

# Fighting the Lack of Wildlife Friendly Architecture: Implementation of Automatic Bird Fountains on Facultad Regional Paraná's Rooftops

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**Summary**— Paraná, which is the capital city of Entre Ríos, is next to the Paraná River, which is one of the most important rivers in South America. The Paraná River's great flow and long extension make it the perfect water source for hundreds of species of animals. However, the construction of a big city next to it disrupted the ecosystem of these animals. The main objective of this project is to address the lack of access to water for indigenous bird species within the urban environment. To achieve this aim, we will describe a possible solution that consists of the implementation of automatic bird fountains on the rooftops of Universidad Tecnológica Nacional (UTN) Facultad Regional Parana (FRP). In this work, the information is organized as follows. First, the problem, which is located in the city of Parana, is briefly addressed. Secondly, there is a description of the context where the problem is located, with a special focus on the area of interest for this project, which is the southwest area of the city. Then, the problem to be addressed, which affects thousands of birds in the city, is described. After this, there is a description of figures that show the problem and the areas surrounding UTN FRP premises where the problem is found. Next, the causes and consequences of this problem are analysed. Finally, the proposal of the solution is explained along with its strengths and weaknesses. It is expected that this work can raise awareness about the importance of reducing bird abandonment in the city as well as decreasing bird extinction in this area. By means of this work, we hope to inspire many citizens to take care of birds by applying similar sustainable measures in other areas of the city.

**Keywords:** automatic bird fountain, lack of water for animals, solar energy, sustainable bird care.

**Resumen**— Paraná, que es la capital de Entre Ríos, está al lado del río Paraná, que es uno de los ríos más importantes de América del Sur. El gran caudal y gran extensión del río Paraná lo convierten en la fuente de agua perfecta para cientos de especies de animales. Sin embargo, la construcción de una gran ciudad al lado alteró el ecosistema de estos animales. El principal objetivo de este proyecto es abordar la falta de acceso al agua para las especies de aves autóctonas en el entorno urbano. Para lograr este objetivo, describiremos una posible solución que consiste en la implementación de bebederos automáticos para pájaros en las azoteas de la Facultad Regional Paraná (FRP) de la Universidad Tecnológica Nacional (UTN). En este trabajo la información se organiza de la siguiente manera. Primero se aborda brevemente el problema, que se ubica en la ciudad de Paraná. En segundo lugar, se describe el contexto donde se ubica el problema, con especial enfoque en la zona de interés de este proyecto, que es la zona suroeste de la ciudad. Luego, se describe el problema a abordar, que afecta a miles de aves en la ciudad. A continuación, se describen unas

figuras que muestran el problema y las zonas aledañas a las instalaciones de la UTN FRP donde se encuentra el problema. A continuación, se analizan las causas y consecuencias de este problema. Finalmente se explica la propuesta de solución junto con sus fortalezas y debilidades. Se espera que este trabajo pueda generar conciencia sobre la importancia de reducir el abandono de aves en la ciudad, así como disminuir la extinción de aves en esta zona. A través de este trabajo esperamos inspirar a muchos ciudadanos a cuidar de las aves aplicando medidas sostenibles similares en otras zonas de la ciudad.

**Palabras clave:** fuente automática para aves, falta de agua para animales, energía solar, cuidado sostenible de aves.

## I. INTRODUCTION

Paraná, which is the capital city of Entre Ríos, is next to the Paraná River, which is one of the most important rivers in South America. The Paraná River flows from north to south, starting in the heart of Brazil and flowing all the way down to Buenos Aires, where it joins the La Plata River, and finally, reaches the ocean.

The Paraná River's great flow and long extension make it the perfect water source for hundreds of species of animals. However, the construction of a big city next to it disrupted the ecosystem of these animals.

The main objective of this project is to address the lack of access to water for indigenous bird species within the urban environment. To achieve this aim, we will describe a possible solution that consists of the implementation of automatic bird fountains on the rooftops of Universidad Tecnológica Nacional (UTN) Facultad Regional Paraná (FRP).

In this work, the information is organized as follows. First, the problem, which is located in the city of Parana, is briefly addressed. Secondly, there is a description of the context where the problem is located, with a special focus on the area of interest for this project, which is the southwest area of the city. Then, the problem to be addressed, which affects thousands of birds in the city, is described. After this, there is a description of figures that show the problem and the areas surrounding UTN FRP premises where the problem is found. Next, the causes and consequences of this problem are analysed. Finally, the proposal of the solution is explained along with its strengths and weaknesses.

It is expected that this work can raise awareness about the importance of reducing bird abandonment in the city as well as decreasing bird extinction in this area. By means of this work, we hope to inspire many citizens to take care of birds

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 by applying similar sustainable measures in other areas of the city. some blocks of apartments where many students live (Fig. 6) In Figure 7, it can be observed that there is courtyard which serves as the university's rugby field.

II. PROBLEM DEFINITION AND ANALYSIS

A. Description of the Context

There are more than 300 specie birds that inhabit the surroundings of the Paraná River, such as woodpeckers, doves, mockingbirds, lapwings, carrion hawks, and others (Fig.1). It is common to see several of these species in the urban areas of Paraná city. It is obvious that the heart of a big city is not the best habitat for wildlife, mainly because birds do not have access to water sources there.



