

Sustainability and Local Identity: The Rocky Trail Program as a Strategy for the SDGs in Higher Education

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Abstract. The Trilha Rupestre (Rocky Trail) Program, developed by the Federal University of Mato Grosso do Sul (UFMS), aims to strengthen culture and the local economy. It also fosters sustainable development in municipalities with archaeological sites and paleontological records. Focusing on the Cerrado-Pantanal ecological corridor, the program covers 90 rock art sites and 733 archaeological sites registered with the National Historical and Artistic Heritage Institute (IPHAN) in 16 municipalities. The initiative trains local communities and encourages sustainable practices, contributing to income generation while promoting environmental preservation. Structured around eight thematic axes (food, archaeology, architecture, art-ceramics, botany, geopaleontology, chemistry-pharmaceuticals, and tourism), the program promotes multidisciplinary development, integrating quality education and building more inclusive and sustainable communities. The partnership with the UNESCO Borders and Migration Chair brings a social innovation approach, combining cultural appreciation with the promotion of inclusion. Through educational and cultural actions, the program raises awareness among communities and tourists about the importance of archaeological sites, linking sustainability with the appreciation of historical heritage. The Trilha Rupestre Program is a notable example of how higher education can contribute to meeting the Sustainable Development Goals.

Keywords:

Archaeological sites, community empowerment, cultural heritage, social innovation, sustainable development.

1. Introduction

The Federal University of Mato Grosso do Sul (UFMS) demonstrates a commitment to promoting public, free, high-quality, inclusive, and equitable education through a range of

institutional actions and projects [1,2]. These initiatives aim to expand access and ensure student retention, with a focus on diversity and sustainability. These same principles guide the Trilha Rupestre (Rocky Trail) Program, which reinforces UFMS's mission to promote change in people's lives through education, sustainable development, and community engagement in its teaching, research, and extension efforts.

The Trilha Rupestre Program is an extension initiative developed by UFMS and supported by the UNESCO Chair on Borders and Migrations. It stands out as an innovative proposal that integrates cultural heritage conservation, sustainable development, and social innovation in regions marked by both vulnerabilities and potentials. Operating in the Cerrado-Pantanal ecological corridor — one of the most biodiverse and culturally rich regions of Brazil — the program adopts a multidisciplinary approach that is sensitive to local specificities and focused on socioecological resilience [19,20].

The proposal is rooted in the recognition of the archaeological, historical, cultural, and geopaleontological richness found in several municipalities of Mato Grosso do Sul (MS). This is particularly true in the regions of Alcinópolis, Aquidauana, Corumbá, and the area covered by the Bodoquena-Pantanal Geopark. These territories, often overlooked by traditional heritage policies, are reinterpreted as living spaces of memory, identity, and opportunities for sustainable income generation. To date, approximately 733 archaeological sites have been identified in Mato Grosso do Sul and registered with the National Institute of Historical and Artistic Heritage (IPHAN). At least 90 of these sites feature rock art, many of which hold significant tourism, scientific, and educational potential. These are the areas where the program develops its core activities.

In this context, Trilha Rupestre is distinguished by its co-creation methodology with local communities, including Indigenous, Quilombola, Riverside, Rural, and Urban groups. This approach promotes the shared management of cultural and environmental heritage. The program moves away from traditional top-down approaches, replacing them with collaborative practices that respect ancestral knowledge and local ways of life. Through interpretive trails, digital technologies, hands-on workshops, and educational activities, the program enriches the teaching-learning process and expands the university's reach.

The trails are not merely tourist routes, but are landscape interpretation systems where science, art, and tradition intertwine. They reconstruct local narratives, strengthen identity, and foster ecological and heritage awareness. Tools such as augmented reality, geolocation, educational games, and interactive panels enhance accessibility and engagement. At the same time, activities like ceramics, herbal medicine, agroecological farming, and intergenerational oral storytelling reactivate sustainable practices and knowledge that are often at risk of disappearing.

