WASWAC

HOT NEWS

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Message for World Soil Day 2025: Healthy Soils for Healthy Cities

By *Dr. José l. Rubio*, the Honorary President of WASWAC

The World Soil Day was officially established by the Food and Agriculture Organization of the United Nations (FAO), following a proposal by the Kingdom of Thailand, and was endorsed by the United Nations General Assembly in 2013. Since then, every December 5th, people around the world come together to recognize the vital role that soils play in supporting life on Earth, reminds us of one of the planet's most essential, yet often overlooked, natural resources, is the soil beneath our feet.

Soil is a living, breathing ecosystem that sustains plants, animals, and people.

Yes, a living system, full of activity and energy. One handful of healthy soil contains more living organisms than there are people on Earth. It's an entire universe down there, working silently to sustain life above the ground. Because everything begins with it.

Healthy soil means healthy food, clean water, stable climates, and thriving ecosystems. It regulates the Earth's temperature, stores vast amounts of carbon, and filters the water that sustains us. Without healthy soils, there is no agriculture, no forests, no biodiversity — and ultimately, no life as we know it.

It is the foundation for food production, a critical regulator of climate and water resources, and a key component of the planet's biodiversity. Healthy soils store carbon, filter water, and provide the nutrients that feed us all.

However, our soils are under increasing pressure from unsustainable land use, pollution, sealing, erosion, climate change, salinization and desertification. Protecting and restoring soil health is therefore not only an environmental priority but also a social and economic necessity.

And if we lose the soil, we lose everything. Without soil, we can't talk about biodiversity, agricultural production, forests, fertile landscapes,…

The World Soil Charter, first adopted in 1981 and revised in 2015, provides a shared framework for nations and institutions to promote the sustainable management and conservation of soil resources. It calls on all of us—governments, farmers, researchers, and citizens—to act responsibly and collaboratively in safeguarding this invaluable natural asset.

The 2025 theme for the World Soil Day, "Healthy Soils for Healthy Cities," will focus on urban soils and the challenges of soil sealing. The event will highlight the role of sustainable soil management in supporting resilient cities, biodiversity, and food security.

The topic is most appropriate and timely. In a few decades 80% of humanity will live in cities. Cities will become one of the most important terrestrial ecosystems for the human population. This trend is a changing paradigm with important implications that offer the opportunity to design friendlier, more resilient, healthy and sustainable cities. In this context, adequate management and conservation of the urban soils are key elements in the functioning of a re-naturalized city. This will require to develop urban-specific soil ecological knowledge and appropriate management-conservation for soil health and productivity.

Urban soils provide a number of important ecosystem services including reduced and delayed storm water and runoff volumes, enhanced groundwater recharge, increased carbon sequestration, urban heat island mitigation, reduced energy demand, improved air quality, additional wildlife habitat and recreational space, improved human health and aesthetical values, opportunity for recreation, exercise, therapy, and education, increased land values and are basic for urban agriculture, among others.

Urban soils can be affected by physical degradation, such as compaction and sealing, which reduces their porosity, permeability, and water-holding capacity. This can lead to increased runoff, flooding, and urban heat island effects, as well as reduced soil fertility and biological activity. Furthermore, urban soils can lose their natural diversity and functionality, as they are often disturbed, contaminated, mixed, or replaced by artificial materials.

Urban soils are unique entities that demand expanding the scope of soil-water conservation, restoration and sustainable management to enhance their agro-ecosystem services as well as improve their resilience and adaptation to climate change. Among these measures, nature-based solutions (NBS) should be considered, with strong priority to the biological component of soil, ecological restoration, improvement of biodiversity, mechanical interventions, structures, prevention of contamination and improving of the physical, chemical and biological properties of the soil.

The incorporation of new and more ecological perspectives in the management and conservation of urban soils will have a crucial and positive impact on the design, management and viability of the green, friendly and sustainable cities of the future.

