



LAYMAN'S REPORT



IMPROVING LOWLAND FOREST
HABITATS FOR BIRDS IN CYPRUS
LIFE 13 NAT/CY/000176



Contact:

Ministry of Agriculture, Rural Development and Environment, Department of Forests
26 Louki Akrita Str., 1414 Nicosia, Cyprus
Tel. : +357 22805510, Fax: +357 22805542
e-mail: director@fd.moa.gov.cy
website: www.moa.gov.cy/forest

Project Partners:



Department of Forests, Ministry of Agriculture, Rural Development and Environment



Game & Fauna Service, Ministry of Interior



Nature Conservation Unit, Frederick University



Cyprus Forest Association

Written & edited: Konstantinos Dimitrakopoulos, Forester MSc.
Photos: Konstantinos Dimitrakopoulos, Game & Fauna Service, Birdlife Cyprus
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Layman's report

LIFE-FORBIRDS (LIFE 13 NAT/CY/000176) "Improving lowland forest habitats for birds in Cyprus"

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A photograph showing two men in a forest. One man, wearing a red t-shirt, is using a red-handled hammer to secure a wooden bird box to a tree trunk. The other man, wearing a dark blue t-shirt, is assisting him. The bird box is a simple wooden structure with a flat top and a small entrance hole. The background is filled with the branches and needles of pine trees under a clear blue sky.

ABOUT THE PROJECT

The main goal of the project 'Improving lowland forest habitats for Birds in Cyprus' (acronym: LIFE-FORBIRDS, LIFE13 NAT/CY/000176) was to improve habitat conditions for birds in 3 dryland areas of the island. These are Kavo Gkreko, Koshi – Pallourokampos and Potamos Panagias Stazousas areas, which are registered as Special Protection Areas (SPAs) within the Natura 2000 network.

LIFE-FORBIRDS was implemented within the framework of the European Union (EU) programme LIFE. The total project budget was €978,718, of which €489,359 (50% of its total eligible budget) was funded by EU. The project was launched on the 1st of October 2014, and was completed on the 31th of December 2017.

OBJECTIVES OF THE PROJECT

LIFE-FORBIRDS had three major objectives:

- To implement conservation / management measures that will substantially improve ecological conditions for selected bird species listed in Annex I of the Birds Directive occurring in 3 Natura 2000 (SPA) sites.
- Through the implementation of these pilot conservation management measures to demonstrate to the Cypriot foresters and other stakeholders, the benefits of adopting a more holistic forest management approach that will address the needs of birds dwelling in, or visiting the forest.
- To contribute towards, enhancement of public awareness on the need to protect wild birds and combat bird crime within the broader project areas.

THE PROJECT AREAS



LIFE-FORBIRDS selected three Natura 2000 SPA sites which differ between them, yet they face common threats. More specifically:

- Food and water availability for birds is scarce in all of the above sites.
- Extensive degradation of the natural habitat types is occurring due to the presence of invasive alien species; i.e. acacia and eucalyptus trees at Kavo Gkreko and Koshi Pallourokampos.
- Human related activities with negative impacts on bird life (house development, intensified agriculture, forest fires, poaching etc.)

Kavo Gkreko (CY3000005), located at the far southeastern part of the inland, is considered a place of exceptional natural beauty and a main attraction of Cyprus, thus attracting annually hundreds of thousands of visitors. It is also the main migration corridor of the island for the birds travelling from Africa and Asia to Europe and vice versa. 10 natural habitat types are present in the area, with the Phoenician juniper type being the dominant one. The flora of the area is rich in species, with 400 present, among them 14 endemic and 14 rare. For the above mentioned reasons the area has been declared by the Republic of Cyprus as a National Forest Park and a Site of Community Importance (SCI). The main threat of the site is the increasing tourist development of the adjacent areas of Ag. Napa and Protaras, with the implications of their visitor activities.

Koshi – Pallourokampos (CY6000009) site is located at the center-east part of the island. It is a hilly dryland area, with unique phryganic vegetation formations, undisturbed by human activities due to its remote location, limited road access, and lack of infrastructures. 3 natural habitat types are present in the area, among them the priority habitat type 5220* - Arborecent matorrals with Ziziphus (jujube tree). These habitat types host hundreds of flora and fauna species some of which are endemic and rare. It is considered the driest area of the island with the annual precipitation never exceeding 280 mm/year. The main threat of the area is the extensive presence of invasive alien species, namely acacia and eucalyptus trees, which displace and replace native species, consequently decreasing the biodiversity of the site.

