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QUALITY
EDUCATION



**ENSURE INCLUSIVE
AND EQUITABLE
QUALITY EDUCATION
AND PROMOTE
LIFELONG LEARNING
OPPORTUNITIES FOR
ALL**

CASE STUDY: ITAIPU AND SDG 4

Activities by Itaipu Binacional supporting implementation of the Sustainable Development Goal 4 (SDG 4) of the United Nations 2030 Agenda for Sustainable Development



Alexandre Marchetti /Itaipu Binacional

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General Coordination: Dirección General Paraguaya, Diretoria Geral Brasileira – Itaipu Binacional.

Editing and writing: Ariel Scheffer da Silva, Ivan Vera, Lígia Leite Soares, Maria Eugenia Alderete e Paulo Abrantes

Collaborators: Cíntia Bena Valoto, Daniel Ramirez, Eloiza Dal Pozzo Chibiaqui, Ignacio German Riquelme, Julio Britos, Lair Margarida da Rosa, Leila Alberton, Leilane Soares Pereira de Sousa, Ligia Neves da Silva, Lucilei Bodaneze Rossasi, Marlene Maria Osowski Curtis, Miguel Mendoza, Mirtha Alfonso, Rodrigo Cupelli, Daniel Olmedo, Ronaldo Pavlak, Vinicius Ortiz de Camargo.

Text reviewer: Roberto Kozdra.

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Itaipu Binacional

Avda. España N° 850 e/ Perú y Padre Pucheu
Asunción, Paraguay

Tel.: (+595) 248-1909 / 248-1908

www.itaipu.gov.py

Av. Tancredo Neves, 6.731

Foz do Iguaçu, Paraná, Brasil

Tel: (+55) 45 3520-5252

www.itaipu.gov.br

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WHERE WE ARE



Integration that generates Renewable Energy and promotes Sustainable Development



ITAIPU BINACIONAL AND THE UNITED NATIONS 2030 AGENDA FOR SUSTAINABLE DEVELOPMENT

Itaipu is a binational entity created in 1974 by Brazil and Paraguay in order to utilize the Paraná River, along the border of the two countries, to generate hydropower. Today, the Itaipu Hydropower Plant is the largest generator of renewable power in the world (ITAIPU, 2018 a). As of 2018, Itaipu had generated a total of over 2.6 billion Megawatts-hour (MWh) since the beginning of its operation, in 1984 (ITAIPU, 2019 a).

Since its conception, Itaipu Binacional has followed sustainable development principles as reflected by its 15 strategic objectives and integrated actions and programs, supporting social well-being, economic growth and environmental protection, contributing to regional prosperity in Paraguay and Brazil. Itaipu's activities in the region have been recognized as excellent examples of "Best Practices" in the effective implementation of the United Nations 2030 Agenda for Sustainable Development and the Sustainable Development Goals (SDGs) (ITAIPU, 2019 b).



SDG 4. ENSURE INCLUSIVE AND EQUITABLE QUALITY EDUCATION AND PROMOTE LIFELONG LEARNING OPPORTUNITIES FOR ALL

Target 4.1 By 2030, ensure that all girls and boys complete free, equitable and quality primary and secondary education, leading to relevant and effective learning outcomes.

Target 4.2 By 2030, ensure that all girls and boys have access to quality early childhood development, care and pre-primary education so that they are ready for primary education.

Target 4.3 By 2030, ensure equal access for all women and men to affordable and quality technical, vocational and tertiary education, including university.

Target 4.4 By 2030, substantially increase the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship.

Target 4.5 By 2030, eliminate gender disparities in education and ensure equal access to all levels of education and vocational training for the vulnerable, including persons with disabilities, indigenous peoples and children in vulnerable situations.

Target 4.6 By 2030, ensure that all youth and a substantial proportion of adults, both men and women, achieve literacy and numeracy.

Target 4.7 By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development.

Target 4.a Build and upgrade education facilities that are child, disability and gender sensitive and provide safe, non-violent, inclusive and effective learning environments for all.

Target 4.b By 2020, substantially expand globally the number of scholarships available to developing countries, in particular least developed countries, small island developing States and African countries, for enrolment in higher education, including vocational training and information and communications technology, technical, engineering and scientific programmes, in developed countries and other developing countries.

Target 4.c By 2030, substantially increase the supply of qualified teachers, including through international cooperation for teacher training in developing countries, especially least developed countries and small island developing States.

Source: United Nations, 2015.



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SUSTAINABLE DEVELOPMENT STRATEGY OF ITAIPU

Itaipu's vision for 2020 is to be "the generator of clean, renewable energy with the best operating performance and the world's best sustainability practices, promoting sustainable development and regional integration" (ITAIPU, 2018).