As we celebrate World Soil Day, let us remember that the future of our food, our ecosystems, our cities and our planet depends on the health of our soil. By caring for the soil, we care for life itself.

So, on celebrating " World Soil Day", let's celebrate the ground that feeds us, shelters us, and connects us. Let's honor the work of farmers, researchers, and organizations around the world who dedicate their lives to studying and protecting this precious resource.

And most importantly, let's make a commitment — to take care of the soil, so that future generations can continue to enjoy the richness and beauty of life on this planet.

Because when we take care of the soil, we take care of the Earth.

And when we take care of the Earth, we take care of ourselves.

2026 Application Guide for International Students of China Institute of Water Resources and Hydropower Research

Major strengths of IWHR

China Institute of Water Resources and Hydropower Research (IWHR) is the largest specialized research institute under the Ministry of Water Resources, with a broad scope in water sector research since 1933. With over 1,200 staff members, including 600 PhD holders, IWHR operates across two campuses in Beijing, a city of history and modernity. It features 36 advanced labs and covers 18 disciplines, leading in national water research and graduate education.

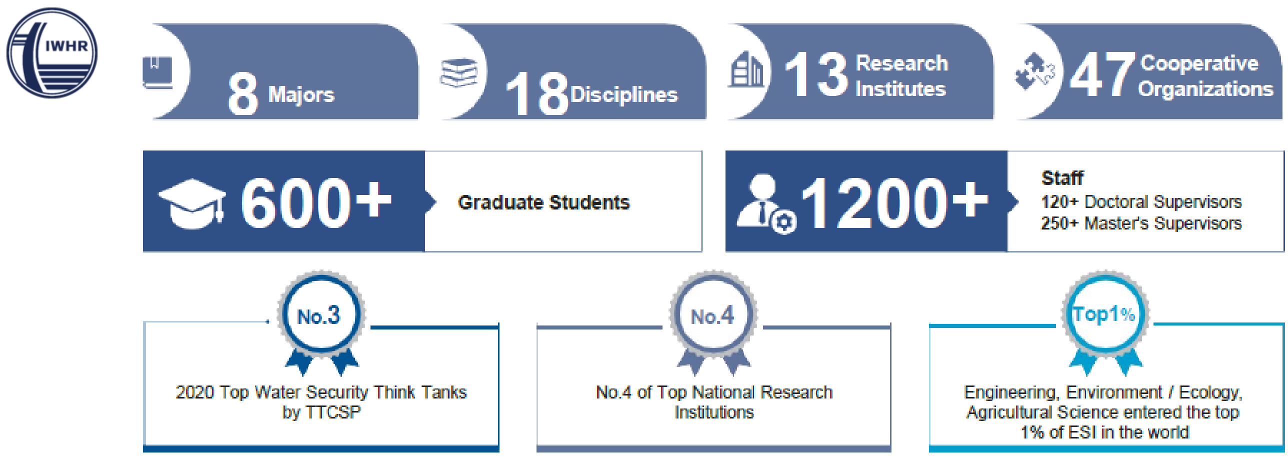
Cutting-Edge Research Hub

IWHR stands as a leading institution in the fields of engineering, ecology, and agricultural sciences, attracting exceptional researchers and students in water-related disciplines from across the globe.

By offering state-of-the-art facilities and a vibrant, stimulating academic environment, the Institute enables its researchers to thrive and grow as scholars, supporting the development of innovative, cutting-edge research projects. The academic freedom fostered by the Institute has resulted in numerous awards, including over 100 national prizes for science and technology.