Furthermore, the program serves as a living laboratory for territorial public policies, developing impact indicators, training local leaders, and creating replicable models for other regions of the country. In areas such as the "Northern Route" or "Cerrado-Pantanal Corridor", which contain the largest concentrations of rock art in the state, there is significant potential for cultural and ecological tourism [3]. This potential is particularly evident in Alcinópolis, home to 41 registered sites, where scheduled visits are already beginning. One example is the "Templo dos Pilares" (Temple of the Pillars), which features more than 3,000 rock engravings estimated to be around 10,700 years old.

Trilha Rupestre also contributes to fostering critical and civic education through intergenerational environmental education that promotes dialogue among different age groups. Activities such as affective mapping, oral history, and sensory experiences enhance

territorial awareness and encourage the recognition of heritage as a collective good. Aligned with the United Nations (UN) 2030 Agenda, the program directly addresses several Sustainable Development Goals (SDGs). It promotes quality education (SDG 4) through interdisciplinary and inclusive practices; contributes to building sustainable communities and the social use of cultural heritage (SDG 11); encourages responsible lifestyles and production (SDG 12) by strengthening the local economy based on bioeconomy; addresses the impacts of climate change through territorial adaptation strategies (SDG 13); and supports biodiversity conservation and sustainable use of terrestrial ecosystems (SDG 15).

Thus, Trilha Rupestre is more than an extension project; it is a territorial transformation initiative that combines methodological innovation, social inclusion, and environmental sustainability. It connects past and future, tradition and technology, conservation and development. In doing so, resilience becomes a lived practice, essential for safeguarding life and cultural diversity.

This article aims to present and analyze the results achieved by the Trilha Rupestre Program in cities across Mato Grosso do Sul. The focus is on highlighting archaeological heritage and promoting local sustainable development through heritage education and culture-oriented tourism. This article presents the program's structure, key outcomes, and its alignment with the SDGs, based on a qualitative analysis of institutional reports, official documents, and academic publications. The research seeks to identify the program's main impacts in the social, economic, cultural, and environmental spheres and discuss its alignment with the SDGs. Ultimately, the goal is to offer a critical reflection on the challenges and opportunities of integrating heritage, territory, and citizenship in vulnerable contexts.

2. Scenario

2.1. The Archaeological Context of Mato Grosso do Sul

The state of Mato Grosso do Sul, located in the Central-West region of Brazil, covers over 357,000 km² in a strategic zone of South America. Situated between the central Amazonian plateau and the Gran Chaco, its geographic location and biomes such as the Cerrado, the Atlantic Forest, and the Pantanal, makes the region an important ecological and cultural corridor. Historically, it is believed that the territory served as a passage route for various human groups migrating across the continent, which helps explain the area's rich archaeological record and the continued presence of numerous Indigenous ethnic groups. The region contains one of the main environmental preservation areas in the country, highlighting its ecological significance [4].

Although archaeology in Mato Grosso do Sul is relatively recent, compared to other Brazilian states, it has revealed a vast and diverse heritage. With only about 35 years of research, the state has a limited number of researchers involved, which contrasts with the territorial extent and complexity of its archaeological sites. The region holds approximately 733 archaeological sites registered with IPHAN, with at least 90 containing rock art that document human presence dating back around 12,000 years. These vestiges are distributed across the state's three main biomes and stand as evidence of the cultural diversity and long history of human occupation.

The majority of the archaeological sites are concentrated in the "Northern Route" or "Cerrado-Pantanal Corridor," with the municipality of Alcinópolis being a standout. This area hosts about one-third of the total sites, with 24 locations featuring paintings, engravings, or both. This earned the city the title of State Capital of Rock Art (State Law No. 4.306/2012). This region, along with nearby municipalities (Rio Verde, Rio Negro, Costa Rica, Pedro Gomes,

Chapadão do Sul, Paraíso das Águas, Paranaíba, and Jaraguari), accounts for a significant portion of the identified rock art sites in the state [3]. The Temple of the Pillars, located in Alcinópolis, with over 3,000 engravings dating back approximately 10,700 years, is an emblematic example of the region's scientific and tourism potential [5,6].



