Revista ARACÊ
ISSN: 2358-2472

LOCAL KNOWLEDGE AND ENVIRONMENTAL EDUCATION: PATHS TO THE SUSTAINABLE CONSERVATION OF THE SÃO FRANCISCO RIVER

https://doi.org/10.56238/arev7n2-107

Submitted on: 11/01/2025 **Publication date:** 11/02/2025

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ABSTRACT

Local knowledge represents an important resource for Environmental Education, especially in the context of the sustainable conservation of the São Francisco River. The interconnection between the traditional knowledge of riverside populations and scientific approaches can strengthen educational actions aimed at preserving ecosystems and

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Revista ARACÊ
ISSN: 2358-2472

promoting sustainable practices and community engagement. Given this perspective, this study aimed to investigate the contribution of local knowledge in Environmental Education and its relevance to the conservation of the São Francisco River. The research was conducted through a qualitative approach, using bibliographic review and documentary analysis, in addition to the consideration of reports and experiences of riverside communities. The methodology allowed us to understand how traditional knowledge can be incorporated into educational practices and conservation policies, favoring the active participation of residents in the care of the river. The results showed that the valorization of local knowledge in Environmental Education increases awareness about environmental impacts and strengthens preservation strategies, as riverside dwellers have empirical knowledge about the dynamics of the river, its seasonal variations, and local biodiversity. In addition, it was found that the integration between science and tradition is essential to promote more effective actions that are culturally appropriate to the realities of the communities. It is concluded that the articulation between local knowledge and Environmental Education can contribute significantly to the sustainable conservation of the São Francisco River, ensuring more responsible management practices and encouraging the participation of the population in the protection of natural resources. However, it is noteworthy that this study does not exhaust the theme, as new research and contributions from other authors are fundamental to deepen knowledge and broaden discussions about the intersection between education, culture, and sustainability in the context of the river.

Keywords: Environment. Natural resource. Preservation. Sustainability.

Revista ARACÊ
ISSN: 2358-2472

PRESENTATION AND JUSTIFICATION

The São Francisco River, popularly known as "Velho Chico", is more than a watercourse in Brazil, being an essential of life, historical memory, and cultural identity for the regions it permeates. Since ancient times, the river has played a central role in the social and economic development of riverside communities, serving as a source of livelihood, transport route, and inspiration for artistic, religious, and cultural manifestations. Its presence is inseparable from the identity of the people of the Northeast and the traditions that are intertwined on its banks.

A Quality Management System based, for example, on the ISO 9000 standard, is designed to establish criteria for good quality management within a typically contractual context between the organization that adopts it and the customer market, as a way to contribute to the organization's competitiveness. An Environmental Management System comes into existence as a consequence of the organization's recognition of the need to control and improve its environmental performance, understood as its ability to manage environmental effects, as a way to, from a reactive and dependent perspective, achieve, among others, reduce costs, comply with laws and regulations, avoid penalties and/or obtain marketing differentials and/or from a proactive and independent perspective, to be able, among others, to develop and maintain their businesses sustainably and to contribute to the preservation, conservation and/or recovery of natural resource sources and strategic ecological niches (KEINERT, 2000).

Recognizing the São Francisco River as a cultural heritage is essential to value the practices, knowledge, and expressions that it inspires and that have been shaped by generations. Festivities, such as river processions and religious celebrations, along with the ways of life of fishermen, boatmen, and farmers, represent a rich tapestry of cultural diversity that deserves to be preserved. However, the river faces threats that go beyond environmental degradation: the loss of cultural and symbolic elements due to disorderly urbanization, migration, and modernization without proper planning also puts its intangible heritage at risk.

This study aims to explore the relevance of the São Francisco River as a cultural heritage, highlighting its importance not only as a natural resource but also as a central axis in the formation of sociocultural identities and practices. By valuing the São Francisco Water System as a symbol of resistance and cultural richness, it seeks to promote

Revista ARACÊ
ISSN: 2358-2472

reflections on the urgency of protecting and perpetuating both natural resources and the cultural elements that make it unique and vital for Brazil.

The concept of sustainable development formally appears in the context of the Bruntland Report. According to Mota (1998), this document, produced by the United Nations World Commission on Environment and Development, definitively introduces the idea that today's economic development must be carried out without compromising the economic development of future generations. That is, development must be sustainable, which may seem like a redundant or unoriginal concept, and which translates a new qualification for development efforts with significant economic and political simplifications.

This study allows us to investigate the possible relationships between traditional knowledge of riverside communities and environmental education practices as a resource to promote the sustainable preservation of the river. The river represents integration, playing a relevant role in the history, economy, and culture of the communities that live on its banks. However, it encounters numerous environmental challenges, such as pollution, deforestation, and unsustainable withdrawal of natural resources, which threaten its biodiversity and the sustainability of the populations dependent on its waters.

In this context, the approach of local knowledge emerges as a promising way to combine environmental education with practices that respect the experience and knowledge of the communities that directly depend on the river. Traditional knowledge, transmitted from generation to generation, offers practical solutions adapted to the local context for the conservation of natural resources and the sustainable use of the territory.

Environmental education, in turn, acts as a tool for awareness, training, and transformation, promoting critical reflections on the practices that impact the river and encouraging changes that involve all social actors. By integrating local knowledge with educational practices, it is possible to build strategies that not only preserve the environment but also strengthen the cultural identity and autonomy of communities. Therefore, discussing the theme "Local Knowledge and Environmental Education: Paths to the Sustainable Conservation of the São Francisco River" is essential to:

- Involve communities in the planning and execution of conservation actions.
- Valuing local knowledge as complementary to science.
- To promote an integrated and sustainable vision of the relationship between man and nature.