World-Class Education Programs

IWHR provides a diverse range of exceptional education programs designed to guide students towards realizing their full potential. Students benefit from the Institute's rich academic environment, expert guidance, and experiences that only IWHR can provide. Fur-

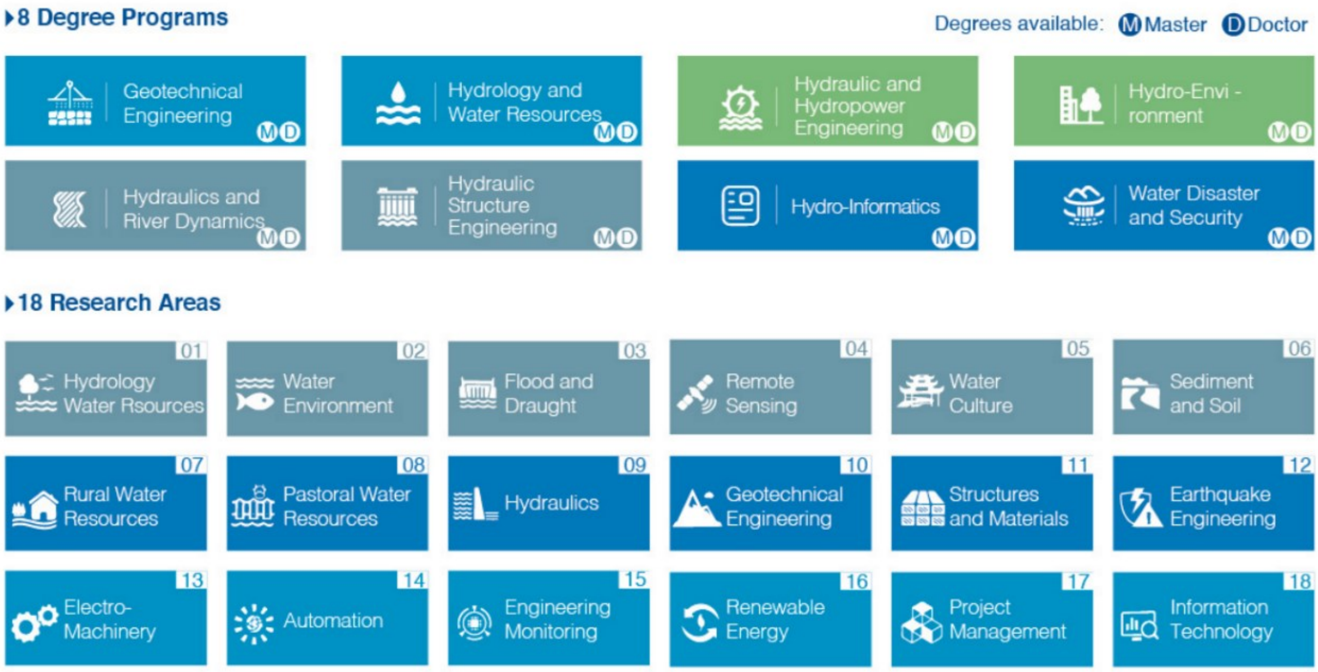


thermore, various extracurricular activities will equip students with the ability to lead, to cooperate, and to thrive into a new career future.

IWHR Degree Programs

IWHR offers a wide range of postgraduate programs covering all water sectors. There are 8 programs in total that apply to both master's and doctoral degrees. If the students have a sparkle of research idea, they can easily find the corresponding experts in the field.

Standard duration 3 years for master's degree and 4 years for doctoral degree. A degree program may have multi-related research areas. To find the specific area, please refer to our website and contact the Graduate School for more details.



IWHR Non-Degree Programs

Non-degree programs in IWHR are usually established between the Institute and the partnership institutions. The students may study at IWHR according to the MOU or agreements.

Not all programs take short-term international students; applicants are therefore advised to contact the Graduate School in advance for details.