Figure 1. Natural rock formations and walkways at the Temple of the Pillars, Alcinópolis (MS)

In Aquidauana, another important archaeological center, sites have been identified with lithic remains and rock engravings attributed to ancestral gatherer groups from about 4,800 years ago [7]. In the eastern part of the state, sites along the Paraná River reveal evidence of both hunter-gatherer and pre-colonial ceramic-farming communities. However, these areas have not yet systematically developed for tourism, largely due to private land ownership [8].

The Bodoquena-Pantanal Geopark, in the western part of the state, is another strategic area. With 417 identified sites — 333 of which are in the municipality of Corumbá — the region holds considerable geological, paleontological, and archaeological significance. Although many sites are not yet prepared for tourism, some receive moderate visitation, such as the Fazenda Figueirinha, Fazenda Salesianos, and Morraria do Sul [9,10]. The majority, however, remain restricted to scientific research, highlighting the need for infrastructure and public policies to foster responsible tourism.

A recent survey confirmed 90 sites with rock art in Mato Grosso do Sul, revealing a remarkable diversity of forms, techniques, and styles produced over approximately 12,000 years of human occupation. These vestiges are distributed across 17 of the state's 79 municipalities (Aquidauana, Corumbá, Ladário, Coxim, Alcinópolis, Costa Rica, Chapadão do Sul, Pedro Gomes, Paranaíba, Rio Negro, Rio Verde, Corguinho, Jaraguari, Maracaju, Antônio João, and Jardim). These reinforce the importance of archaeological heritage in understanding the history and cultural expressions that have shaped the territory [5].

The archaeological wealth of the state thus goes beyond the visible material remains, such as rock engravings, encompassing vast educational, cultural, and economic potential. The variety of contexts—from rock shelters with paintings to lithic structures and geosites—reveals lifeways, cosmologies, and relationships with nature that are still being deciphered, but which already prove valuable for strengthening local identity and fostering sustainable practices rooted in the appreciation of cultural heritage. With the advancement of research and programs like Trilha Rupestre, the state is establishing itself as a fertile ground for

Brazilian archaeology and for rethinking tourism, heritage education, and integrated territorial management [11].

3. Implementation

3.1. The Trilha Rupestre Program and the SDGs

The Federal University of Mato Grosso do Sul is actively engaged in promoting sustainability, with a notable alignment with the United Nations 2030 Agenda. Initiatives such as the creation of dedicated institutional structures, ongoing monitoring of SDG-related projects, and the integration of these goals into academic and administrative practices, reinforce the university's commitment to sustainable development. Within this context, the Trilha Rupestre Program emerges as a strategic initiative that contributes to institutional and territorial sustainability [12]. The program's implementation framework integrates community engagement, interdisciplinary research, and strategic actions aligned with the SDGs, all structured through eight thematic axes.

Launched in August 2021 with a five-year duration, the program represents a key step in the recognition, appreciation, and preservation of the archaeological heritage of Mato Grosso do Sul. Its uniqueness lies in the integration of science, culture, sustainable economy, and community participation. The promotion of social innovation and a sustainable local bioeconomy are central components. Aligned with the SDG 11 (Sustainable Cities and Communities), SDG 4 (Quality Education), and SDG 8 (Decent Work and Economic Growth), the program aims to transform archaeological sites into catalysts for citizenship, income generation, and the appreciation of local identities, with direct impacts on community well-being (SDG 3 – Good Health and Well-being).

A fundamental principle of the program is the involvement of local communities to connect past and present. Its objective is to foster awareness and active engagement in the preservation of archaeological sites, ensuring their integrity and preventing their degradation. The program seeks to generate positive economic impacts by encouraging the development of products and services related to archaeological tourism, such as handicrafts, heritage education courses, and the creation of historically contextualized tourist routes.