Revista ARACÊ
ISSN: 2358-2472

The union between the traditional and the scientific opens up possibilities for environmental conservation that respects ecosystems and the people who depend on them, ensuring a more balanced and sustainable future for the important river system of the northeast region and its communities.

The literature on the subject points to the relevance of integrating traditional knowledge with environmental conservation strategies. According to Diegues (2000), local knowledge constitutes a cultural heritage capable of contributing to the sustainable use of natural resources, being an important tool to face contemporary socio-environmental challenges. Reigota (1998) highlights that environmental education when contextualized and based on local realities, can promote significant transformations in the relationship between communities and the environment. These authors converge on the idea that valuing community knowledge strengthens the sense of belonging and co-responsibility in environmental management.

In addition, studies such as those by Loureiro (2006) and Jacobi (2003) reinforce that environmental education should not be limited to the transmission of information, but rather stimulate the active participation of different social actors in the construction of collective solutions. In the case of the riverside communities of the São Francisco River, such approaches are particularly relevant, considering the close relationship of these populations with the river and their dependence on water resources for survival.

The choice of the theme "Local Knowledge and Environmental Education: Paths for the Sustainable Conservation of the São Francisco River" is justified by the environmental, social, economic, and cultural relevance of this river, which is fundamental for the livelihood of millions of Brazilians and for the biodiversity of the regions it crosses. Known as "Velho Chico", the São Francisco River faces serious environmental threats, such as deforestation, siltation, pollution, and loss of biodiversity, many of them aggravated by inadequate practices in the use of natural resources and the absence of effective public conservation policies.

In this scenario, it is essential to consider the local knowledge of riverside communities, which have a deep practical knowledge about the territory and ecosystems associated with the river. This knowledge, transmitted from generation to generation, offers solutions adapted to the local reality and has the potential to contribute significantly to the preservation of the river. When integrated into environmental education practices, this

Revista ARACÊ
ISSN: 2358-2472

knowledge becomes a valuable tool for promoting sustainability and strengthening the cultural identity of the populations directly involved.

The justification of the study is also anchored in the need for a dialogue between scientific knowledge and traditional knowledge, promoting participatory approaches that encompass the different social actors in the conservation process. Environmental education, in turn, is essential to make society aware of the importance of the São Francisco River, encourage changes in behavior, and engage people in concrete preservation actions.

In this context, the need to preserve this natural resource is evident, due to the importance of the strong relationship between local knowledge and environmental education as integrated measures for the preservation of the São Francisco River. Riverside communities present knowledge accumulated over generations on various topics such as natural cycles, sustainable management of resources, and practices of harmonious coexistence with the environment of experience. However, this knowledge is often ignored in the context of public policies and conservation projects, promoting a significant limitation of the potential for the development of sustainable practices.

In this context, environmental education ensures an articulating transformation, acting as a provider of scientific knowledge and strengthening local knowledge, establishing the population's awareness and active engagement in the conservation of the river. This study seeks to fill gaps in the implementation of these approaches, by exploring how the appreciation and sharing of traditional knowledge can enrich the educational environment and train different social agents in environmental preservation.

The problem that this study seeks to investigate lies in the following question: how can the local knowledge of riverside communities be incorporated into environmental education to effectively contribute to the sustainable conservation of the São Francisco River? The proposal is based on the assumption that the traditional knowledge obtained by the communities that live on the banks of the river has a relevant potential to strengthen environmental education practices, promoting awareness and community engagement in favor of sustainability.

The study will be based on interdisciplinary principles, integrated with the areas of Education, Geography, and Environmental Sciences, to understand the relationships between culture, environment, and educational practices. Thus, this research aims to contribute not only to the conservation of Velho Chico but also to the full guarantee of

Revista ARACÊ
ISSN: 2358-2472

environmental justice and the enrichment of the cultural identity of riverside communities, reaffirming its central importance as a protector of knowledge that can corroborate the overcoming of socio-environmental issues in contemporary times.

However, despite the theoretical contributions, there are still gaps in the literature related to the practical application of these concepts in the context of the São Francisco River. Research such as those by Silva et al. (2019) points out that public policies and conservation projects often disregard local knowledge, limiting the impact and effectiveness of the proposed actions. Thus, it is essential to investigate how the integration between traditional knowledge and environmental education can promote the sustainable conservation of the Velho Chico, respecting the cultural and socioeconomic specificities of the riverside communities.

Environmental Management has been gaining a growing space in the business environment. The increase in ecological awareness is visible at different levels and sectors of society, encompassing different companies and educational institutions. Environmental management involves planning, organizing, and guiding the company to achieve specific environmental goals. A relevant aspect of environmental management is that its introduction requires decisions at the highest levels of management and, therefore, sends a clear message to the organization that it is a corporate commitment (ALCÂNTARA et al., 2012).

In this way, the proposal seeks not only to understand and value local knowledge but also to propose strategies that articulate this knowledge with educational practices and public policies that ensure the sustainability of the river that sustains life in the heart of Brazil. The preservation of the river is not only an environmental issue but an ethical commitment to future generations and to the maintenance of life in the communities that directly depend on its resources.

OBJECTIVES

This study has as its general objective the investigation of the relevance of the local knowledge of the riverside populations for the development of sustainable practices for the preservation of the São Francisco River, through measures from environmental education that integrate traditional and scientific knowledge.