Tuition and Fees

Application Fee: Free;

Annual Tuition: CNY 26,000-CNY 39,000;

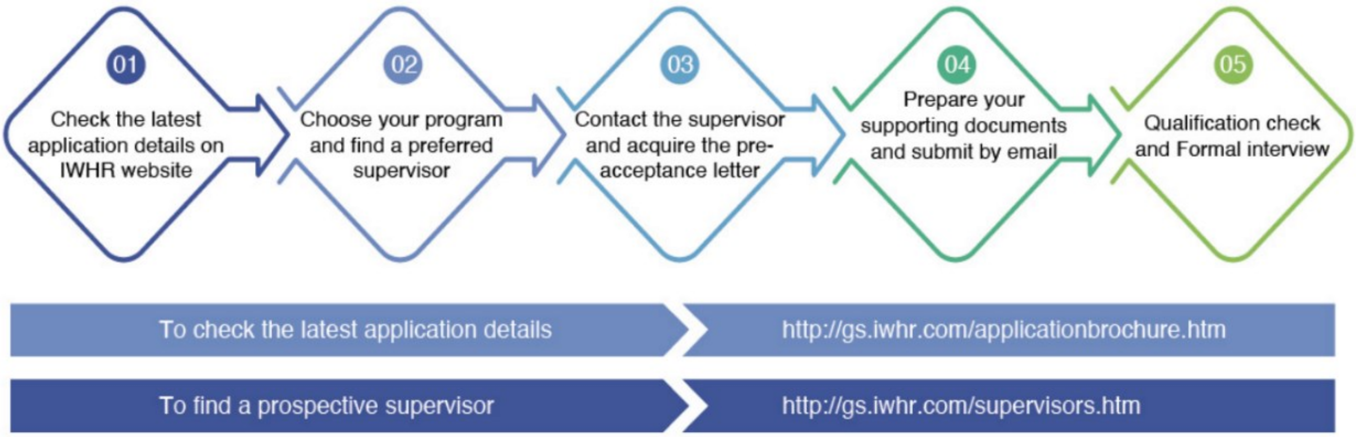
Annual Accommodation: CNY 24,000;

Annual Insurance: CNY 800.

How To Apply for a Degree Program

Applicants for degree programs shall submit their application to IWHR by email: graduateoffice@iwhr.com

General Procedure of the Whole Application Process:



Required Application Documents

Application materials include transcripts, certificates, personal information and etc. Please visit the website below for more details.

http://gs.iwhr.com/howtoapply.htm

Important Dates

⋆ Application Deadline

No later than 30th April for the next academic year.

⋆ Admission Notice Time

Between 10th June and 15th July for the next academic year.

⋆ Academic Year

In early September.

Contacts

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Integrated Solar Model Fixes Shifting Sands

In the heart of the Ulan Buh Desert, where harsh winds once swept sand into the Yellow River, vast fields of solar panels stretch across the horizon. Below them, a grid pattern made of straw anchors the soil, and desert shrubs thrive in the shade.

This "photovoltaic plus desertification control" model in the Inner Mongolia autonomous region's Dengkou county has been key in China's battle against desertification. Over the years, the model has evolved into a sophisticated, integrated approach that marries ecological restoration with economic development.

For Dengkou, a front-line zone in the battle against the spread of the Ulan Buh Desert, it has moved beyond just planting trees and shrubs.

"We're building stable ecosystems that also produce energy, grow crops and sustain livelihoods," said He Wenqiang, deputy head of Dengkou's desertification control bureau.

The county has installed 536,000 kilowatts of photovoltaic capacity integrated with 9,560 hectares of treated desert land.

He said the integrated model creates a productive system with panels generating power above, and their shade helping plants thrive below. Cistanche, also known as desert ginseng and the shrub mostly planted beneath the panels, is a high-value crop that maximizes land use efficiency, turning ecological restoration into economic opportunities.

In Dengkou, over 3,000 local farmers in the sand industry have been involved, increasing their average annual income by more than 5,000 RMB ($700).

Tourism has also grown, with visitors touring solar farms, experiencing cistanche harvesting, or exploring desert landscapes. Last year, Dengkou received 1.5 million tourist visits, generating 550 million yuan in revenue — a 13 percent year-on-year increase.