Potamos Panagias Stazousas (CY6000007) site is located at the foothills of Mt. Stavrovouni, at Larnaca District. The key natural element that distinguishes this site from the rest, is the river crossing the site from NW to SE, with a constant water flow present from December till March. 5 natural habitat types, along with the water flow and the agricultural crop fields aside the river bed, create favorable conditions for the birds of the area, thus making the site a major migrating corridor for many species. Forest fires can be considered the major threat of the site, with their causes attributed to human related activities such as military training, negligence and arson to name a few.

IDENTIFYING THE LOCATIONS FOR THE IMPLEMENTATION OF THE CONSERVATION ACTIONS

LIFE-FORBIRDS team visited each SPA site at the early stages of the project in order to identify the needs of each site in terms of water, food and nesting places. The areas were thoroughly examined so as to select the best locations for the creation of the traditional agricultural fields, the cereal/legume fields, the water related infrastructures, the installation of the nest boxes, as well as the restriction barriers for limiting road access to poachers. Thus, the specific locations for the creation of the infrastructures were demarcated and consequently mapped for official use. In addition, both at the Kavro Gkreko and Koshi – Pallourokamos sites, the team mapped the invasive alien species' distribution took place, aiming at facilitating their removal and restoration of the fragmented local natural habitat types via reforestations.



CENSUS OF BIRD POPULATION IN THE PROJECT AREAS

A bird census was conducted as soon as the project began, and a bird census was launched and lasted for several months. The census was carried out within the 3 SPAs of the project and recorded all the birds which dwell or pass by. A detailed report was then prepared which included the actual number of birds per species for each area, the estimated fluctuations within species' population, and the main threats for each species per site. The findings were used for measuring the success of the conservation actions and attainment of the project's objectives. Thus, the success of each one of the measures which were applied in practice was precisely evaluated.





CREATING TRADITIONAL AGRICULTURAL FIELDS FOR THE BIRDS

One of the core actions of LIFE-FORBIRDS was the creation of 5 traditional agricultural fields at the SPA areas of the project, namely two at Kavro Gkreko, two at Koshi – Pallourokamos, and one at Potamos Panagias Stazousas. Several fruit trees and forest trees and shrubs were planted at each field. The foliage and the fruits of the trees and shrubs are meant to provide food and nesting places for the birds of the areas. Moreover, sunflowers were planted annually at each field, plant species that provide food for the birds by attracting insects and producing seeds. In addition, food points filled with seed mixture as well as nest boxes were installed inside and in an area surrounding the fields. One 25 m dry stone wall was constructed at each field; a simple construction which attracts insects and reptiles that a lot of bird species feed upon, but also provides nesting places for small sized birds. Water couldn't be left out from the equation, consequently 1 small water pond was created at each field, to provide water for our bird visitors throughout the year. Last but not least, a water tank was created near each field so as to provide water for plant irrigation and for the water pond. To sum up, it wouldn't be an exaggeration to say that we created 5 starred hotels for birds!



IMPROVING WATER, FOOD, AND NESTING CONDITIONS FOR THE BIRDS

Several infrastructures were created through the LIFE-FORBIRDS project, to aid the birds of the areas in their search for water, food and nesting places. The above infrastructures will render the 3 project SPAs more attractive to birds, thus increasing the latters' total numbers. 10 cereal/legume fields were established on state forest land and in addition 2 privately own fields were leased for the project's needs. All of them were sown and cultivated with seed mixture, without using pesticides or herbicides, thus providing chemical-free food for the birds of the areas. Next to almost all of the aforementioned fields a dry stone wall was constructed, in order to attract insects, reptiles and to provide nesting places for small bird species. In addition, next to each field a watering point was created, offering clean water to the birds of the areas year-round. Finally, several nest boxes were installed to provide nesting places for birds in a small distance around the fields, but also scattered throughout the SPAs. All the above measures work in synergy, creating hot-spots for the birds within the project sites. The Koshi – Pallourokampos SPA is the driest area of the project. In order to alleviate the harsh conditions during summertime, the project constructed a small weir at the site plus two water guzzlers. The former will create an open water surface, thus attracting reptiles, amphibians, birds and mammals, while the latter will collect rain water for the birds.