Revista ARACÊ
ISSN: 2358-2472

Among the specific objectives, it seeks to understand the traditional knowledge of riverside communities regarding the use and management of the river's natural resources, analyzing how this knowledge can be implemented in sustainable educational practices.

METHODOLOGY AND FORMS OF ANALYSIS

The research will be carried out with a qualitative approach, ensuring the veracity of the information and the understanding of the sociocultural dynamics regarding local knowledge and environmental education within the scope of the São Francisco River. The study addresses an ethnographic methodology, which guarantees direct contact with riverside populations to capture perceptions, different practices, and traditional knowledge related to the use and preservation of natural resources.

Gil (2008) states that research happens when, based on existing knowledge, scientific methodologies, techniques, and tools are used in the search and construction of knowledge.

Data collection techniques will include semi-structured interviews with the local community, community managers, and environmental educators, as well as focus groups, in which topics related to sustainability and the role of traditional knowledge will be discussed. Observations of the community's experience will also be collected, with a record in a field diary, to understand the daily practice of the populations in the management of the river and its resources. Historical documents, teaching materials and local records related to environmental education and the use of the river will be investigated to supplement the information.

The data analysis will be carried out through triangulation, allowing the crossing of information obtained from different sources and methodologies, to promote a relevant and grounded view on the subject. The analysis technique of the research object will be used to interpret the dialogue with the interviewees and identify thematic categories, such as the environmental challenges encountered, traditional management practices, and perspectives on environmental education.

> Bibliographic research is that which is carried out from the available record, resulting from previous research, in printed documents, such as books, articles, theses, etc. It uses data or theoretical categories already worked on by other researchers and duly recorded. The texts become sources of the themes to be researched. The researcher works from the contributions of the authors of the analytical studies contained in the texts (SEVERINO, 2007, p. 122).

Revista ARACÊ
ISSN: 2358-2472

Regarding the materials and techniques used, academic texts with relevant information for the topics studied were chosen, all of which were in Portuguese. In them, it sought to make the appropriation of concepts related to technologies, with a special focus on the area of education. Texts that dealt with the presence of technological devices in the school space and how the school, educators, and students deal with these resources were also necessary. Publications that dealt with teacher training and practices, on the one hand, and active learning, on the other, were also considered. At the end of the bibliographic research, the focus was on suggestions of practical possibilities for the use of technologies for the benefit of students' active learning.

Therefore, the methodology for carrying out the research on the São Francisco River and its importance for preservation involves an interdisciplinary approach that articulates scientific and traditional knowledge, combining qualitative and quantitative research techniques. Initially, a comprehensive literature review is carried out on the

theme, addressing historical, social, economic, and environmental aspects of the river, as well as specific studies on its biodiversity and the impacts of human activities. In parallel, field visits are developed to collect primary data, including physical-chemical analysis of the water, mapping of degraded areas, and recording of local practices for the use of natural resources.

In the qualitative field, listening to riverside communities through interviews, conversation circles, and questionnaires stands out, seeking to understand local perceptions about the river, its problems, and preservation strategies. Valuing this knowledge is essential to integrate innovative solutions into traditional sustainable management practices.

The analysis formats include comparative studies between different stretches of the river, seeking to identify patterns of environmental impact and resource use, in addition to the application of technologies, such as remote sensors and geographic information systems (GIS), to monitor changes in land use and the quality of water resources. In addition, socio-environmental indicators are used to evaluate the effectiveness of conservation and environmental education projects implemented in the region.

Revista ARACÊ
ISSN: 2358-2472

Chart 01 – Methodologies and Forms of Analysis

Methodology	Description	Form of Analysis
Qualitative Research	Exploratory approach to understanding the community's perception of local knowledge and environmental education.	Content analysis based on interviews and reports from the riverside population.
Field Research	Direct observation and application of questionnaires to residents, educators, and environmental managers.	Categorization of responses to identify patterns and challenges in river conservation.
Document Analysis	Survey of public policies, environmental projects, and educational materials related to the theme.	Comparison between theoretical guidelines and the reality observed in riverside communities.
Case Study	Iinvestigation of specific communities along the São Francisco River that have sustainable and traditional practices.	Evaluation of the impact of educational and environmental actions in these communities.
Participatory Mapping	Involvement of the local population in the identification of areas of environmental risk and good conservation practices.	Construction of collaborative maps to support future environmental management actions.

Source: Prepared by the authors

The research on local knowledge and environmental education in the São Francisco River used a diversified methodological approach to understand the relationship between the riverside community and the sustainable conservation of the river. The qualitative research was essential to capture the perception of the residents, allowing an in-depth analysis of the reports collected through interviews and direct observations. The field research complemented this process, with the application of questionnaires directed to educators, environmental managers, and residents, enabling the identification of challenges and good practices.

In addition, documentary analysis played a key role in examining public policies, environmental projects, and educational materials, contrasting theory with the reality experienced by communities. The case study focused on specific communities along the river, investigating the impact of sustainable practices already implemented and their potential for replication. Participatory mapping was also a relevant instrument, as it involved the residents themselves in the identification of areas of environmental risk and in the construction of collaborative maps that can support future management actions.

The combination of these methodologies allowed a broad and integrated understanding of the theme, highlighting the need to value local knowledge, strengthen environmental education, and implement effective public policies to ensure the sustainability of the São Francisco River and the well-being of the populations that depend on it.