The initiative operates in 16 municipalities selected for their high concentration of archaeological sites with the potential for sustainable economic activities [13]. This coordinated approach aims to build an intermunicipal network that strengthens belonging, promotes community-based tourism, and supports value chains inspired by biodiversity and traditional knowledge [10], aligning with SDG 1 (No Poverty) and SDG 2 (Zero Hunger).

The program's conception is grounded in the valorization of rock art as an ancestral language and living heritage. The traces found on rock walls and in natural shelters are not just records of a distant past, but symbolic expressions that connect indigenous peoples to current communities. By incorporating pedagogical actions and formative actions with teachers, students, and residents, the program promotes educational inclusion and strengthens cultural identities. This contributes to SDG 10 (Reduced Inequalities), SDG 16 (Peace, Justice, and Strong Institutions), and SDG 5 (Gender Equality) by ensuring the active participation of women, indigenous peoples, and traditional communities.

The specific goals of the Trilha Rupestre include creating an integrated trail linking the cities and encouraging interdisciplinary research, contributing to SDG 9 (Industry, Innovation, and Infrastructure). The program seeks to stimulate the local economy by training residents to create products inspired by traditional knowledge, promoting responsible consumption

(SDG 12). Additionally, it proposes educational actions to expand access to cultural heritage and values the collective memory of indigenous peoples, to transform heritage into a driver of territorial development, in line with SDG 15 (Life on Land).

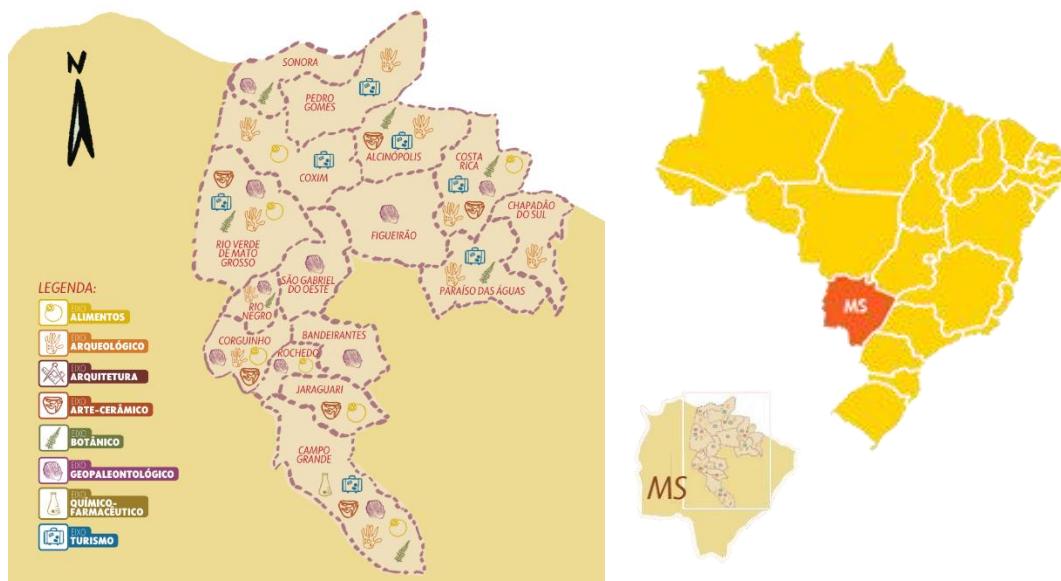


Figure 2. Map of the municipalities in the “Cerrado-Pantanal” corridor region at Mato Grosso do Sul (MS)

3.2. Thematic Axes of the Program

To achieve its goals, the program develops interdisciplinary actions through eight innovative technological thematic axes that structure its integrated and participatory approach. There are eight thematic axes of the Trilha Rupestre Program.

Archaeological Axis is to train teachers, artisans, merchants, and the community on the theme of archaeology and prehistory of the municipalities that are part of the project. Actions include conducting excavations at archaeological sites, producing replicas of archaeological ceramics as a way of valuing culture and generating income, training tourist guides, and encouraging local businesses to explore and incorporate the theme into their products and services.

