during which the measures of the 2014-2020 period will continue to apply.

The 2014-2020 RDP has a few issues, mostly in terms of low ambition in regards to biodiversity and nature protection, as well as low uptake by the farmers. For example, there was no measure to decrease the use of pesticides, herbicides or rodenticides overall, but only complete prohibition of pesticides and herbicides in tree plantations such as olive, carob and almond orchards in areas of High Nature Value (HNV) (Scheme 10.1.11; Ministry of Agriculture and Rural Development, 2021a). Another example is an agri-environment measure for banana plantations (Scheme 10.1.4), whose only requirement was for dead banana tree branches to be laid on the ground as mulch. Such measures are not ambitious enough in order to effectively tackle the current biodiversity crisis.

In addition, there were no targeted measures for farmland birds. The only bird related scheme (Scheme number 10.1.10), focused on migratory birds, meaning that this measure was seasonal. This particular sub-measure was included in the previous programming period of the CSP and it targeted bee-keepers and insect eating migratory birds, which are often persecuted (mainly the European Bee-eater, *Merops apiaster*). The sub-measure, offered €8 euro per beehive, provided the farmer followed certain actions, such as providing watering points for bees between August and October. It did not however include any measures specifically reducing Bee-eater interaction with beehives, and so did not help reduce human-wildlife conflict.

A few RDP measures (in the 2014-2020 period) aimed at reducing the negative effects that agriculture has on biodiversity, such as the prohibition of the use of herbicides in certain crops. These included olives, citrus and deciduous crops with supports ranging from 225 euro for citrus, to 600 euro per hectare for vineyards (Ministry of Agriculture and Rural Development, 2021a). Agri-environment measures also incentivised the conversion to organic farming. However, such measures had very low uptake by farmers. In 2017, only 10% of agricultural plots were under Agri-environment and climate measures, while the target for Cyprus was 30% (Eurostat, 2019).

Organic farming was included in the last CSP measures and even though there was an increase in organic farms during that period, Cyprus still remains lower than the EU average, meaning it will be hard to meet the 2030 targets for organic farming in Europe. Specifically, the total area under organic farming increased in Cyprus from 3% in 2014 to 4.9% (covering about 5,550 hectares) in 2016, compared with an average of 6.7% across the EU (Eurostat 2019). According to the International Federation of Organic Agriculture Movements (IFOAM), in order to reach the 25% target for organic growing of the EU's Farm to Fork Strategy by 2030, Cyprus would need to increase the national Organic area share to 11.8% (IFOAM, 2021).

Furthermore, there was also a scheme targeting marginal areas and giving incentives to decrease farmland abandonment in specific areas. Specifically, scheme 13, gave financial support to farmers with land at an altitude of more than 800m, or fields on a slope of more than 15% (Ministry of Agriculture and Rural Development, 2021b). Regardless of this scheme being in place, there has been a decrease of 29.1% in total utilised farm area from 2003 to 2016 (Eurostat, 2019). This could be due to a combination of reasons, both economic and social. Statistics show that the income of agricultural workers was around 60% of the average wage on the island between 2005 and 2017 (Eurostat, 2019). Furthermore, a minority of farmers (around 20% in 2015) receive the majority of the CAP support money (77% of the total direct payments; Source: CATS data FY2017). These factors could be particularly discouraging to small farmers and could be among the many reasons why not more young people take up this profession. In fact, the island has a very low percentage of young farmer managers in comparison with the rest of the EU (1.3% IN 2016; EUROSTAT). Both these social and economic factors could be the reasons behind changes in agriculture, such as the decrease in extent of agricultural areas from 166,000 hectares to 112,000, between 2005 and 2016. A similar decline was observed in the number of farms during the same period, from 45,200 to 34,900. Permanent crops also declined by 37% and arable land by 32% between 2005 and 2016 (Eurostat, 2019). Furthermore, even though the amount of livestock significantly decreased, the livestock density increased from 1.47 to 1.53 between the same time (2005 to 2016; Eurostat, 2019), as the sector became more intensive.

According to feedback received from Department of Agriculture officials, to the LIFE IP (*Pandoteira*) project partners, the most worrying issue regarding agri-environment measures was the low uptake by farmers. The department assesses that this problem seems to stem from the five-year commitment that is required for AEC measures and the checks that the farmers would be subjected to. In addition, the fragmented nature of farm holdings and their small total area limit the attractiveness of the AEC measures for farmers. According to the Department, most farmers have expressed that they would rather forego the subsidies in favour of not having to deal with more frequent checks.