For Itaipu, social responsibility is a major commitment, intrinsically linked to its management system, constituting one of its most important missions in its different lines of action. Itaipu follows policies and practices that promote prosperity and contribute to improving the well-being of the population in many communities, in both Paraguay and Brazil. The organization represents a powerful force in the advancement of sustainable regional development, helping to build more responsible, equitable and solidary societies. In Brazil, these actions have taken place mainly in the area of influence of the Reservoir and extend to many municipalities in the western

region of the state of Paraná. In Paraguay, many of the actions have national coverage and benefit different regions of the country.

Within the social dimension of sustainable development, activities by Itaipu are designed to help to reduce poverty, increase food security and enhance nutrition, improve health, foster better education and promote equality with respect to gender, age, disabilities, race, religion, ethnicity and economic status. They also promote income generation, protection of children and adolescents, respect for human rights, conservation of biodiversity, and sustainable means of production and consumption. These activities are part of Itaipu's Business Plan, which includes the corresponding programs and actions that are fully linked to strategic objectives and organizational policies and guidelines.



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Itaipu and the SDG 4

Itaipu has multiple initiatives in place with the aim of improving education for all and allowing the economic and social transformation of communities in the region and beyond. As a result, the Entity has been able to help many people, including the socially vulnerable, by providing them with opportunities to develop technical qualifications and special skills. Many students with financial needs have benefitted from the ample programs of scholarships being implemented by Itaipu in both Paraguay and Brazil.

By providing a wide variety of different educational opportunities in fields of relevant sustainability (such as water, energy, health, waste treatment, land and environment, and agriculture), Itaipu has been able to make progress towards many targets within the Sustainable Development Goal 4 (SDG 4), which calls for ensuring inclusive and equitable quality education, promoting lifelong learning opportunities for all. Itaipu's educational programs are accessible and broad in scope, affordable, and backed with scholarships as

necessary while maintaining focus on technical and vocational skills as well as with specialized support for the indigenous population of the region.

Itaipu has also provided important support for the revitalization of the educational infrastructure and also to public schools in Itaipu's area of influence. This support includes equipping education centers that provide services to persons in vulnerable situations.





1.

**ITAIPU
TECHNOLOGICAL
PARK (ITP)**



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Objective and description

Education is fundamental to any initiative aimed at sustainable development, whether it is in the economic, social, environmental or technological spheres. As a result, the Itaipu Technological Park (ITP), which was created in 2003 by Itaipu, has been instrumental in establishing intellectual capital in the region. The ITP has created human resources capable of great economic and social transformation by implementing actions that cover the area of influence of Itaipu and its surroundings.

The rapid increase in population during the eighties and nineties created a need for a new education and skills profile for the people of the region, and thus the ITP was created to implement an appropriate environment for technological and sustainable development. Among its six strategic objectives, four are related to education. They are:

1. Promoting scientific, technological and innovative development of interest to Itaipu and the territory;
2. Contributing to the training of skills, technical qualifications and valorizing the people living in the

territory;

3. Promoting actions that contribute to social, cultural and environmental development in the territory; and
4. Contributing to the strengthening of productive activities in the territory.

One of ITP's primary objectives is to attract university students and to offer specialized courses and degrees (Undergraduate, Master's, Doctorate, and Specialized degrees) focusing on the demands of the region. Some examples of these programs include undergraduate courses such as in electrical engineering, mechanical engineering, and renewable energy. The ITP environment also promotes student exchanges. For instance, laboratories are shared between students from the State University of Western Paraná (Unioeste) and the Federal University of Latin American Integration (Unila). In addition, a branch of the Open University of Brazil (UAB) also operates within the ITP. The following is a summary of the number of students who graduated from university campuses located in the ITP, from 2006 to 2018:

DEGREES CONFERRED IN ITP Period: 2006-2018		
Institution	Degree	Total Graduated
Unioeste (Mathematical Sciences Courses)	Undergraduate	579
	Master	206
Unila	Undergraduate	461
	Master	134
UAB	Post-Secondary (Technical)	16
	Undergraduate	818
	Specialized	1202
Interinstitutional PhD in Law (UFPR)	Doctoral	14
Interinstitutional PhD in Numerical Methods (Unioeste and UFPR)	Doctoral	22

Besides the degrees listed on the table above, other programs are in progress, such as two Master's degree programs (Management, Technologies and Sustainability, and Informatics), three PhD programs (Electrical Engineering, International Relations and Regional Development, and Agribusiness) and two specializations (Public and Project Management, and Numerical Methods). These efforts provide access to education, to new technical and professional skills and to qualification of teachers.