Geopaleontological Axis is to research, locate, and identify the diversity of geosites in the municipalities that are part of the Trilha Rupestre, with the aim of promoting the exchange of knowledge and experiences with the local population, sharing geological and paleontological information that may contribute to the development of sustainable economic activities.

Food Axis is to add value to local products associated with sociobiodiversity, exploring the potential of native fruits in the production of processed, healthy, and sustainable foods, aiming to stimulate income generation for local communities, valuing traditional knowledge, and encouraging the responsible use of the region's natural resources.

Botanical Axis is to identify plants, fungi, and lichens from Mato Grosso do Sul and gather information about their uses and applications. It seeks to value native biodiversity and train residents through courses and workshops on the educational, economic, social, cultural, and environmental benefits.

Chemical-Pharmaceutical Axis is to investigate natural products from local biomes as a basis for the development of items with aromas from the Cerrado and Pantanal. The use of essential oils and extracts from native species economically values the products, boosts the bioeconomy, and contributes to biodiversity preservation.

Art Axis is on the rock art of the state, exploring archaeological records that reveal forms of communication, expression, and the daily life of ancient inhabitants. The axis proposes integrating these studies into school curricula and offers in-person training for teachers, valuing the cultural heritage of the region.

Tourism Axis is to provide advisory services for the planning, management, and tourism development of the municipalities in the Trilha Rupestre. It focuses on strengthening local entrepreneurship and training the workforce in hospitality and tourism. Its actions include diagnosis, inventory, formation of councils and municipal tourism funds, in addition to marketing strategies to promote regional tourism.

Architecture Axis is to design built spaces based on the demands of the other axes, prioritizing functionality, local identity, and sustainability. It also seeks to integrate and provide unity to architectural interventions in different locations, respecting the cultural characteristics of each place.

Sustainability and program consolidation are supported by a resource mobilization plan, including submitting projects to funding agencies (such as CAPES, CNPq, FINEP, UNESCO) and securing funding via cultural incentive laws, reflecting a commitment to SDG 17 (Partnerships for the Goals), focusing on areas such as cultural heritage, education, citizen science, and bioeconomy. Collaborations with universities, public agencies, and local associations are also key. The establishment of intermunicipal consortia is underway to create a regional fund for cultural and tourism development.

Expected results include georeferenced mapping of sites, production of educational materials, training of local agents, creation of interpretative trails, and the holding of exhibitions and immersive experiences. In the long term, the program aims to consolidate a regional archaeological tourism circuit and strengthen sustainable public policies. The program's methodology is interdisciplinary and participatory, based on public consultations and the integration of academic and traditional knowledge.

The program has institutional support from the UNESCO/UNITWIN Chair in Humanities, Frontiers, and Migrations at the Federal University of Santa Maria (UFSM), which enhances its reach and reinforces its commitment to intercultural dialogue and social inclusion [13]. Linked to the UFSM Graduate Program in History and the Montevideo Group of Universities Association (AUGM), this chair promotes interdisciplinary and international actions aimed at strengthening the role of the Humanities in promoting sustainable development, cultural diversity, and peace. This partnership enhances the program by integrating its scope with research, teaching, and extension networks connecting institutions in Latin America and Europe, broadening the program's reach, and reinforcing its commitment to intercultural dialogue, social inclusion, and the valorization of historical heritage [14].

The Trilha Rupestre program team is led by archaeologist Lia Raquel Toledo Brambilla Gasques (scientific coordinator) and Professor Ivo Leite Filho (administrative coordinator). In summary, the program is a notable example of how archaeological heritage can become an active agent of social, educational, and economic transformation. By valuing local memory, and resources, the program creates a new model of regional development connected to Brazil's cultural and environmental diversity, contributing to the 2030 Agenda.



Figure 3. The eight innovative technological axes of the Trilha Rupestre Program

4. Results

The Trilha Rupestre Program has yielded significant outcomes by coordinating multiple actions focused on cultural heritage preservation, scientific research, and sustainable community practices in Mato Grosso do Sul. Through an interdisciplinary approach, the program has involved researchers, students, and local communities in a collaborative network. The accumulated actions demonstrate a sustained commitment to the social, cultural, and economic transformation of the territories involved. A summary of the actions developed in the eight thematic axes is presented below.