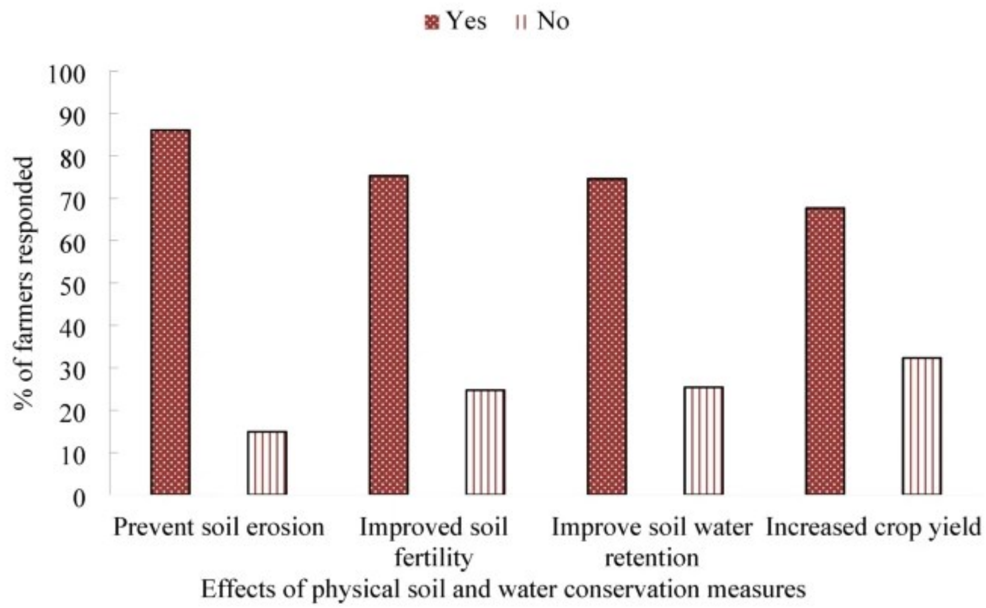
Under the Three-North Shelterbelt Forest Program, similar integrated photovoltaic projects are planned across northern China, where desertification threatens agriculture and water security.

News Source

https://www.chinadaily.com.cn/a/202510/24/WS68face6ea310f735438b69cb.html

Evaluating the Impacts of Physical Soil and Water Conservation Measures Implemented by Community Mobilization in Shebel Berenta District of Northern Ethiopia

Soil erosion ranks among the severe and widespread environmental issues affecting agricultural land productivity and food security. In Ethiopia, to address the widespread erosion and degradation impacts on food security, soil and water conservation (SWC) practices are widely implemented through community mobilization. This study evaluated the impacts of physical SWC practices that were implemented by community mobilization in food insecure rural areas. The study employed interviewing farm households and soil analysis. Using a multi-stage sampling technique, 130 farm households were chosen and interviewed. Farmers' opinion on soil fertility change due to physical SWC practice, such as stone bunds, was further investigated by analyzing a total of 36 composite soil samples, which were collected at 0–20 cm depth. Eighteen of the samples were collected from fields with stone bunds, and the other 18 were taken from the adjacent fields lacking physical SWC measures. The results revealed that 48% of the farmers perceived severe soil erosion, while 52% perceived moderate and slight erosion before the implementation of physical SWC measures. Following the construction of SWC measures, such as stone bunds, only 16% of the farmers perceived severe soil erosion, implying reduced soil erosion on many farmers' fields. About 68% of the respondents perceived that physical SWC measures could increase crop yield, and 75% perceived improvement in soil fertility. Results of soil analysis showed that soil organic carbon, available phosphorus, and available potassium were significantly ($p < 0.05$) greater in farmlands with stone bunds than adjacent non-treated fields, which aligned to the farmers opinion on soil fertility change. Greater soil fertility in fields with stone bunds revealed the positive effect of SWC practice in reducing erosion. The majority of farmers (60%) repaired constructed bunds and related SWC measures to sustain its function, while considerable farmers were not motivated in repairing the broken bunds, mentioning complaints about cultivable space taken by bunds, shortage of labor, and lack of awareness on the benefit of physical SWC. We conclude that SWC practic-