Focus on training also applies to the teachers who lead the initiatives. In Paraná, the teaching of astronomy is mandatory in the school curriculum and teachers are trained at the ITP on this subject. In basic education, in partnership with the city of Foz do Iguaçu, the use of new information and communication technologies is stimulated by pedagogical practices with continuous training of the teachers to improve the quality of their teaching. In four years, there were 20,000 teachers trained and the Index of Development of Basic Education (Ideb) of Foz do Iguaçu was measured, which allowed the quality of ITP's education to be compared at a state and country-wide level. In elementary education, for example, the indicators for 2017 were: Foz do Iguaçu (7.2), Paraná State (6.3) compared to the overall country Brazil (5.5), based on a scale from 1 to 10, with 10 being the highest grade. In addition, the ITP offers scientific activities to promote investigative practices and

encourage scientific discovery, starting at the most basic level.

Currently, Western Paraná's installation of a modern and competitive agro-industrial complex supported by the ITP has shown strong performance in Brazil and abroad. The region has the largest number of cooperative agribusinesses in the state: there are 17 agricultural cooperatives that are ranked among the 1,000 largest companies in Brazil. Of these, eight are located in the Western region. (IPARDES, 2003; EXAME, 2017). This is due, in a large part, to the creation of a Science, Technology, and Innovation (ST&I) environment and a culture of higher education focused on agro-industrial activities, compatible with the prevailing production trends, which generates a policy to encourage research and suitable institutional arrangements. This, in turn, results in a closer relationship between science and the needs of the productive sector (IPARDES, 2003). In addition to the agricultural vocation, other highlights are the furniture industry, tourism, and the Itaipu Hydroelectric Power Plant itself, all of which attract suppliers and service providers to the region.

An important program promotes technical training to be used mainly in the tourism market, since Foz do Iguaçu is a very popular destination in Brazil. Another training program is related to the development of software for entrepreneurship and leadership. Finally, in a

partnership with the Industrial Social Service (SESI), psychosocial assistance is provided to young people aged 15-21 for their entrance into the workforce, as well as improving their self-esteem, their family and community living, formal education, and their employability.

Related Targets

The educational actions of the ITP encompass all levels of training of individuals, including: scientific initiation with children, support for the attendance of young people in public universities and referral of those who are socially vulnerable, either for educational training or the labor market. Also, the ITP offers continuing education and undergraduate, technical specializations, Master's and Doctorate programs and the granting of scholarships. With all these actions, the ITP activities are strongly linked to most targets of SDG 4, including: 4.1, 4.3, 4.4, 4.5, 4.7, 4.a, 4.b and 4.c.

Challenges

The biggest challenge of the Itaipu Technological Park was integrating the universities with other actors, such as: society, government, investors and companies. In Brazil, universities are still questioned about their role in facing the challenges of technical and intellectual development in the community. In general, it is challenging for the society to understand the importance of research for technological development.

The recommendations for education to succeed in its varied contexts relate to the importance of identifying the fragilities of the region in the educational context, so that the technology park can take the necessary actions in order to solve such needs.

Another challenge for ITP is maintaining a comprehensive record of the number of students who have been benefitting directly or indirectly from the the ITP and Itaipu activities through the years. Also, it has

been a challenge to create close communication within its network to promote synergy among the different sections of the ITP and trying to maintain high quality training for both students and teachers, as well as trying to attract both the best student candidates and teachers.

Lessons learned

The ITP, through its extensive partnership network of universities, public and private organizations and technical center, is ensuring a very rich knowledge environment which has been proven very valuable for the people of the region. Scholarships and training represent very effective tools in improving the Human Development Index (HDI) of the region, and the professional training that is offered at the ITP often results in its participants being able to move successfully into new, higher-paying labor markets.

Results

The ITP offers a very large variety of education and capacity building programs to many people including many young, socially vulnerable people. It has proved to be a strong platform for training, education, research and development, and technical innovation in the region and in Brazil and Paraguay. A large part of the ITP's efforts is directed to enhancing the local and regional capacities in areas that are priorities for the region, such as agriculture, the environment, energy, engineering and information technologies and tourism.

In addition, since 2006, the ITP has granted scholarships to encourage and foster research, technological development, and education for people with economic needs throughout the region. From 2006 to 2018, 1,793 scholarships have been awarded in various modalities. Perhaps in large part due to this initiative, the Western region of Paraná has the highest Human Development Index (HDI) of the State (0.717), according to data from the Paranaense Institute for Economic and Social Development (IPARDES, 2019).