Revista ARACÊ
ISSN: 2358-2472

This set of methodologies and analysis formats allows us not only to understand the environmental and social complexity of the São Francisco River but also to propose policies and actions aimed at its preservation. Velho Chico is a vital source of water, food, and energy for millions of people, as well as being a cultural and environmental heritage of Brazil. Its conservation depends on the balance between sustainable development, environmental education, and appreciation of local knowledge, ensuring the perpetuation of its ecological and cultural importance for future generations.

Environmental Management in Brazil is based on the country's democratization process in the 1980s, however, few concepts took into account the social subject responsible for management: public power. The very institution of policies for the environment was born of technocratic power, not of exchange with society. From the 1930s to 1987, there was a strong interventionism by the State and from 1988 onwards, with the process of democratization in the early 1980s, decisions became, theoretically, more 'open to society', as well as a great dissemination of the notion of sustainable development (BOEIRA, 2003).

With this, it seeks to understand how local knowledge can be implemented in pedagogical contexts and public policies that promote the sustainable conservation of the São Francisco River, corroborating to foster the connection between communities and environmental preservation. In addition, the research intends to point out ways to integrate this knowledge into educational practices, encouraging environmental awareness and collective participation in favor of the preservation of the river, and ensuring sustainability for future generations.

SCHEDULE

The schedule of activities for the study "Local Knowledge and Environmental Education: Paths to the Sustainable Conservation of the São Francisco River" was structured in stages, ensuring an organized and comprehensive development of the research. Initially, a bibliographic review was carried out during the first month, to theoretically substantiate the theme and understand the existing approaches to environmental education and local knowledge applied to environmental preservation.

Subsequently, over the following two months, field visits were conducted to collect qualitative and quantitative data. These activities included interviews with community leaders, fishermen, and other members of riverside communities, as well as conversation

Revista ARACÊ
ISSN: 2358-2472

circles and questionnaires to identify traditional knowledge related to the sustainable use of the river and its banks. At the same time, water and soil samples were collected for environmental analysis.

In the following two months, the process of systematization and analysis of the collected data began. From this, local preservation practices, challenges faced by communities and possible strategies for integration between local knowledge and environmental education were identified. This phase was also used for the development of educational materials based on the knowledge collected, such as booklets and videos, for future awareness actions.

Finally, the last month was dedicated to the writing of the final report, which included the results obtained and the proposals for actions for the sustainable conservation of the São Francisco River. In addition, feedback was given to the communities involved, with the presentation of results and suggestions, aiming to strengthen local engagement and ensure the continuity of preservation initiatives.

Table – 02: Schedule of Activities

STEPS	Jul	Aug	Set	Out	Nov
1. Literature Review	x				
2. Data Collection		x	x		
3. Systematization			x		
4. Analysis and Reflection			x	x	
5. Preparation of proposals				x	x
6. Final Report					x

Source: Prepared by the author

The elaboration of a schedule of activities is essential for the development of a deep and well-structured research. This planning allows for the efficient organization of the study stages, ensuring that each phase is completed within the established deadline and avoiding work overload. In addition, a schedule enables better time management, properly distributing activities, such as bibliographic survey, data collection, analysis and writing of results.

Another relevance of the schedule is its function of guiding the researcher, allowing continuous monitoring of the progress of the research and making adjustments when necessary. By dividing the work into clear steps, it helps to identify possible difficulties and search for solutions in advance. In this way, planning avoids delays and contributes to the quality of the study, ensuring that all phases are completed with depth and methodological rigor.

Revista ARACÊ
ISSN: 2358-2472

Therefore, a well-prepared schedule is essential to ensure the fluidity of the investigative process, allowing the researcher to stay focused, meet the objectives of the study and produce consistent and relevant results for the area of knowledge in which he or she is inserted.

RESULT AND DISCUSSION

The results of the research on local knowledge and environmental education, in the context of the sustainable conservation of the São Francisco River, indicate that the riverine populations have a vast empirical knowledge about the dynamics of the river, including hydrological patterns, biodiversity and environmental impacts resulting from human activities. This traditional knowledge, transmitted orally between generations, proves to be fundamental for sustainable management practices and for the formulation of effective conservation strategies.

Cunha and Coelho (2008), for example, analyzing the emergence of the sustainable development paradigm, found an internal dispute in the debate between contrasting philosophical views and the constitution of a hegemonic conception of sustainable development of an instrumental nature. The authors identify, on the one hand, an egocentric vision based on a complex understanding of planet Earth and the need for radical changes in ethical and political standards capable of transforming the productive base of Western society. On the other hand, they characterize the instrumental approach as one that defends conservation for its economic value, the market and the management of resources as efficient instruments for promoting development, and the ideology of progress as the philosophical foundation of the desired society.

The analysis of the collected data shows that the riverside communities perceive the environmental degradation of the São Francisco River as a growing problem, associating it mainly with the deforestation of the banks, the inadequate disposal of waste and the reduction of the volume of water due to anthropogenic interventions. In addition, a concern was identified with the decrease in fish species and other aquatic organisms, which affects both biodiversity and the livelihoods of many families that depend on fishing.

The obstacles to the feasibility of the political emancipation of society for participation in Environmental Management are, among others, the opposition of the public power and the elites to give up the space that was appropriated and the government's welfare. If there is no participation of society, technical deliberations become distant from

Revista ARACÊ
ISSN: 2358-2472

local reality. Therefore, the consideration of differences in societies, the defense of the environment as a truly collective wealth and the strengthening of civil associations are necessary attitudes for effective popular participation (LAYRARGUES, 2000).