Perceived effect of physical soil and water conservations on soil, water, and crop in the suha watershed, shebel berenta woreda, ethiopia.

es improve soil properties for crop production, but some farmers need follow up to increase awareness about positive effect of SWC. Thus, in addition to constructing new physical SWC measures, farmers should be encouraged to repair the damaged physical SWC measures that were constructed by public campaigns. Context-based technical and resource support to the needy group could contribute to implementation and sustainable use.

The majority of farmers agreed that physical SWC measures prevent soil erosion and improve soil and crop yield. The physical SWC measures could detain and retain surface runoff, as a result of which it reduces the soil detachment and sediment transport capacity. Thus, it could reduce loss of nutrients and soil organic matter. In other areas, e.g., in the central Kenya highlands, 82% of farmers perceived that physical SWC practices increased crop yield.

Article Source

https://www.nature.com/articles/s41598-025-99986-7

Weakly Supervised Ephemeral Gully Detection In Remote Sensing Images Using Vision Language Models

Among soil erosion problems, Ephemeral Gullies are one of the most concerning phenomena occurring in agricultural fields. Their short temporal cycles increase the difficulty in automatically detecting them using classical computer vision approaches and remote sensing. Also, due to scarcity of and the difficulty in producing accurate labeled data, automatic detection of ephemeral gullies using Machine Learning is limited to zero-shot approaches which are hard to implement. To overcome these challenges, we present the first weakly supervised pipeline for detection of ephemeral gullies. Our method relies on remote sensing and uses Vision Language Models (VLMs) to drastically reduce the labor-intensive task of manual labeling. In order to achieve that, the method exploits: 1) the knowledge embedded in the VLM's pretraining; 2) a teacher-student model where the teacher learns from noisy labels coming from the VLMs, and the student learns by weak supervision using teacher-generate labels and a noise-aware loss function. We also make available the first-of-its-kind dataset for semi-supervised detection of ephemeral gully from remote-sensed images. The dataset consists of a number of locations labeled by a group of soil and plant scientists, as well as a large number of unlabeled locations. The dataset represent more than 18,000 high-resolution remote-sensing images obtained over the course of 13 years. Our experimental results demonstrate the validity of our approach by showing superior performances compared to VLMs and the label model itself when using weak supervision to train an student model. The code and dataset for this work are made publicly available.