The low uptake of existing support schemes under the RDP, exacerbate the numerous agriculture related challenges that the island is facing. The most important ones, which also have a subsequent negative effect on biodiversity, are abandonment of farmland in more marginal and especially more upland areas and intensification in more fertile and generally lowland areas, including high inputs of chemicals, such as biocides and fertilisers. These threats were also identified by the Ministry of Environment in the fifth National Report to the United Nations Convention on Biological Diversity (Ministry of Agriculture, 2014).

Cyprus Strategic Plan 2023-2027 (CSP)

In a recent publication from Euractiv (2021), the European Commission named a few recommendations to all member states for Cyprus, in order to achieve their next CAP targets.

For Cyprus, these included ensuring support for small and organic farms, conservation of landscape elements and restoration of protected habitats. Furthermore, the Commission recommends that Cyprus focus on the cultivation of more drought resistant crops and less water-intensive ones. Finally yet importantly, according to the recommendations, there should be a social and economic incentive for people to work in rural and mountainous areas, in order to reverse the abandonment of the land.

The biodiversity-focused elements of the Commission's recommendations are in line with what has been recommended under Action A5 of the LIFE IP PHYSIS program. These recommendations are detailed in the following pages and are designed to contribute to addressing and reversing the issues outlined in the sections above.

Recommendations

Recommendations of the LIFE IP Physis (*Pandoteira*) programme (LIFE18 IPE/CY/000006) for agri- environment – climate (AECM) and other measures for the next programming period of the Common Agricultural Policy (CAP).

1. **Agri-environment scheme for the preservation of non-intensive agricultural activity in farmland areas of High Natural Value (HNV) and/or in NATURA 2000**

Agri-environment scheme for effective support of the maintenance of non-intensive agricultural activity in High Natural Value (HNV) and NATURA 2000 agricultural areas. The focus on HNV and NATURA 2000 ensures that the most valuable agricultural areas for biodiversity are conserved.

We propose an agri-environment scheme entitled **'Preservation of traditional crops in HNV and NATURA 2000 areas'**. This aims to avoid the abandonment of non-intensive agriculture and to prevent the conversion of crops from existing to more intensive forms of farming. For example, to prevent conversions to irrigated agriculture, or conversion from traditional arboriculture and vines to ploughed crops, as well as the construction of new terraces, unless the latter is done in the traditional way, i.e. with dry stone walls. Compensation on the basis of income foregone resulting from this restriction, i.e. the avoidance of intensification.

In essence, the measure simply aims to maintain traditional, non-intensive farming. Through this measure, sufficient financial support must be provided so that the beneficiary can secure the required seasonal workforce to be able to carry out the work required to keep the crops in good condition. It is worth noting that that simple maintenance is eligible for support through agri-environment schemes, in cases where it can be shown that failure to maintain an existing situation will lead to negative results which would require a much larger future investment to restore back to the existing situation (opportunity cost). Given the current and documented threat of abandonment of non-intensive cultivation in mountainous and semi-mountainous regions in Cyprus, and with the designation of a large percentage of these areas as HNV and / or NATURA 2000, maintenance support is clearly justified in the case of Cyprus.

Two restrictions are included under this proposed measure for the sake of biodiversity in general and pollinating insects in particular:

i) Complete ban on the preventive use of insecticides and herbicides in crops (chemical intervention only after severe crop infestation). This restriction must be compensated additionally to the resulting lost income (damage to production due to insects) and also because mechanical weed control through surface cultivation will be required (additional labour and costs).

ii) Protection and preservation of all remnants of natural vegetation and of all dry stone walls within agricultural areas, both along the perimeter (e.g. natural banks, dry stone walls) and within fields, as well as in uncultivated plots between fields. The only exception is alien, invasive species, such as Acacias, which should be removed. Non-intensive grazing of areas with remnants of natural vegetation should be allowed, but during the birds breeding season in, March-June, grazing or any other intervention should not be allowed in these areas. Complete ban on the use of herbicides, insecticides and chemicals in general, in areas with natural vegetation remnants. This restriction must be additionally compensated on the basis of additional work and expenses for the removal of alien or invasive species.

Therefore, to sum up, the scheme consists of four elements:

i) Prohibition of intensification of agriculture.

ii) Preservation of low-intensive agricultural activity.

iii) Protection of natural vegetation and removal of non-native, invasive species.

iv) Prohibition of preventive use of insecticides and herbicides (mechanical weed control).

What is the benefit for biodiversity of this scheme?

The action will benefit biodiversity as the intensification of agriculture leads to degradation of ecosystem. Given the threat of abandonment of non-intensive farming in mountainous and semi-mountainous regions of Cyprus, conservation support will help a variety of native plant species (including through the removal of invasives), pollinators, and birds, including birds of prey. This measure will benefit bird species that are priority species for the Republic of Cyprus (RC), for example the European Roller *[1], the Griffon Vulture *, the Cyprus Wheatear *, the Calandra Lark *, the Masked Shrike *, the Long-legged Buzzard *, the Bonelli's Eagle *, the Eurasian Stone-curlew * and the Cretzschmar's Bunting *, which are species included in Annex I of the Birds and Habitat Directive (2009/147/EC) through which the Republic of Cyprus has an obligation to conserve.