IMPROVING NATURAL OCCURRING HABITAT TYPES AT THE PROJECT AREAS



The natural habitat types of Cyprus consist of flora species which are commonly found in Mediterranean climates, and other unique ones which cannot be found elsewhere in the world. These habitat types compose the natural landscape of the island, with its unique characteristics, and it is our duty to preserve it for the generations to come. Both Kavο Gkreko and the Koshi–Pallourokampos SPAs' natural occurring habitat types are threatened by the extensive presence of invasive alien species, namely acacia and eucalyptus. These species displace and gradually replace native ones such as juniper, lentisk and hawthorn species, to name but a few, thus altering the floristic composition of the habitat types. A two-phase restoration of the latter took place at selected locations within the project's framework. Removal of the invasive alien species was carried out during the first phase, under the supervision of an expert in the field, at selected locations where the species had formed extensive clusters. The second phase included reforestations of these areas, with suitable species for each habitat type, in order to restore the floristic composition of the latter and functions over time.

COMBATING ILLEGAL BIRD TRAPPING



Bird trapping is an illegal practice that involves capturing large numbers of birds with non-selective means such as lime sticks and mist nets. During this process all birds trapped end up dead, and not exclusively the ones that the poacher had in mind. Each year it is estimated that over 200 bird species are affected by this abhorrent practice in Cyprus, raising the total annual number of dead birds up to 2.000.000. From the beginning of the project, a consultation committee was established with a specific objective; i.e. to design a communication strategy plan for reaching the wider public of the project areas, and to propose measures that will address bird crime within the 3 SPAs. One of the most effective measure proposed and applied was the establishment of an extra patrol schedule of the Game and Fauna Service, just specifically for the project sites.



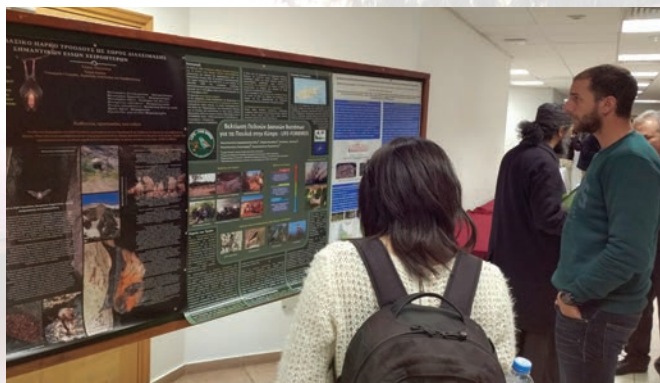
In addition, road access for vehicles was limited at selected locations with the installation of restriction barriers, so as to discourage poachers and to create shelters for birdlife. Warning signs against bird trapping were also installed at all 3 SPAs. Finally, 18 IR cameras were installed at selected locations to capture bird crime incidents and prosecute offenders.



PUBLIC AWARENESS CAMPAIGN AND DISSEMINATION OF PROJECT RESULTS

One of the project's main objective was to change the mentality of the wider public towards bird crime related activities in Cyprus. For optimum results, the project included visits to elementary schools in the local communities, in order to change the mindsets of young children concerning bird crime. Several lectures were conducted at schools regarding the birds of the project areas, their importance for the environment, as well as the negative implications of bird trapping. In addition, these schools visited the traditional agricultural fields of the project, and participated in bird watching competitions. As regards the public in general, information on the implications of bird trapping was attained through relevant television spots, distributed information material, the project's participation in public events, through the two operating webpages, information signs and kiosks scattered within the 3 SPAs, and by posting highway billboards with anti-bird trapping messages.





An additional goal of the LIFE-FORBIRDS' dissemination campaign was to inform the general public, local communities, NGO's and government officials on the results of the project. Special emphasis was given to educate employees of the Department of Forests on the management measures applied throughout the project which favour birdlife. To attain the above purpose, several workshops were organised throughout the project's implementation timeframe. The attendees participated in lectures regarding the national and EU legislation regarding birdlife, the Natura 2000 network, as well as the project's progress and results.



EXCHANGE OF EXPERIENCES & EXPERTISE, EVALUATION OF RESULTS

From the very beginning, LIFE-FORBIRDS adopted an extrovert policy, thus establishing a wide network with other relevant scientists and experts. The reason behind this approach was to gain experience from other projects which had to address similar challenges, in order to meet the goals which were set, as adequately as possible. During the first month of the project, an international scientific committee was formed assigned with an advisory role. The project team consulted the committee throughout the project's duration, and the latter visited the project several times overseeing the materialization of the conservation actions. In addition, networking was established with other EU projects, visits of both sides, and expertise regarding bird life was exchanged successfully.