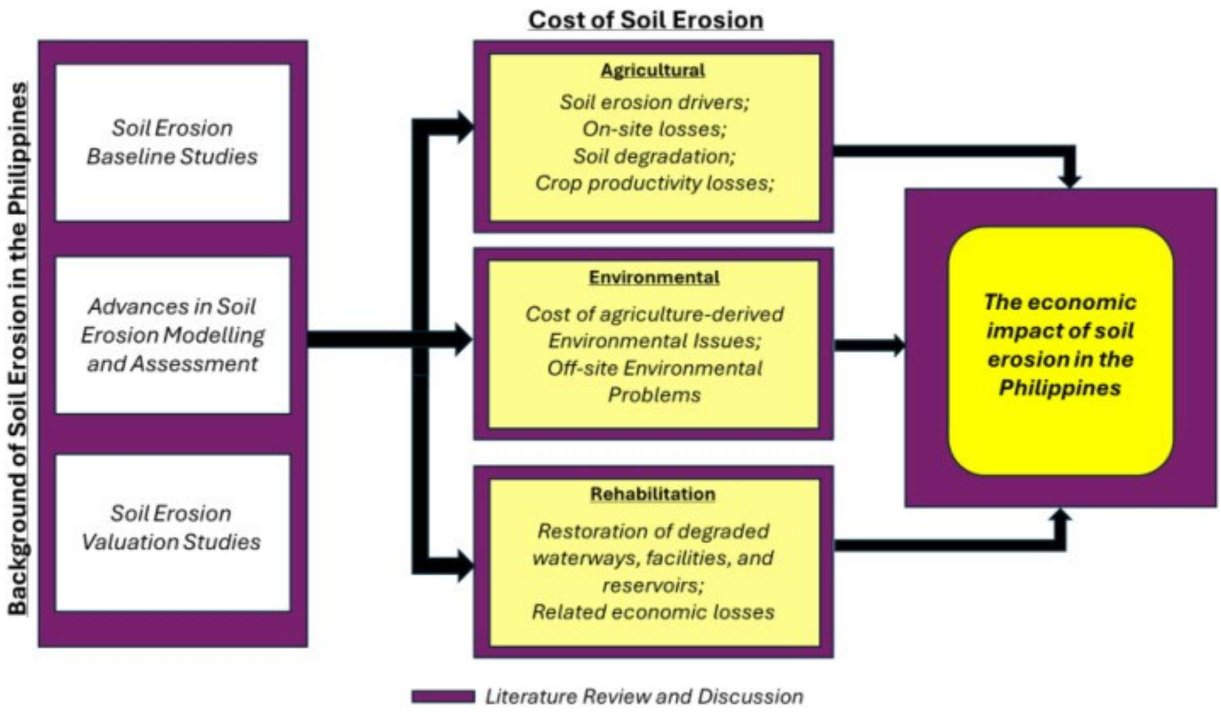
Article Source

https://arxiv.org/abs/2511.13891

The Agricultural, Environmental, and Rehabilitation Impacts of Soil Erosion in the Philippine Economy – A Walkaround Review

Land degradation is a major issue that is in line with the current major problems that the world is facing today – climate change and food security. As a developing country, the Philippines heavily relies on its natural resources for food production, which are constantly being threatened by natural and anthropogenic processes that lead to agro-environmental and economic problems. Soil erosion has long been identified as one of the most serious drivers of natural resources degradation. However, an emphasis must be given to soil erosion to reveal its severity, not only as a physical process that induces direct damage, but also its possible contribution in exacerbating other problems due to its derivative effects. This review aims to undertake soil erosion from an economic perspective that focuses on the possible cost it can impose on the Philippine economy, from the poorest communities to government-level expenditures. It provides a plain sailing overview that can be used to ratify government-level decisions in support of soil and water conservation programs from concerned institutions, together with the need to employ current scientific and technological advances for a more holistic and reliable promulgation of soil erosion mitigation and rehabilitation measures in different settings. The economic impacts of soil erosion on agriculture, the environment, and disaster risk and rehabilitation are presented to delineate the areas that can be addressed through research and development interventions, policy recommendations, the exchange of vital information through instruction and extension, and effective plans for conservation and restoration.

This paper provides an overview of the economic impacts of soil erosion, classified into its agricultural, environmental, and rehabilitation dimensions, supported by existing soil erosion research findings in the country. Whereas mainstream sedimentation, geomorphology, coastal impacts, and geologic processes are beyond its scope. A compendium of identified problems, such as the systems affecting soil erosion and their relative costs, is also hereby presented. This review recognizes the need for a more updated integrated multi-scale economic assessment of soil erosion that is anchored in recent advances in science and



socioeconomic analyses that were not leveraged by older studies in the country. Catalyzing a general soil erosion cost evaluation framework and standardization of publication data for a more inclusive data sharing across independent studies is also envisaged. Moreover, this review highlights the direct and indirect impacts of erosion from previous assessments and current perspectives, to emphasize the reinvigoration of land degradation mitigation programs.

Article Source

https://www.sciencedirect.com/science/article/pii/S2667006225000383

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