Cartões Artesanais « Arte da Terra

A artesanato é o trabalho realizado com as mãos e com o uso de ferramentas, técnicas e materiais locais, produzindo objetos de uso cotidiano ou decorativos, que representam a identidade cultural e o saber tradicional de uma comunidade.

Os produtos artesanais são feitos com materiais locais e com técnicas tradicionais, sendo uma expressão da identidade cultural e do saber tradicional de uma comunidade.

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2.

**PROGRAM FOR THE
PROTECTION OF
CHILDREN AND
ADOLESCENTS (PPCA)**



Alexandre Marchetti /Itaipu Binacional

Objective and description

The Program for the Protection of Children and Adolescents (PPCA) was developed by Itaipu in 2003 with the objectives of mobilizing social actors for the creation and implementation of public policies that protect, promote and defend the rights of children and teenagers, and to intensify the fight against child labor, sexual exploitation and other forms of violence.

The program is located in the tri-national region where Brazil, Argentina and Paraguay converge, mainly in the municipalities of Foz do Iguaçu, Puerto Iguazu and Ciudad del Este, with about 700,000 inhabitants. It is responsible for the secretariat of Rede Proteger (Protection Network), the main partner in the tri-national initiative to protect the rights of children and teenagers. It includes about 40 institutions that, together, develop campaigns, research, projects and restructure care plans to serve the target public. Its initiatives address issues regarding combating inequalities, improving environmental education and community engagement, ensuring multiple uses of the Reservoir, and encouraging the social inclusion of children and teenagers.

The work of the PPCA in this border region, on such issues as networking – to avoid duplicating work – achieving results, and promoting social dialogue for the protection and promotion of the rights of children and teenagers. This is what leads Rede Proteger to being recognized as a benchmark in other border regions. In 2018, the PPCA joined the Foz do Iguaçu Program to Combat School Abandonment.

Itaipu created three corporate actions in its strategic planning for the PPCA:

- Professional training of underprivileged families in Foz do Iguaçu and Ciudad del Este to contribute to the eradication of child labor and the sexual exploitation of children and teenagers, through the insertion of family members and teenagers into the labor market.
- Support for programs that care for children and teenagers in situations of social risk, with the objective of transferring resources to the partner entities to carry out their projects of social and

sports care in extracurricular school activities, thus guaranteeing the full development of children and teenagers.

- Support for the Rede Proteger "Comprehensive Child and Adolescent Protection Network" in Foz do Iguaçu and the tri-national region, that aims to strengthen the collective work with the institutions of the Child and Adolescent Rights Guarantee System.

In order to monitor the program's progress, Itaipu uses the results achieved in its social projects. On a monthly basis, the social entities and partners of the PPCA report on the financial contributions made by Itaipu, along with the corresponding results.

To reach these goals, the PPCA shares managing the five following projects:

1. Young Athletes

A partnership with the Athletics Institute of Foz do Iguaçu. It serves 160 athletes annually, including disabled athletes, who train in 27 types of athletics, such as running, throwing and jumping. The members participate in important competitions of Brazilian athletics, with records and medals in various modalities.

2. Lake Boys (Meninos do Lago)

A canoeing project, with values, attitudes and behaviors of solidarity, ethics, and respect for the environment. This is in partnership with the Meninos do Lago Institute. The activities take place in the Piracema Channel of Itaipu, which is an artificial fish migration channel, with a special area for canoeing.

Since 2009, more than 1,000 children and teenagers have participated in this project, which resulted in Olympic and Pan American Games medalists.



3. Sailing is a Must (Velejar é Preciso)

A partnership with the Itaipu Lake Yacht Club that annually serves 120 students from public schools, with the aim of encouraging sailing and respecting local biodiversity.



4. Basketball without Borders

A partnership with the Basketball Association of Foz do Iguaçu to accommodate up to 200 athletes annually.

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A partnership with the Basketball Association of Foz do Iguaçu to accommodate up to 200 athletes annually.

5. Youth Trails

The PPCA offers training and professional insertion in the tourism sector for 120 young people between 16 and 24 years of age, annually. These actions are undertaken by the International Polo Iguaçu Institute, which is a partner of the PPCA.

Related Targets

The program is linked to targets 4.4 and 4.7 as it has partnerships with local institutions to encourage the practice of various sports and cultural activities, insertion into the labor market, entrepreneurship, and fighting against the use of narcotics. All of these practices aim to keep children and teenagers out of the risk of being approached for illicit acts, to reduce school dropout rates and to improve school performance.