Element iv of the action aims to reduce the chemicals from crops that end up in groundwater, water bodies and soil, with multiple benefits for biodiversity and humans. Specifically, this measure also benefits pollinators, which are threatened by the use of synthetic insecticides / pesticides, while assisting agricultural activity. This will benefit insect eating bird species which are priority species for the Republic of Cyprus (RC), for example the European Roller which is included in Annex I of the Birds and Habitat Directive (2009/147/EC) through which the Republic of Cyprus has an obligation to conserve. Other bird species such as the Cyprus Warbler *[1], the Cyprus Wheatear *, the Cretzschmar's Bunting *, the Calandra Lark *, the Masked Shrike * and the Eurasian Stone-curlew *. Furthermore, the Eleonora's Falcon * and the Red-footed Falcon *, two very important bird of prey species for Cyprus, will benefit from these actions, especially through the prohibition of preventative use of insecticides, which will boost populations of their insect prey.

2. Agri-environment scheme for the management of grazing in areas of High Nature Value (HNV) and Natura 2000

Management and restriction of grazing pressure in HNVs and NATURA 2000 areas based on the carrying capacity of local plant communities. For the proper implementation of this measure, a relevant study is required to assess the grazing capacity of the various plant communities. Until the relevant studies are completed, the following restriction should be applied: the maximum number of animals should not exceed two animals per available hectare of pastureland (including common land) and grazing should be completely prohibited in February and March. Compensation for any income foregone resulting from this restriction (i.e. in cases where the application of the restriction leads to a reduction in the number of animals for which a shepherd is licensed to keep). The focus in HNV and NATURA 2000 ensures that the most valuable pastures for biodiversity are maintained and managed.

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[1] Species with an asterisk (*) after their scientific name, are species included in Annex I of the EU Birds and Habitats Directive 2009 / 147 / EC, and the designation of special protection areas is required for them.

What is the benefit for biodiversity of this scheme?

This will benefit the conservation of endangered flora species, such as the *Ophrys kotschy*i orchid, as well as other species of the "Red Data Book" of Cyprus. The measure will also benefit bird species that are priority species for the Republic of Cyprus (RC), for example the European Roller *, the Griffon Vulture *, the Cyprus Wheatear *, the Masked Shrike *, the Long-legged Buzzard *, the Bonelli's Eagle *, the Eurasian Stone-curlew * and the Cretzschmar's Bunting *, which are species included in the Annex I of the Birds and Habitat Directive (2009/147/EC) through which the Republic of Cyprus has an obligation to conserve. These are all species that are linked to more open habitats and / or to scrub habitats. Maintenance of moderate grazing pressure will support maintenance of such habitats, to the benefit of these bird species.

It is worth noting here that for NATURA 2000 areas, the provisions of the two above mentioned agri-environment schemes, can be converted into management decrees for the designated areas of the Network, and thus become mandatory. This would mean that land-users within NATURA 2000 areas could be compensated on the basis of NATURA 2000 compensation payments. [Please note that the provisions of the above measure are in line with management measures that have been integrated into management plans for SPAs, NATURA 2000 areas for birds]

3. **Horizontal ECO-SCHEME or agri-environment scheme aiming to preserve and create "Space for Nature" in agricultural plots.**

Under this measure, 15% of each farmland plot would be specifically managed as 'Space for Nature' (SFN). SFN areas may include existing remnants of natural vegetation, dry stone walls, banks and areas around the cultivated area that will remain simply uncultivated (fallow) or are areas that will be set aside from production and planted with wildflowers (sowing only), shrubs and trees (native species of the flora of Cyprus that are local to the area in question). SFNs do not have to be compact, uniform areas but may consist of various relevant elements at different points around the perimeter or within the plot. SFN areas should remain virtually intact, with the exception of one surface ploughing in September for fire protection purposes, and only in SFN areas that do not have permanent natural vegetation (shrubs, trees). The use of herbicides, insecticides and chemicals in general, would be completely prohibited in SFN areas.

What is the benefit for biodiversity of this scheme?