The experience gained and the lessons learned, regarding the effectiveness and suitability of management measures/actions implemented with the aim to favor bird populations are set out below. According to the data collected from the hidden cameras, the census reports which were carried out by independent ornithologists and the first visits of experts, following were established:

- Both the traditional agricultural fields, as well as the cereal/legume fields attract a large number of birds.
- The cultivation of a cereal/legume field is considered a simple practice with low initial and maintenance costs, attracting large numbers of birds.
- Several years need to pass in order to increase the nesting rate of artificial nests in an area. In order to facilitate the process, advantageous locations with water and food provision should be preferred during the installation phase.
- Water related infrastructures attract large numbers of birds, reptiles and mammals.
- Infrastructures which attract birds work better in synergy; i.e. a watering point installation near a cereal/legume field.
- Acacia is a notably resilient species, hard to control and eradicate from an area. Its removal is a timely and costly procedure that requires trained staff and recurring efforts for several years.
- Increasing the patrols in an area has a direct impact in decreasing the number of poaching related incidents.



THE FUTURE OF LIFE-FORBIRDS

Although the project was completed in December 2017, the infrastructures created at the 3 Natura 2000 SPAs will continue to operate, thus ensuring the long term prosperity of the avifauna of these areas. For the attainment of the above aim, the project team prepared a detailed After-LIFE Conservation Plan encompassing the following: a) description of a detailed schedule ensuring the continuity of the conservation actions and the longevity of the infrastructure, b) dissemination of the project expertise regarding avifauna conservation to Cyprus and abroad, c) dissemination of project results and bird-trapping implications to the general public.



WHAT HAS LIFE-FORBIRDS ACHIEVED!

- 5 traditional agricultural fields were created for the birds of the project areas.
- 4 water-tanks were constructed for providing water to the traditional agricultural fields of the project.
- 17 watering points were installed and 2 water guzzlers.
- 1 small weir was constructed at Avdellero area.
- A total area of 4 ha, 12 of cereal/legume fields in total was created and cultivated, thus providing food for birds.
- 200 artificial nests were installed.
- 14 dry-stone walls were created with a total of 366 running meters.
- A total area of 5,3 ha from acacia trees was cleared out, through a well-designed removal process.
- Natural habitat types were restored through planting over 5.000 trees at a total area of 6 ha.
- 66 cases of poaching related activities were prosecuted.
- 18 IR cameras were installed.
- 74 road entries to poachers were restricted.
- 55 info signs and 4 info kiosks were installed.
- 8,000 copies of information material (leaflets, newsletters, posters) were prepared and distributed.
- TV-spots and a documentary was prepared, broadcasted on TV channels and cinemas across the island.
- 8 workshops/events were held with over 300 participants in total.
- 10 lectures at elementary schools of the local communities were conducted regarding birdlife, and were attended by over 700 students.
- 4 bird watching competitions were held with 245 participants from the elementary schools of the local communities.
- Over 300 students of 6 elementary schools of the local communities visited the traditional agricultural fields of the project.
- Networking with 7 related EU projects was established, thus exchanging expertise and broadening its knowledge base.
- Project results were disseminated to thousands of web users, and raised awareness regarding bird crime implications through the operation of 2 websites.



FACTORS RELATED TO THE SURVIVAL AND CONSERVATION OF AVIFAUNA, AND GENERAL GUIDELINES OF USEFUL PRACTICES

WATER

Water means life. Even in the search for other habitable planets, the presence of water is the first thing that scientists search for. Providing water to the birds in a dry-land area is a key management practice for increasing population numbers. Nowadays, several areas of the island are affected by drought during the summer months, and the problem is intensified further with the lack of surface waters. Such problems may be addressed through the creation of water related infrastructures, scattered within a dry-land area. Such infrastructures which do not exclusively favour the birds of an area, but all the fauna living within, are described in detail below.

WEIRS:

Weirs intended to improve water conditions of bird habitats are small in size, and are constructed along the riverbed of small torrents. They are considered small sized hydraulic infrastructures, since they aim at creating an open surface and are not intended to reserve water, compared to the large weirs constructed for irrigation or water for supply purposes. Their size should have the capacity to store at least 300 – 1000 m³ of water, depending on the construction location. Creating an open water surface benefit birds, but also attracts insects, tortoises, snakes, lizards, mammals etc., thus increasing local biodiversity.

