

OVERCOMING CHALLENGES IN EIA: ENVIRONMENTAL SCIENCE STUDENTS IN ARGENTINA IDENTIFICATION 22

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Summary:

The Environmental Sciences program at the Faculty of Agronomy, University of Buenos Aires, which has over 110 years of history, has evolved in the last 20 years towards an approach that integrates science and environmental management, with special emphasis on Environmental Impact Assessment (EIA). Established in 2003, the program has undergone three curricular adaptations (2003, 2008, 2017) to meet changing environmental, social, and economic needs. Collaboration between scientific research and practical environmental management has been encouraged, with over 600 professionals trained who are working both domestically and internationally. Graduates and faculty highlight the importance of comprehensive training in environmental management and EIA, which are essential for professional development and contributing to public welfare.

Introduction and Development:

Environmental sciences are dedicated to studying natural and human systems, analyzing the interactions between them, and developing solutions to protect and preserve the environment. Moreover, they feature an interdisciplinary approach as they integrate knowledge and perspectives from various fields of study (Universidad Simón Bolívar, Mexico, 2023). Environmental education is a process that enables people to gain a deeper understanding of environmental issues and acquire the tools to make informed and responsible decisions (Environmental Protection Agency, USA, 2023). Studying the training in Environmental Sciences and environmental management, including Environmental Impact Assessment in the Bachelor's degree in Environmental Sciences at the Faculty of Agronomy, University of Buenos Aires, over the past 20 years, including perceptions from its faculty and professional graduates, helps us understand the role this profession plays, its temporal evolution, and the relationship between the academic and environmental management fields. As an introduction, and to set a temporal context, it is appropriate to mention that prior to the creation of the program, the General Environmental Law was enacted in 2002, a significant milestone in Argentine environmental legislation that has provided a framework for environmental management and protection at the national level. This law, in its Article 22, mandates that any work or activity that could have significant adverse effects on the environment, quality of life, or natural and cultural heritage must undergo an environmental impact assessment and has been, to date, the minimum requirement for EIA at the national level (Law 25.675, 2002), as Argentina still lacks a national law regarding EIA. The program was initiated in 2003, originally sharing common foundations with Agricultural Engineering and differentiating itself environmentally in its second stage, still

maintaining a clear agricultural bias. In these two decades, there have been three adjustments to the curriculum (2003, 2008, 2017), and more than 600 professionals have graduated. Each plan evolved in content and adapted with the aim of meeting solid research and management foundations in response to changing environmental, social, and economic needs. By 2008, it began to strongly differentiate from the dominant program (Agronomy), proposing a basic trunk much more focused on the environment and later specific elective and optional subjects. The offering of these electives increased until 2017 and continues, with a clear increase in the number of subjects associated with environmental management, providing options for students in their pursuit of orientations. A significant event that shows how science and management were in articulation was the book "Research in Environmental Sciences" published in 2017 by FAUBA, which synthesizes more than a decade of reflections on the complexity of environmental issues. In one of its chapters, it explicitly shows the role of Environmental Impact Assessment (EIA) as a key tool for combining different competencies in environmental matters, uniting management with science (Plencovich, MC, Vugman, L., & Cordon, G., 2017). In this context, the concept of "evidence bridges" between research and conservation (Kadykalo, A. N., Buxton, R. T., Morrison, P., Anderson, C. M., Bickerton, H., Francis, C. M., Smith, A. C., & Fahrig, L., 2021) becomes key. Evidence bridges are knowledge intermediaries that facilitate the exchange of knowledge between researchers and practitioners. In environmental sciences, this concept of knowledge exchange is gaining importance, defined as "processes that generate, share and/or use knowledge through various methods appropriate to the context, purpose, and participants involved," particularly in conservation they aim to allow an effective exchange of knowledge. This concept is common in the medical world but in conservation or environmental issues, the intermediaries are more varied and often poorly defined and, according to Kadykalo, insufficient in number and underdeveloped in their function of bringing research into practice (Kadykalo et al., 2021). These bridges would facilitate the connection between scientific knowledge and its practical application in environmental management, allowing a faster and more efficient transfer of scientific knowledge to practice and improving the quality and relevance of environmental solutions. From my experience relating these two worlds, closer collaboration would allow a faster and more efficient transfer of scientific knowledge to practice, improving the quality and relevance of environmental solutions. Additionally, feedback from consultants to academia would generate research lines towards areas of critical need, promoting applied studies that have direct positive impacts on environmental management. Now, where is the problem? Many professionals indicate that it could be in the times that management needs to act and the time researchers consider necessary for a well-founded investigation. In this regard, could we consider establishing agreed criteria? It would be wise to consider the importance of building bridges between both sides.

