



# SUSTAINABLE DEVELOPMENT GOALS

15 LIFE  
ON LAND



# Sustainable awareness campaign - Protecting the Pantanos de Villa



## Fauna

En su territorio se han registrado 210 especies de aves (incluyendo migratorias, residentes y cualquier registro). Los migrantes pueden incluso dividirse por origen: América del Norte, América del Sur, andinos y migrantes locales. Además, en este humedal crecen especies vegetales y/o animales que se encuentran en las principales etapas del ciclo biológico.

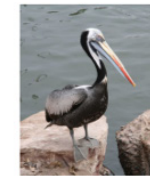
Dentro de las aves registradas se encuentra el potoyunco peruano (*Pelecanoides garnotii*), el pelicano peruano (*Pelecanus thagus*), el guanay (*Phalacrocorax bouganvilli*), el piquero peruano (*Sula variegata*), el gallareta común (*Fulica atra*) y la gallareta gigante (*Fulica gigantea*). Otras especies de aves importante son: la garza blanca (*Ardea alba*), el pato cabeza verde (*Anas platyrhynchos*), el gallinazo cabeza roja (*Cathartes aura*), el halcón peregrino (*Falco peregrinus*), el chorlo del ártico (*Pluvialis squatarola*) y la garza tricolor (*Egretta tricolor*).



Polla de Agua



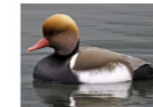
lechuza de los arenales



Pelicano peruano



Garza Blanca Grande



Pato colorado

In July 2023, the UNSA Architecture program carried out the sustainable awareness campaign “Protecting the Pantanos de Villa” (Villa Swamps), with the aim of raising awareness about the threats faced by Pantanos de Villa and motivating the population to take action to mitigate the impacts

on this ecosystem and preserve this natural area.

Within each section of the course AR338 - Sustainability and Environment, six campaigns were developed and shared on Instagram, explaining the importance, threats, and

actions to be taken to preserve the Villa wetlands.

UPC students actively aligned with the SDGs in this initiative to preserve a natural area. Additionally, they engaged the surrounding population in the wetlands’ preservation efforts.





# Conference for “World Environment Day”



On June 5, 2023, the UPC Environmental Engineering program organized the conference “World Environment Day,” an academic event addressing the challenges in managing protected natural areas in Peru.

This conference aimed to raise awareness among participants about the role

and importance of protected natural areas in biodiversity, the economy, their relevance to sustainability, and the challenges they face.

In this way, UPC contributed to the Development Goal 15, Life on Land Ecosystems.

**RETOS EN LA GESTIÓN DE ÁREAS PROTEGIDAS EN EL PERÚ**

Por el Día Mundial del Medio Ambiente, los invitamos a participar de la **ponencia** de:



**JEFF PRADEL**  
Biólogo y experto en conservación de diversidad biológica, manejo de recursos naturales, gestión de áreas protegidas y desarrollo sostenible.

📅 5 de junio - 3 p.m.  
📍 Auditorio - Campus Villa



# Tropical contamination by hydrocarbons: Biotechnological perspective for the remediation of soils in forests, application case Peruvian Amazon, Bagua – Imaza



**Authors:** Aujasio, L. | Cruz, R. | Sarmiento, S. | Ruiz-Huaman, C.

**Abstract:** The objective of the present investigation is to publicize the situation of the forests with respect to the contamination of soils by hydrocarbons. The biotechnological processes applied to soil bioremediation and the feasibility of applying them in the country were investigated. Hydrocarbons are the major contaminants due to their resistance to biodegradation and their ability to bioaccumulate in the soil. In the world it is estimated that around 2,381,000 barrels of oil are spilled per year due to spills. Similarly, only in the Peruvian Amazon there have been 566 oil spills and from 1997 to 2021 87,370.82 barrels of oil have been spilled. All this has caused social conflicts and loss of species. In the case of the Bagua province, Imaza district, Inayo annex that crosses the Norperuano Pipeline, many times due to mismanagement, the pipeline has suffered ruptures and subsequent hydrocarbon leaks. The purpose of the study is to publicize in-situ bioremediation techniques, bioventing, bioaugmentation and biostimulation, and ex-situ Technology remediation techniques such as biopiles and landfarming. As well as the phytoremediation technique. The comparative result of the techniques showed the lines of thought that led to the selection of the most appropriate technique for the Amazonian soil of study.

**Keywords:** Remediation, North Peruvian Pipeline, hydrocarbons, ex-situ, in-situ, phytoremediation.

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# Smart Environments through the Internet of Things and Its Impact on University Education: A Systematic Review



**Authors:** Chamorro-Atalaya, O. | Morales-Romero, G. | Quispe-Andía, A. | Caycho-Salas, B. | Ramos-Salazar, P. | Cáceres-Cayllahua, E. | Arones, M. | Auqui-Ramos, R.

**Abstract:** At present, there is diverse scientific evidence of the contributions of smart environments (SE) that have positively impacted various urban problems. However, the concept of SE is very broad, so it is relevant to investigate how these technological trends have been integrated into the university educational environment. Therefore, the objective of this study is to explore and describe the state of the art on the impact of intelligent environments implemented through the Internet of Things (IoT) in university education. Therefore, a systematic review of the literature was developed. The research was developed with a mixed approach and descriptive scope. From this study, it was determined that the purpose of implementing SE in university education is focused on contributing to the teaching and learning process and managing and optimizing the use of resources provided by the educational environment. In addition, smart classrooms are the type of environments that have been implemented to a greater extent and whose results show a positive impact on indicators such as motivation, participation, interaction, satisfaction, and student attitude. With which it is concluded that universities should reflect on the implementation of institutional policies that lead to the progressive implementation of SE, seeking to transcend from being just simple learning classrooms to sustainable environments that contribute to student health and environmental conservation.

**Keywords:** university education, higher education, intelligent environments, internet of things

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