Local knowledge emerges as a valuable resource for environmental education, as it allows a contextualized approach that is closer to the reality experienced by residents. Educational programs that incorporate this knowledge tend to have greater acceptance and effectiveness, as they reinforce cultural identity and community responsibility in the preservation of the river. It was observed that initiatives that involve the riverside dwellers themselves in the construction of environmental knowledge promote a more active and committed participation in the conservation of water resources.

The São Francisco River plays a fundamental role for the states it crosses, being an essential source of supply, economic development and environmental preservation. Its waters guarantee the livelihood of millions of people, especially in semi-arid regions, where it becomes the main source of water for human consumption, irrigation and energy generation. Cities such as Juazeiro (BA) and Petrolina (PE), which are divided by the river, have their economy strongly boosted by irrigated fruit growing, becoming major centers for the export of tropical fruits, in addition to benefiting from tourism and fishing.

In addition to its economic and social importance, the São Francisco River is a space for research and knowledge, being studied in several areas, such as Geography, Biology and Environmental Engineering. Its waters and ecosystems provide a natural laboratory for the study of biodiversity, environmental impacts, and sustainability strategies. However, environmental degradation, caused by deforestation, siltation and pollution, threatens its preservation, making it essential to implement public policies and community actions for its conservation.

The sustainability of the São Francisco River depends on a collective effort, involving governments, research institutions and the riverside population, ensuring that its resources continue to benefit current and future generations. The balance between development and preservation is essential for it to remain the "Velho Chico", a river of life, culture and history for Brazil.

On the other hand, the survey also revealed challenges in the implementation of environmental education actions aimed at the sustainability of the São Francisco River. The lack of consistent public policies and the low investment in educational initiatives make it difficult to value and disseminate local knowledge. In addition, the influence of

Revista ARACÊ
ISSN: 2358-2472

unsustainable economic practices, especially in the industrial context, such as the intensive use of pesticides and the disorderly occupation of the margins, represents a significant obstacle to the implementation of conservation actions.

Since the 1950s, Brazil has undergone a major transformation due to demographic growth and the modernization of its development bases. From a stage of economy predominantly exporting agricultural products, it went to a stage of considerable industrialization, with a growth rate of 9.3% per year of the industrial population in the period from 1970 to 1990, according to Vianna and Veronese, (1992).

In view of this scenario, the discussion points to the need for a dialogue between traditional knowledge and scientific knowledge, in order to build more efficient and integrated conservation strategies. Valuing the knowledge of riverside populations not only strengthens the cultural identity of these communities, but also contributes to the formulation of public policies that are more aligned with the local reality. In addition, the expansion of environmental education actions, with a focus on sustainability and community participation, may represent a promising path for the preservation of the São Francisco River and its associated ecosystems.

The general perception that remains from the above debate is that the process of institutionalization of environmental policies in Brazil has advanced relatively; in a tortuous, vacillating and contradictory way. Its motivations, objectives and instruments were built under the sign of ambivalence and economic pragmatism and, therefore, could not present more consistent and effective results today from the socio-environmental point of view, Lima (2011).

Therefore, the intersection between local knowledge and environmental education should be considered as a fundamental axis for the sustainable conservation of the São Francisco River. The promotion of empirical knowledge of riverside populations, combined with effective educational strategies, can contribute significantly to mitigate environmental impacts and ensure the maintenance of water resources for future generations.

Revista ARACÊ
ISSN: 2358-2472

Chart 03 – Results and Discussion of the research

Category	Findings	Discussion
Local Knowledge	Riverine communities have extensive knowledge about the water cycle, native species and traditional conservation practices.	Valuing local knowledge can complement public policies and environmental actions, promoting an integrated and participatory approach.
Environmental Impacts	Reports point to water pollution, siltation and reduced biodiversity due to human action and climate change.	The degradation of the river compromises not only the environment, but also the culture and livelihoods of local populations, requiring urgent solutions.
Educational Practices	Environmental education projects are still punctual and lack continuity and institutional support.	The inclusion of environmental education in the formal curriculum and in community actions can promote greater awareness and social engagement.
Challenges/Conservation	Lack of effective public policies, inspection and encouragement of sustainable practices.	The implementation of participatory policies and the strengthening of local networks can improve river conservation.
Pathways to Sustainability	Initiatives such as agroecology, sustainable tourism, and sustainable management of natural resources have shown promise.	The articulation between local and scientific knowledge can enhance these initiatives, promoting a more integrated and efficient environmental management.

Source: Prepared by the author

The results obtained in the study on local knowledge and environmental education in the context of the sustainable conservation of the São Francisco River demonstrate the importance of the traditional knowledge of riverside communities. These populations have accumulated knowledge about the fauna, flora, and dynamics of the river, which can contribute significantly to sustainable management practices and environmental preservation. However, this knowledge is still undervalued and rarely incorporated into conservation and environmental education policies, which limits its potential for impact.

Educational practices aimed at environmental awareness, although existing, are punctual and lack continuity and institutional support. The absence of a systematic approach in school curricula and community actions hinders the formation of a more critical and participatory environmental awareness. In addition, the riverside population clearly perceives the impacts of environmental degradation, such as siltation, pollution, and the reduction of biodiversity, but faces structural barriers to act effectively in protecting the river.

Among the challenges for the conservation of the São Francisco River, the absence of effective public policies, the lack of inspection, and the low incentive for sustainable practices stand out. Without government support and the implementation of participatory policies, conservation actions tend to be isolated and short-term. However, some sustainable initiatives have shown promise, such as agroecology, sustainable tourism, and

Revista ARACÊ
ISSN: 2358-2472

the sustainable management of natural resources. The integration between local knowledge and scientific knowledge can enhance these practices, promoting more efficient and inclusive environmental management.