The archaeological axis carried out two fieldwork phases, collecting evidence of human occupation between the 6th and 18th centuries CE, including records of the consumption of fruits such as Baru since ancient times. The excavations involved experts from multiple institutions (UFSM, UNESC, IPT-PT). In parallel, the program promoted academic training through events like the "Semana da Arte Rupestre" (Rock Art Week) and developed heritage education initiatives in schools, guided tours, and the distribution of teaching materials. Scientific production has been consolidated mainly through institutional partnerships and support from the UNESCO chair.

In the geopaleontological axis, the program organized "GeoDia" (Geo Day) events in 2023 and 2024, bringing together educational and scientific activities. Key actions include developing the first Geodiversity Inventory of the Trilha and creating educational materials. Projects were conceived for two museums, the Paleontology Museum in Rio Verde de Mato Grosso and the Geosciences Museum in Campo Grande, and strategic locations were selected for viewpoints. Academic outcomes include one undergraduate thesis, two master's thesis, and several scientific presentations at national and international events.

The chemical-pharmaceutical axis transformed natural resources into value-added products. Dermocosmetics from native fruits and plants were developed under the Tyakuã line, highlighting the Guavira fruit (the state's symbol) [15], alongside artisanal beers with

local flavors. The results include two articles in high-impact journals, two registered patents, two book chapters, and several funded projects and conference presentations.

In the architecture axis, the focus was on requalifying urban spaces with geocultural potential. The Urban Geopaleontological Park Morro da Lua, located in Rio Verde de Mato Grosso, was designed to transform a former clay pit into an educational and cultural center. A Geopaleontological Route was also structured, passing through four municipalities with a focus on geodiversity and local landscape. The conception of informative totems and viewpoints in 3D modeling reinforces the use of technologies for environmental interpretation. Currently, 19 undergraduate students are actively involved in these projects.

The tourism axis established public policies and training programs. Municipal laws were drafted for six municipalities to organize tourism and preserve heritage. Training programs totaled over 300 hours, covering topics like environmental guiding, public tourism management, community entrepreneurship and social media marketing.

In the art axis, the "Mãos que Moldam" (Hands that Shape) project engaged 16 local artisans in Alcinópolis in ceramics workshops. The group is now forming a cooperative, contributing to income generation by creating authentic products that reflect the regional identity. The integration of art, culture, and tourism stands out as one of the most important legacies of this initiative.

The food axis developed a product line using native and exotic fruits to create ice creams, breads, and other items, including vegan and gluten-free options. These products were presented at ten technical-scientific events. The axis also offered an extension course and conducted workshops with Quilombola communities, promoting the sustainable use of resources. Innovations include testing 3D printers for food production.

Finally, the botanical axis provided transversal support by focusing on ethnobotany and plant ecology. The actions are integrated with the "Valorization of Edible Plants of the Pantanal and Cerrado" Extension Program and promote environmental education through interpretive trails. Furthermore, it generated scientific information about native flora, promoting sustainable practices for using biodiversity.

In quantitative terms, the Trilha Rupestre Program has achieved significant results, including the execution of 44 expeditions and the establishment of 19 ongoing research projects. The initiative has also held 18 training sessions, which contributed to the creation of one cooperative. Its academic and outreach efforts have produced 9 scientific articles, 8 documentaries, 12 posters, and have generated 64 media reports. Furthermore, the program has established 4 technical cooperation agreements, involved 18 scholarship holders, and acquired 3 pieces of laboratory equipment to support its activities.

To expand its reach, the program created an official website [16] and an Instagram profile. Complementing this, videos and documentaries are available on the UFMS Archaeology Museum's YouTube channel, serving as an accessible educational and scientific resource. Trilha Rupestre represents an innovative model of collaboration that promotes regional development based on the valorization of cultural and natural heritage, establishing a lasting legacy for Mato Grosso do Sul.