In order to construct a small weir, a respective study should be prepared by a licensed engineer. Subsequently, the study is reviewed for official approval by the competent national authorities, namely the Water Development Department, the Department of Environment, the Department of Forests to name a few. Finally, the weir construction is assigned to a contractor for its completion according to the technical specifications of the approved study.



WATER GUZZLERS:

Water guzzlers collect and storage rain water, and can easily channel it to a specially designed waterer. They were invented during the '40s in the USA, and since then, they are used worldwide. They are simple in design and construction, providing a water source for the birds all the year round.

A water guzzler is a structure comprising a surface that collects rain water, a tank for reserving the water (used for a capacity of 1 t), the waterer (usually made out of concrete and of 3,2 l capacity), and accessory plumbing equipment (hoses, fittings, float balls etc.). The water amount collected can be estimated by multiplying annual precipitation by the area surface. The result is reduced by 20% due to water evaporation. In Akamas for example, the mean annual rainfall is 500 mm, thus a 4 m² surface can collect annually 1,6 t of water, enough to provide water for the birds during the dry summer months.



WATER SPOTS:

Water spots are the simplest water related infrastructures, with low construction, installation and maintenance costs. They consist of a plastic water tank (used for a capacity of 1 t), the waterer (usually made out of concrete and of 3,2 l capacity), and accessory plumbing equipment (hoses, fittings, float balls etc.). The main difference between the water spot and the water guzzler is that the former requires filling from a water truck, while the latter is self-filled by collecting rain water. For the installation of the water spot it is recommended that an excavator buries the water tank in order to avoid malicious destruction incidents. From the water tank's base the supply hose will be connected to the waterer after running downwards for a few meters in order to ensure constant flow.



FOOD

Birds, depending the species, feed on seeds, grass, fruits, reptiles, amphibians, small mammals and even fish. Nowadays, more than ever before, the availability of food sources for birds is declining rapidly, as a result of the destruction of their natural habitats and the decline of biodiversity. Less food availability, corresponds to smaller bird populations for a given area. EU wide data reveal that agricultural areas have lost over 58% of their birds. In general, due to the small scale farming practices applied at Cyprus, the island is considered an attractive location for birds. However, pesticide and herbicide use is showing an increasing trend, as well as the usage of rat baits, resulting in an annual death toll of hundreds of birds.

Millions of birds migrate each year in search for food. Wintering populations wander in their food quest, and remain in favorable locations that revisit the following years. Management infrastructures that favor bird populations are associated with the creation of respective infrastructures as presented below.

CEREAL/LEGUME FIELDS:

Cultivating a field with cereals and legumes is a simple practice that contributes greatly in providing good quality food for the avifauna of an area. Since the goal is to produce “chemical free” food, apart from fertilizers, no herbicides and pesticides should be used. A seed mixture of species such as barley, vetch and peas can yield great results, creating over a few years a self-maintained soil seed-bank. In addition, these plant species attract insects and small mammals, providing indirectly food for other bird species.



FEEDERS:

The installation of bird feeders is the easiest and most affordable solution, since they have low purchase, installation and maintenance costs. Filling them with seed mixture acquired from pet shops is a convenient solution, usually containing millet, linseed, sesame and hemp seeds. The feeders can be installed at specific locations or seasonal periods where extreme lack of food is evident. The only disadvantage of the feeders is the need of monitoring them for refilling purposes and that their target group is seed eating bird species only.



NESTING

Nesting is an essential and instinctive need, directly related to the life circle of all bird species. It is the survival mechanism and the fulfillment of the species since it serves the reproducing procedure. Annually, birds migrate long distances so as to reach the reproduction locations in time, and to select the best nesting spots available. Species that do not produce offsprings are destined to perish. Identifying the underlying mechanisms that facilitate nesting procedures, is of great significance for a manager trying to conserve the avifauna of an area. The most crucial and defining part of the nesting season is its beginning, where birds undergo great stress, since the tree foliage is not fully developed and the provision of cover is insufficient, thus rendering the nests vulnerable to predators.