The accelerated pace of industrialization and the consequent concentration of population contingents in urban areas, observed mainly in the 1960s, began to cause profound impacts on the environment. The worsening of the environmental issue in Brazil began to be felt in areas where industrial activity was more intense, such as Cubatão, Volta Redonda, ABC Paulista, and in other large Brazilian metropolises, which promoted industrial activity as a determining factor in the environmental transformations that occurred (NOGUEIRA, 2009).

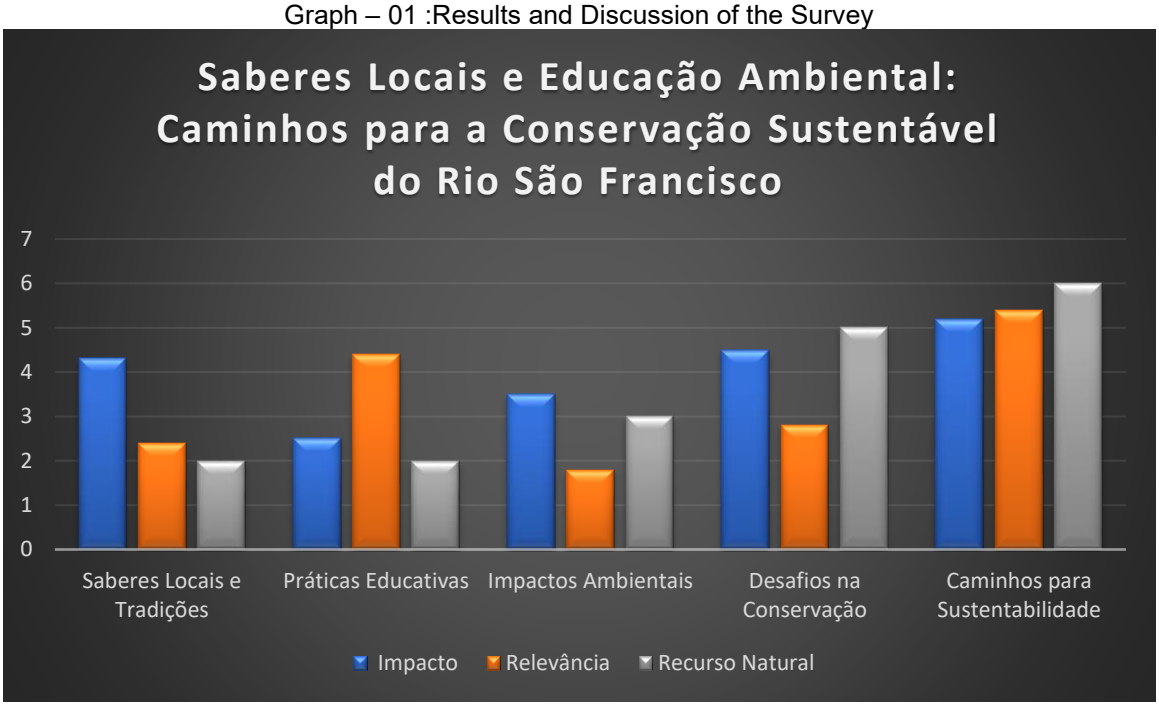
Nogueira highlights how the accelerated process of industrialization and urbanization, especially from the 1960s onwards, intensified environmental impacts in Brazil. The disorderly growth of industries in regions such as Cubatão, Volta Redonda and the ABC Paulista region resulted in significant environmental degradation, making industrial activity a central factor in the country's ecological transformations. This context highlights the need for public policies and sustainable practices that reconcile economic development with environmental preservation, minimizing the damage caused by industrial concentration in large metropolises.

Therefore, the valorization of local knowledge combined with continuous environmental education programs and effective public policies represents a viable path for the sustainable conservation of the São Francisco River. Strengthening local networks and encouraging community participation can ensure that environmental actions are more lasting and aligned with the needs of populations that depend on the river for their livelihoods.

The sustainability of the São Francisco River is a topic of great relevance, considering its ecological, social and economic importance for the regions it crosses. Known as "Velho Chico", the river plays an essential role in the maintenance of ecosystems, the supply of water for human consumption and irrigation, in addition to its contribution to the generation of hydroelectric power. In the context of navigation, the São Francisco has historically represented a fundamental route for the transport of people and goods, boosting economic development and the integration of several riverside communities.

Revista ARACÊ
ISSN: 2358-2472

Graph – 01 :Results and Discussion of the Survey



Source: Prepared by the author

The graph represents the importance and challenges related to local knowledge and environmental education in the sustainable conservation of the São Francisco River. It highlights five core categories: local knowledge and traditions, educational practices, environmental impacts, conservation challenges, and paths to sustainability. The data indicate that local knowledge plays a fundamental role in the preservation of the river, but still lacks greater appreciation and integration with public policies.

Quintas, (2006 p30), defines environmental management as the process of mediation of interests and conflicts (potential or explicit) between social actors who act on the physical-natural and built environments, aiming to guarantee the right to an ecologically balanced environment, as determined by the constitution.

Educational practices, although existing, are punctual and face difficulties in continuity. The community's perception of environmental impacts is significant, reflecting concern about river degradation, but effective action is still limited by structural challenges, such as the absence of effective policies and adequate enforcement. Despite this, sustainable initiatives such as agroecology and ecological tourism show great potential to promote more balanced environmental management. The graph reinforces the need to integrate traditional knowledge with scientific approaches and public policies that encourage sustainable practices, ensuring the conservation of the São Francisco River.