These actions can increase pollinator populations (Grass *et al* 2016) and attract and support insect-eating birds, to better combat pests in a natural way, and will also provide new nesting sites for some insectivorous bird species (e.g. Dry stone walls / Cyprus Wheatear, Banks/ European Rollers, Trees/scrub / Masked Shrike, etc.). Research has shown that the presence of flower strips or patches high in biodiversity can offer up to 44% better protection against natural enemies that are harmful to farmers (Martin *et al* 2019). Dry stone walls also help reduce soil erosion and water loss and help maintain soil nutrients. In addition, research in Europe has shown that dry stone walls help populations of several animals such as lizards and pollinators (Collier 2012, Manenti 2014). The scheme will benefit insectivorous and carnivorous bird species that are priority species for the Republic of Cyprus (RC), for example the European Roller *, the Cyprus Wheatear * and the Masked Shrike *. These are species included in Annex I of the Birds and Habitat Directive (2009/147/EC) through which the Republic of Cyprus has an obligation to conserve. Other bird species such as *Sylvia melanothorax* *, *Emberiza caesia* *, *Melanocorypha calandra* *, *Buteo rufinus* *, *Aquila fasciata* *, *Falco eleonorae* *, *Falco vespertinus* * and Burhinus oedicnemus *, will also benefit from this scheme.

4. **For cereals, potatoes and salad crops (intensive crops) we propose an agri-environment scheme to reduce the impact of intensive agriculture, with two components, the first one for all relevant crops and the second one only for cereals only:**

i Fallow every three years, with the only intervention being one surface ploughing in the fall (no use of herbicides or insecticides). In cases where the beneficiary has two or more plots of land included in the agri-environment scheme, the set-aside should be done 'alternately' in the different plots, in order to create a different mosaic of crops and set-aside fallow areas each year.

ii Delay of harvest until the end of June on 25% of the plot, so that a strip of crops remains unharvested. Compensation for lost income resulting from restrictions and reduced production.

What is the benefit for biodiversity of this scheme?

Action i will allow the field to regain its moisture and fertility. Also in this way many species benefit such as pollinators and insectivorous species such as lizards and birds, including the Eurasian Stone-curlew *, the Calandra Lark * and the Spur-winged Lapwing (*Vanellus spinosus* *).

Activity ii can increase the populations of insectivorous animals and reptiles, which will help to better control pests in a biological way. Several species of fauna will benefit from these measures, since most will be able to complete their breeding cycle, including Zitting Cisticola (*Cisticola juncidis*), Common Quail (*Coturnix coturnix*), Calandra Lark *, Eurasian Stone-curlew * and Corn Bunting *. Delaying the harvest will protect bird species that nest in these fields, such as the Black Francolin (*Francolinus francolinus*), which nests later than Chukar partridge (*Alectoris chukar*) and may lose nests due to early harvesting (mainly hayfields).

5. **Agri-environment scheme for the decrease in the use of rodenticides in agriculture, through the promotion of the Barn Owl as a biological control agent against rodents.**

The proposed scheme focuses on carob, pomegranate and citrus plantations, i.e. tree crops that face severe problems with rodent damage. It consists of banning the use of second-generation rodenticides and at the same time promoting alternative biological control methods such as encouraging natural predators – Barn Owl - by placing artificial nesting boxes in trees and adjacent buildings/infrastructure.

Compensation for the measure should be based on the foregone income resulting from the reduced (at least in the short-term) production due to the restriction on the use of rodenticides and the costs for the artificial nests, their installation and maintenance. The installation of the nests boxes for the Barn Owls should be done in collaboration with the working group for the Barn Owl in Cyprus, which consists of the Departments of Agriculture, Forestry, the Game and Fauna Service, the Veterinary Services and BirdLife Cyprus. It is worth to highlight however, that this scheme should be adopted at the level of an organised group / community of farmers, given that rodent control through the encouragement of the Barn Owl nesting may not be as effective without the participation of all farmers in an area. This is essential to ensure a wide ban on the use of second-generation rodenticides throughout the area where the artificial nests are installed.

What is the benefit for biodiversity of this scheme?

Reducing the chemicals that end up in groundwater, water bodies and soil from crops, has multiple benefits for biodiversity and humans. How fauna will benefit from this scheme: Rodenticides can cause death to birds of prey, following multiple exposure to poisoned rodents on which they feed on (secondary poisoning). Species in Annex I of the Habitat and Birds Directive 2009/147 / EC for which the Republic of Cyprus is obliged to conserve, such as the Long-legged Buzzard *, the Bonelli's Eagle * and the Eleonora's Falcon * will benefit from the reduction of rodenticides in agricultural areas. Also species such as the Barn Owl, the Cyprus Scops Owl (*Otus cyprius)*, the Long-eared Owl (*Asio otus)*, the Peregrine Falcon (*Falco peregrinus* *) and the Short-eared Owl (*Asio flammeus* *), as well as migratory birds of prey (eg the Common Buzzard (*Buteo buteo)*, Harrier species (Circus sp.), the European Honey Buzzard (*Pernis apivorus* *) and the Red-footed Falcon *) will benefit from rodenticide reduction.

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