Fig. 1. Some of the main birds in Paraná area.

Paraná is divided into four big municipal areas as indicated in Fig. 2. Although Paraná is not as busy as big cities, it still has its own way of life. People there do their daily tasks, businesses run, and cultural events take place. These activities can impact the local bird ecosystems. However, the focus of this work is on the area surrounding UTN FRP premises in Paraná.



Fig. 2. Paraná city map.

UTN FRP premises are located in the heart of city life on Almaguer Avenue (Fig. 3). This is a dynamic urban context which faces a big problem related to the lack of water access for indigenous bird species. If we focus on UTN FRPs surroundings, in Figure 4 we can see that there is a school opposite the FRP's premises. Also, Figure 5 shows the bridge that people use to cross Almaguer Avenue, which is in front of the university premises. The university has a car park that is on the left of its premises. To its right, there are

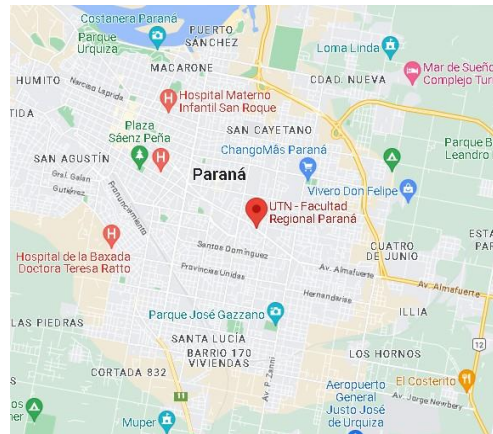


Fig. 3. Location of UTN FRP's premises.



Fig 4. School opposite UTN.



Fig 5. Bridge on Almaguer Avenue.

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Fig 6. University surroundings.



Fig 7. UTN's rugby field.

Figure 8 shows the different shops which are near UTN FRP. For example, there are well-known shops like Cetrogar, which is on the corner of Almagro Avenue and Garrigó Street, as well as Musimundo, which is on the corner of Almagro Avenue and Rondeau Street. There is a Día supermarket near these shops. Also, there is also a car dealer and a hotel, located on Almagro Avenue near UTN.



Fig 8. Shops nearby UTN.

### B. Problem Statement

The urbanization is a big problem for animals in general, this happens in all cities of the world, and it happens more notoriously in big cities like the city of Paraná. The animals have been affected by many factors such as strong noise pollution, the impossibility of living in central places, the use of insecticides in agriculture that reduce insects, the difficulty in obtaining water and others. However, the focus of this study is the lack of water for birds in particular.

It is difficult for birds to find water since the city of Paraná is very large. The journey to the river is long, especially if these animals have babies.

Within the UTN FRP campus, there are wooded and green areas, either in front or in the background of the premises. These areas are chosen by dozens of birds to lay nests or simply rest. However, there are not any water sources to hydrate them within UTN FRP or in the nearby areas.

The failure to take advantage of the available opportunities within the UTN FRP campus is evident. The reason for this is the fact that there is a large number of birds which are concentrated in this area and those tools that can be employed to help these animals are underused.

### C. Description of Scenes that Help Picture the Problematic Situation

Within the UTN FRP campus, there are various places where birds usually rest. At the main entrance of the faculty, there is a gallery (Fig.9) where many birds rest. A short distance away, palm trees serve as nesting spots for some birds (Fig.10).

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Fig. 9. UTN's gallery.



Fig 10. University palm trees.

Towards the rear of the UTN FRP, there is a green area with many trees where birds perch or make their nests.

However, none of these locations offer access to water for the birds on the campus or in the area (Fig 11).



Fig 11. Trees in the university parking lot.

The easiest way to understand the importance of this problem is to compare the journey to get water of a city-dwelling bird to that of a rural bird. The bird which lives in less developed areas has access to many natural water sources. However, a city-dwelling bird does not have access to clean spots, so they often drink from dirty street puddles (Fig. 12).



Fig 12. Bird drinking water from a dirty street puddle.

#### D. Identification and Analysis of Causes or Factors that Give Rise to the Problem:

There are many causes that trigger the lack of access to water for indigenous bird species within the urban environment. However, the four most important factors will be addressed in this work. One of the main factors is urbanization. Urbanization directly affects animals, because the lack of natural habitats makes it difficult for birds to find places to get water.

Another important factor is the little awareness in society about the needs of birds. There are very few people who put birdbaths in their homes. Moreover, local media as well as the municipal government do not carry out awareness campaigns to preserve native bird species.

Also, there are not any companies in the market that offer sustainable solutions for this issue. In the case of UTN FRP, in this faculty there are many tools which could help achieve a solution.

Last but not least, pollution affects all living beings and birds are no exception. The pollution of rivers and streams means that the sources of hydration for birds is increasingly limited. Even something as simple as a rain puddles can be contaminated, posing health risks to birds.