Revista ARACÊ
ISSN: 2358-2472

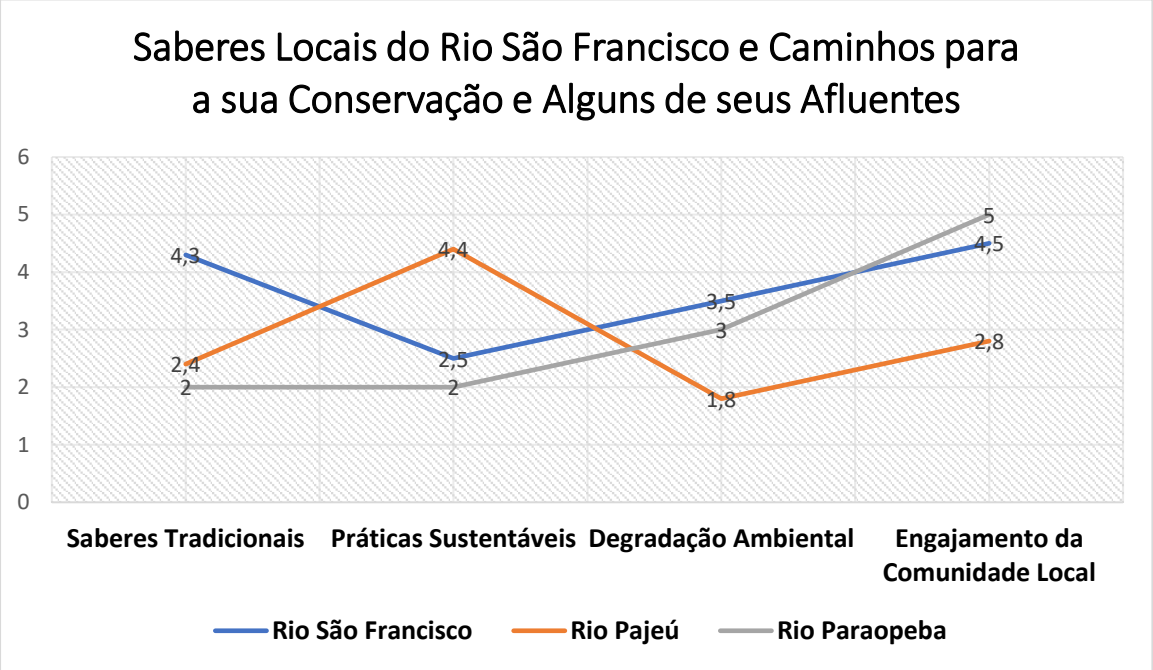
The São Francisco River, known as the "Old Chico", runs an extensive path from its source in Serra da Canastra, in Minas Gerais, to its mouth between Alagoas and Sergipe, crossing six states and playing a fundamental role in the history, culture and development of riverside communities. Since colonial times, the river has been an important route of communication and trade, boosting the settlement of the interior of Brazil and serving as a setting for narratives that marked the country's identity.

Culturally, the São Francisco is a source of inspiration for legends, music and artistic manifestations that celebrate the life and customs of the riverside populations. Its waters support traditional practices such as artisanal fishing and navigation, in addition to hosting religious festivals and events that reinforce the population's bond with the river. The material and immaterial heritage of the cities on its shores, such as Juazeiro, Petrolina, Piranhas and Pirapora, preserves the memory of indigenous peoples, pioneers, missionaries and so many generations who built their lives along the Velho Chico.

In addition to its historical and cultural value, the São Francisco River has immense economic and social relevance. It guarantees water supply for millions of people, boosts irrigated agriculture, sustains fishing and hydroelectric power generation. However, it faces environmental challenges such as deforestation, siltation and pollution, threatening its biodiversity and the survival of the communities that depend on it. The preservation of this heritage is essential for the sustainability of cities.

Revista ARACÊ
ISSN: 2358-2472

Graph – 02: Results of the Field Research



Source: Prepared by the author

The graph presents the evolution of traditional knowledge, sustainable practices, environmental degradation and local community engagement over the years in the context of the São Francisco River. There is a continuous growth in the appreciation of traditional knowledge and the adoption of sustainable practices, reflecting a greater recognition of the importance of this knowledge for environmental conservation. At the same time, there is a gradual reduction in environmental degradation, indicating possible positive impacts of these initiatives. The engagement of the local community also shows a significant increase, evidencing the strengthening of social participation in the actions of preservation of the river. These results highlight the need for integrated public policies and the strengthening of community initiatives to ensure the sustainability of this important water resource.

The field research carried out aimed to explore traditional knowledge, sustainability, environmental degradation and the engagement of local communities in the context of the São Francisco River. During the study, interviews, direct observations and analysis of cultural and environmental practices were conducted, allowing us to understand the relationship between the riverside populations and the river.

It was identified that traditional knowledge plays an essential role in the sustainable management of water resources, although much of this knowledge is at risk due to modernization and the lack of valorization policies. At the same time, it was found that sustainable initiatives have been implemented, but they still face challenges in the face of

Revista ARACÊ
ISSN: 2358-2472

the impacts caused by environmental degradation, such as deforestation, pollution and reduction of the river flow.

Community engagement proved to be a crucial factor for preservation, with local mobilizations promoting environmental recovery actions and ecological education. The results of the research highlight the need to strengthen the dialogue between scientific and popular knowledge, in addition to the implementation of public policies that encourage sustainable practices and expand social participation in the conservation of Velho Chico.