ARTIFICIAL NESTS:

The installation of nest boxes for aiding bird nesting is a well-practiced method, commonly applied EU-wide and all over the world. It is best utilized in regions with a historical presence of the species and with well reserved natural habitat types. Manufacturing nest boxes is a simple and affordable carpentry work with common materials. The boxes' dimensions vary, depending on the targeted bird species. The construction material commonly used is marine plywood, due to its low cost, durability and water repellent properties. Another commonly used nest, that targets small-sized species nesting at slopes, is that of the clay tube type.

Usually, nest installation takes place on tree trunks at a specific height (depending the targeted bird species), or on utility poles. It is a procedure that needs to be well designed so as to ensure higher nesting rates. Field visits should precede in order to select the appropriate installation spots (preferably next to water or food sources). The installation needs to be carried out by a crew of at least 3 people, and the coordinates of each nest should be recorded for future monitoring to be possible.



MULTI-PURPOSE INFRASTRUCTURES

DRY STONE WALLS:

A dry-stone wall is constructed from stones without any mortar to bind them together. Dry stone structures are stable because of their unique construction method, which is characterized by the presence of a load-bearing facade of carefully selected interlocking stones. Their traditional use is to create land terraces and field boundaries at the countryside. As with many older crafts, with the advent of modern wire fencing, the usage of dry stone walls is declining. However, recently as a result of the increasing appreciation of their landscape and heritage value, dry stone wall building is again in demand.

Dry stone walls also contribute to increasing biodiversity. As a wall matures, its ecological value generally increases. Mosses and vascular plants colonise a wall as it begins to slump and buckle. This is also the time when birds, insects and mammals (including bats) begin to shelter in walls. This is because there are more sheltered spaces in a wall that has started to bow or slump. These spaces are havens for animals and birds, but perhaps more importantly, it is in these spaces that humus and leaf litter slowly accumulates, leading to the formation of soil in which plants can take root.

Constructing a wall of at least 25 running meters from local stone serves the aforementioned purposes, but the longevity of the infrastructure will be guaranteed only by assigning its building to a skillful technician.



TRADITIONAL AGRICULTURAL FIELDS:

The creation of a traditional agricultural field establishes a hot spot for birds at an area. It is an infrastructure that fulfills the necessities of birds in their quest for water, food and nesting locations. During the past, they had been sanctuaries for birds and other fauna species in the forest that gradually disappeared, as a result of the modernization and intensification of agriculture and forestry. These fields improve the biodiversity of forest ecosystems at a local level, and the capability of the latter to successfully host larger bird populations, and therefore to improve the conservation status of existing avifauna species both resident and migratory.

Such fields' area can vary, but 1000 m² will suffice for proper implementation. At least 60 trees and shrubs can be planted there, providing through their foliage and branches food, cover and nesting places for birds. Fruit trees can be combined with forest and agricultural species. Recommended tree species include: pomengrate, fig, pear, apricot, loquat, plum, mulberry, and some of the forest species include: hawthorn, juniper, olive, carob, lentisk, myrtle, and laurel to name a few. In addition, a small area of at least 10x6 m can be reserved for cultivating agricultural species such as: pea, vetch, barley or even sunflowers.

The creation of a small dry stone wall should be considered, since it provides nesting places, but attracts insects and reptiles that birds feed upon.

In addition, during the construction phase, selected trees within the field area (if any) can be left intact, so as to provide installation places for artificial nests and bird feeders.

Last but not least, a valuable construction attracting large numbers of birds inside the field is one associated with the provision of water; i.e. a water guzzler, a water spot or even a small water pond. The latter specifically creates an open water surface that is preferable, since it also attracts insects, tortoises, snakes, lizards, mammals etc. The water pond can be constructed out of concrete with dimensions of at least 3x2x0,5 m. Water supply can be provided from a borehole or the water supply network of the area. Alternatively, a concrete water tank with a capacity of at least 20 t should be constructed, the filling of which can be carried out periodically by a water truck. The water supply will also provide irrigation to the field via the construction of a drip irrigation system, which is affordable and easily maintained.



All the aforementioned information can be used as a guideline for wildlife managers and lowland forest habitats. However, a crucial factor that one needs to bear in mind, is that the infrastructures mentioned at these guidelines should be created at selected remote locations, far from busy roads, picnic areas etc. Thus, the avifauna of the area will not get disrupted and will be easily familiarized with the usage of the infrastructures. Another benefit of selecting remote locations, is that the risk of dealing with cases of malicious destruction of infrastructures is greatly reduced.



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