5. Conclusions

The Trilha Rupestre Program stands as a transformative initiative that strategically integrates science, culture, education, and sustainability within territories endowed with exceptional archaeological and environmental heritage, yet historically marked by structural inequalities, marginalization, and political invisibility. By implementing a multidisciplinary and participatory methodology, the program transcends conventional top-down heritage management models, establishing instead a new paradigm of collaborative governance that values and safeguards ancestral knowledge, local lifeways, and the cultural diversity of Mato Grosso do Sul's populations.

This approach is firmly anchored in heritage and environmental education, developed through continuous processes of listening, co-creation, and community protagonism. Its activities — conducted across formal, non-formal, and informal learning spaces — cultivate an intergenerational educational environment in which community members of all ages actively engage in knowledge construction, thereby strengthening territorial belonging, reinforcing cultural identity, and fostering critical awareness of the natural and cultural legacy they inherit and transform.

A defining strength of the program is its demonstrable alignment with the United Nations 2030 Agenda for Sustainable Development, a core principle embedded in UFMS's institutional strategy [17,18]. Through its eight thematic axes — ranging from sustainable tourism and bioeconomy-based food production to natural cosmetics and rock art – inspired ceramics — the Trilha Rupestre not only stimulates income generation and entrepreneurship but also strengthens local economies grounded in sociobiodiversity.

Initiatives such as the Tyakuã line of dermocosmetics derived from native fruits, the valorization of indigenous gastronomy, and the formation of artisan cooperatives exemplify the program's capacity to link economic development with social inclusion. Particular emphasis is placed on empowering women, Indigenous peoples, Quilombola communities, and small-scale family farmers, positioning the public university as an active catalyst for equity, social innovation, and sustainable territorial development.

The scope and diversity of results achieved thus far attest to the program's maturity and replicability. Beyond its dozens of expeditions, workshops, scientific symposia, and community trainings, Trilha Rupestre has generated tangible products, museum projects, and educational resources that recover, reinterpret, and revitalize local knowledge systems.

The active engagement of students and researchers in every stage of the process has not only ensured the integration of cutting-edge academic research with social demands but has also contributed to the formation of new leadership and the consolidation of applied research with measurable social impact. The production of scientific articles, patents, theses, and dissertations, combined with significant community outreach, positions Mato Grosso do Sul as a national and international reference in public archaeology, cultural tourism, and sustainability-oriented territorial planning.

Another cornerstone of the initiative is its robust networking strategy, which articulates partnerships with Brazilian and international universities, public agencies, local associations, and UNESCO Chairs, enabling multidirectional knowledge flows and reinforcing intercultural dialogue. The establishment of intermunicipal consortia, the mobilization of cultural incentive laws, and the design of shared governance structures provide a strategic basis for the

program's long-term financial and institutional sustainability, as well as for its expansion to other regions of the Cerrado-Pantanal ecological corridor.

In essence, the Trilha Rupestre Program offers a sophisticated and ethically grounded model of how higher education institutions can integrate teaching, research, and outreach to address pressing socio-environmental challenges while promoting cultural resilience. By recontextualizing archaeological sites as dynamic spaces of memory, identity, and innovation, the program redefines heritage as a living driver of sustainable development, civic engagement, and social justice. Its experience and methodological framework constitute a robust blueprint for the design of integrated, participatory, and socially just public policies — an urgent necessity in societies facing profound historical inequalities and accelerating environmental crises.

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Conflict of Interest

The authors declare that there is no conflict of interest regarding the publication of this article.

Authors Contribution

All authors contributed substantially to the work. **L.C.C.** and **L.R.T.B.G.** are the main authors of the manuscript and were responsible for conceiving the research idea and writing the original draft. **J.V.C.**, **L. R. P. D.** and **L. C.** assisted in the development and execution of the study and in the compilation of data. **V.D.S.Q.**, **C.C.B.F.I.** and **A.S.S.** contributed to the critical review of the manuscript. All authors reviewed and approved the final version of the manuscript.

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