Between the 1960s and 1980s, scientists, environmental movements, and a range of politicians and civil servants denounced the ecological and social problems of the economies inherited from the Industrial Revolution. In response to growing public concern about the negative effects of the industrial model, the United Nations (UN) has initiated a cycle of conferences, consultations and studies to align nations around principles and commitments for a more inclusive and harmonious development with nature. (BARBIERI & SILVA, 2011).

Environmental education plays a key role in preserving the São Francisco River, promoting awareness of the importance of this water resource and encouraging sustainable practices among riverside communities and other social actors. The river, known as "Velho Chico", is essential for the biodiversity, economy and culture of the populations that depend on it, making it urgent to adopt educational strategies that encourage the responsible management of its resources.

Gadotti (2000) states that three years before the Thessaloniki Conference, UNESCO had launched the international initiative on education for a sustainable future, recognizing that education was the 'key' to sustainable and autonomous development.

However, challenges such as deforestation, siltation and pollution threaten its navigability and sustainability. Environmental degradation reduces the volume of water and compromises navigable stretches, directly impacting the local economy and waterway transport. To ensure the sustainability of the river and maintain its relevance for navigation, actions aimed at preserving its headwaters, controlling deforestation, properly managing water resources and revitalizing compromised stretches are necessary.

Government programs and community initiatives have sought sustainable alternatives for the recovery of the river, promoting environmental awareness and the rational use of its resources. Navigation on the São Francisco can be enhanced with investments in infrastructure and public policies aimed at revitalizing the river, ensuring its

Revista ARACÊ
ISSN: 2358-2472

preservation for future generations and maintaining its strategic role in regional development.

The need for awareness campaigns for the preservation of the São Francisco River becomes increasingly urgent in the face of the environmental challenges that threaten its existence. Deforestation, siltation, pollution and the uncontrolled exploitation of water resources compromise water quality, biodiversity and the very navigability of the river, directly impacting riverside populations and the regional economy.

Given this scenario, educational campaigns play an essential role in sensitizing society about the importance of conserving this natural heritage, promoting sustainable practices and encouraging the active participation of the community in its recovery. The mobilization of governments, environmental institutions, schools, and the media can strengthen actions aimed at protecting springs, restoring riparian vegetation, the conscious use of water, and pollution control. In addition, it is essential that these campaigns reach different audiences, from farmers and fishermen to companies and public managers, reinforcing the collective responsibility in the preservation of Velho Chico. Only with environmental education and social engagement will it be possible to guarantee the sustainability of the river and its continuity as a source of life, supply and development for future generations.

Through educational projects, community actions and integration between traditional and scientific knowledge, it seeks to strengthen social engagement in the conservation of the river, reducing environmental impacts such as deforestation, pollution and inappropriate use of water. Thus, environmental education is an essential way to ensure the sustainability of São Francisco and future generations.

FINAL CONSIDERATIONS

Local knowledge plays a fundamental role in Environmental Education, especially in the context of the sustainable conservation of the São Francisco River. The interrelationship between traditional knowledge and modern science allows for a broader look at environmental challenges, promoting sustainable practices that respect the culture and reality of riverside communities. In this sense, valuing local knowledge strengthens social engagement and fosters awareness about the importance of preserving natural resources. Environmental Education, by integrating this knowledge with formal education and conservation policies, contributes to the formation of critical citizens committed to

Revista ARACÊ
ISSN: 2358-2472

sustainability. In this way, the articulation between education, culture and the environment is essential to ensure the preservation of the São Francisco River, promoting sustainable development and ensuring the quality of life of present and future generations.

The study revealed that local knowledge is fundamental for the construction of sustainable practices aimed at the conservation of the São Francisco River, since the riverside populations have knowledge that dialogues directly with the environmental and sociocultural dynamics of the region. It was observed that Environmental Education, when integrated with this knowledge, strengthens community engagement and enhances preservation actions, promoting an awareness that goes beyond conventional approaches. In addition, it was found that the relationship between traditional and scientific knowledge can generate innovative solutions to environmental challenges, as long as there is an efficient mediation in the educational process. However, it is understood that this study is not exhausted in this research, as the complexity of the theme allows diversified approaches, and other authors can contribute with new perspectives and methodologies to deepen the understanding of the intersection between local knowledge and Environmental Education in the conservation of the São Francisco River.

Conducting this research on local knowledge and environmental education in the São Francisco River proved to be an arduous task, especially due to the difficulty of finding specific materials that would address in depth the relationship between traditional knowledge and river conservation.

The study was based on renowned authors in the area, ensuring a solid theoretical basis for understanding the challenges and potentialities of this theme. However, the results presented here do not represent an end point, but rather a step within a broad and constantly evolving field of study. Other researchers can contribute to the enrichment of this discussion, bringing new perspectives and further deepening the understanding of the importance of local knowledge for the sustainability of the São Francisco River. In this way, this work reinforces the need for new investigations and actions that promote the appreciation of traditional knowledge and the preservation of this important watercourse for future generations.

The research on the knowledge of the São Francisco River and the paths for its preservation allowed an in-depth understanding of the relationships between riverside communities and the river, highlighting the importance of traditional knowledge in environmental conservation. Sustainable practices, challenges faced and strategies that

Revista ARACÊ
ISSN: 2358-2472

can contribute to the protection of this important watercourse were analyzed. The results show the need for more effective public policies, in addition to strengthening the dialogue between scientific and popular knowledge. Thus, it is concluded that the preservation of the São Francisco depends on joint actions, environmental education and appreciation of local cultural practices.

Revista ARACÊ
ISSN: 2358-2472

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