Continuing this process, prior to the pandemic in 2020, FAUBA established the Environmental Management Area, with the Environmental Impact Assessment (EIA) course being a core part of its development. In 2023, the National Interuniversity Council issued Resolution 175/23, highlighting the relevance of Environmental Science professionals and related fields in public welfare. The resolution urges the inclusion of these programs in Article 43 of the Higher Education Law, demanding that the curricula meet the standards set by the Ministry of Education, Science, and Technology of Argentina. The 2017 plan meets these requirements, ensuring that graduates are sufficiently prepared to face responsibilities that directly affect the

health, safety, and welfare of the population (National Interuniversity Council, 2023), indicating as an essential competence the reserved professional activity of Article 43 referred to "designing, planning, and directing environmental assessments."

In line with the timeline in 2023, to identify the perceptions of professional graduates, a survey was conducted among 323 graduates from the 2003, 2008, and 2017 curricula, on the occasion of the anniversary of the Environmental Sciences program. A key question of this survey focused on identifying essential areas for their activity that they felt had not been addressed during their studies. The responses highlight a predominance of environmental management themes. The answers show that graduates consider environmental management and EIA not only as fundamental areas in their work but also as areas that could have been emphasized more during their training (Aguar M., Bargiela M., Camerero G., Nasta L., Carboni L. & Diéguez H., 2023). In addition to this study, FAUBA's Environmental Management Area conducted interviews with professional graduates, who had focused their final degree projects on EIA or environmental management topics. In their responses based on their experience, they highlight the importance of having been trained with a systemic approach and a generalist vision, stating that this allows them a comprehensive understanding of the interrelationships between environmental components and facilitates the production of objective and well-founded documents for informed decision-making in complex projects. They emphasized how through their professional life they have applied their interdisciplinary work capacity and effective development in EIA, both in the public and private sectors. They agree with the first survey, conducted during the anniversary, highlighting the need for greater integration of environmental management and EIA in academic training, suggesting its inclusion from the early years of the program (Environmental Management Area, 2023). This inquiry was complemented by the opinion of faculty members, many of whom have been directors of this program. Some consider the inclusion of environmental management and Environmental Impact Assessment (EIA) in the Environmental Sciences curriculum of high relevance, due to the integration of knowledge that occurs and the development of key competencies for professional life. They note that this comprehensive training through sciences and the teaching of its application in management positively impacts the preparation of students. They believe that the skills acquired are crucial for the country's progress, contributing to national development aligned with actions aimed at reducing and mitigating climate change and promoting environmental, economic, and social sustainability, in line with internationally agreed Millennium Goals (Environmental Management Area, 2023).

Conclusions:

The training in Environmental Sciences and environmental management, including Environmental Impact Assessment (EIA), in the Bachelor's degree in Environmental Sciences at the Faculty of Agronomy, University of Buenos Aires, has evolved to address changing environmental, social, and economic needs. The inclusion of EIA and environmental management in the curricula is essential to prepare professionals to face current and future challenges in conservation and environmental management. Graduates and faculty highlight the importance of comprehensive training that develops key competencies. The establishment of

the Environmental Management Area at FAUBA and the Resolution 175/23 by the National Interuniversity Council, with its reserved activities, reflects the recognition of the relevance of these professionals in public welfare and the need for an academic training that meets the standards already defined by the Ministry of Education, Science and Technology of Argentina.

We can observe the need for evidence bridges between research and practice to facilitate the connection between scientific knowledge and its application in environmental management. A rapid and efficient transfer of scientific knowledge to practice would improve the quality and relevance of environmental solutions. Graduates of the Environmental Sciences program have the potential to act as scientists and managers but also as bridges, increasing the efficiency of the system

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