#### E. Identification and Description of the Consequences

There are several consequences that this problem generates. One of the main ones is that the birds often become ill or die due to a lack of access to clean water. When they find water, it is contaminated, which generally endangers their health and can ultimately lead to the death of these birds.

Another consequence is that many birds choose to leave the city, due to scarcity of water and the lack of good treatment from humans. These birds choose to relocate to rural areas, seeking a more suitable habitat, which in turn can affect the relationship between humans and birds.

The last consequence, and perhaps the worst one, is the increase in endangered species facing extinction. This is related to the first consequence. If birds continue to get sick and die, the number of species in danger of extinction will increase and it is crucial to prevent the extension of entire species of birds.

### III. THE WAY FORWARD

#### A. Problem Approach

To address this problem, a sustainable solution is proposed. Although it may not solve the root problem, it can contribute to the well-being of a large number of birds in the area. The solution involves the installation of a bird water source in a strategic place located in one of UTN FRP's galleries, as shown in Figure 9. This gallery is a common perch for birds within the educational facility.

To achieve the fountain installation, two water pumps are needed (Fig. 12). One of these pumps, which is the main

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pump in charge of transferring water from the faculty's water tank to the bird water source through a network of pipes, should be placed next to the fountain.

The reason for placing the pump next to the fountain is that the pump must be connected to an electrolevel, which is responsible for turning the pump on. The electrolevel helps maintain a perfect water level inside the fountain. When the water level decreases, the electrolevel tilts downward, to turn the pump on. Once the water reaches the set level, the electrolevel restores its position, turning off the pump.

The second pump is installed to prevent water stagnation. If the water stagnates, it could become contaminated and be harmful to the birds. This pump is located on the floor of the fountain. Hoses collect and circulate the water through the source's tunnel ensuring the constant circulation to keep the water drinkable.

In relation to the technical specifications, the main pump consumes 18 watts and is capable of providing 800 liters per hour, which is equivalent to 13.3 liters of water per minute. The second pump consumes 2 watts and is capable of providing 200 liters per hour, which is equivalent to 3.3 liters of water per minute. The electrolevel consumes 100 watts.

All the necessary electrical power for these components can be generated from the solar panels available at the faculty. These panels work with solar energy. The operation consists of transforming sunlight into electrical energy, without needing the conventional electricity distribution network.

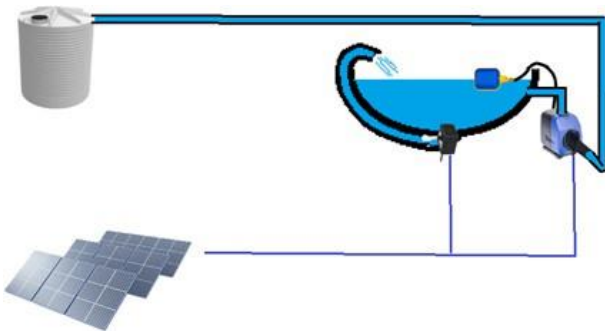


Fig 13. Illustrative diagram showing the fountain installation process.

### B. Strengths and Weaknesses of the Proposal

In this section, the strengths and weaknesses of the proposal for the implementation of an automatic water fountain at the university are examined. These are:

#### Strengths:

In this project, one of its most important strengths is its self-sufficiency. Personnel are not required to monitor the operation of the fountain on a daily basis, since with its automated mechanism, it activates without the need for manual intervention.

Moreover, the project offers financial benefits to the university. The proposal may not generate future expenses for the university, as it eliminates the need for personnel to operate the pumps and relies on green energy generated by the UTN FRP's solar panels for its functioning.

Furthermore, this solution does not generate environmental damage. Using renewable energy for this water bird source eliminates the pollution associated with traditional electrical energy.

#### Weaknesses:

An important weakness of the project may be the high cost of acquiring devices and materials, especially the pumps. This expense may be a financial challenge for the university during the purchasing and installation stages.

Moreover, it is necessary to carry out monthly maintenance to verify that there are no obstructions such as leaves, bird feathers, etc. However, this can be difficult, since the fountain would be located in a place that is difficult to reach.

## IV. CONCLUSION

In conclusion, it can be said that this project is capable of positively improving the life of birds, while maintaining an environmentally friendly approach through the use of renewable energy. Although some construction materials have a high cost, they are elements and equipments that can be maintained or fixed, minimizing the need for replacements. If failures arise, they are of minor importance because water pumps only require rubber replacements so minimal expenses are required for their fixing.

The implementation of sustainable automatic bird fountains could be an incentive for more people to participate in the conservation of native birds. If this project were replicated throughout the city, there would be an improvement in the lives of the birds, mitigating the impact of urbanization and the damage generated to the environment.

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The present project is a skills integration activity in Inglés I at Universidad Tecnológica Nacional, Facultad Regional Paraná, carried out by EFL engineering students. The yearlong project requires students to delve into a problem in the city where they live and to address it by means of a simple project in English. Should the reader have any questions regarding this work, please contact Graciela Yugdar Tófaló, Senior Lecturer, at [gyugdar@frp.utn.edu.ar](mailto:gyugdar@frp.utn.edu.ar).