In addition to improving physical and mental health in the students, sports projects help develop ethical values and practices in both the students and their families and communities. They strengthen cognitive skills, environmental awareness, and resilience in order to lessen exposure to the risks of moral and sexual harassment.

Challenges

One of the biggest challenges for the PPCA is to remain in close coordination with the relevant members in a border region, where sometimes political and electoral changes can result in the subsequent changes of representatives in the Protection Network. This can impair collective dialogue and the implementation of policies to guarantee public rights, as agendas shift depending on the current government.

Another challenge is to maintain the work and autonomy of the partnering social entities, especially in relation to personnel and financial resources for other activities. It is worth noting that the cultural aspects and different laws of three distinct countries all require the presence of experts, especially in legal matters, to reconcile conflicts and carry out actions in Portuguese, Spanish, Guarani, and English.

Lessons learned

To implement a program with this much international scope in an open border region, Itaipu must respect the political systems and diversities in place in each partnering country. Therefore, Itaipu must seek representatives from all segments of society, in particular from international organizations such as the International Labor Organization (ILO) and the United Nations Children's Fund (UNICEF), for a more global dialogue, with goals guaranteed by international conventions which countries would be signatories to.

Results

The PPCA has been very successful in helping children, teenagers and their families as well as the communities where they live since its inception, in 2003, in particular with its five athletic projects and more recently with its partnership with the Foz do Iguaçu Program to Combat School Abandonment, in 2018.





3.

CONTRIBUTION OF EDUCATION TO SUSTAINABILITY IN SOLID WASTE MANAGEMENT



Nilton Rolin /Itaipu Binacional

Itaipu works with different demographics to achieve lasting systemic results, and one of these objectives is focused on the sustainable management of solid waste. Education in sustainable solid waste management involves workshops with waste collectors and training for public managers, including continuous training for technicians and raising awareness of the population in general about these issues. The workshops allow for continuous training of proper waste collecting and sorting and are held to diagnose the needs of specific individual groups, identifying possible improvements and setting goals and expectations for the future cooperatives or associations of waste collectors. Since 2017, when they first started, 53 workshops have been held involving 1,266 collectors, addressing issues such as conflict management, bylaws, self-esteem and recycling habits.

In addition to these workshops, groups of collectors in their geographical regions are encouraged to participate in other national solid waste events and carry out technical visit exchanges of their own in order to acquire knowledge.

Objective and description

Some objectives of this initiative are the following:

- To sensitize the population to the responsibility of the Waste Management process
- To promote the sense of responsibility for the separation of recyclable materials and its referral to the selective collection
- To participate in the continuous training of all the agents involved in the production chain of the recycling program for the development of essential skills and techniques
- To create jobs for the poor in vulnerable communities
- To prevent trash from polluting the environment



Nilton Rolin /Itaipu Binacional

1. Training of Public Managers and Waste Collector Leadership

Itaipu promotes the training of public managers and local leaders through a partnership with the Association of Waste Pickers of Santa Terezinha (ACARESTI), which has become a national reference in effective solid waste management with the inclusion of waste pickers from vulnerable communities. Capacity building involves such issues as the importance of recycling and finding sustainable alternatives in the reuse of e-waste and vegetable oil waste, as well as the technical visits to the state's main sorting center. In 2018, 1,200 people were trained in the matter, including technicians, public managers, and waste collectors through the region.

2. Ongoing Training in Solid Waste Management for Waste Management Technicians

Considering the responsibility of the municipalities in determining the correct destination of their waste, the Network of Municipal Reference Technicians was created as a requirement for the implementation of the Selective Collection Program. Itaipu periodically holds meetings with these technicians, working on the most diverse of solid waste topics, organizing support forums, debates, meetings, and technical visits to various sorting centers.

In 2018, a course was held, in partnership with the Free University of the Environment (UNILIVRE), on solid waste management for 100 public managers in 55 municipalities in the Itaipu area, using a semi-virtual classroom methodology (involving both in-person and distance learning).

3. Raising Awareness of Local Populations

This awareness-raising initiative involves door-to-door campaigns to homes and commercial establishments, as well as lectures in schools, businesses, etc. In addition, cooperatives receive groups of visitors at their sorting centers to present their work on solid waste management. Campaigns have educational materials such as booklets and folders to hand out.

The target demographic for these activities consists of collectors of recyclable materials, the municipalities, and the public managers of 55 municipalities in Brazil that are part of the area of influence of Itaipu, where 40 associations and three organized groups of collectors are located.

Related Targets

The following are some targets related to this initiative:

Target 4.4: Continuous training that develops essential skills and techniques for obtaining knowledge, skills, and attitudes that encompass theoretical and practical knowledge relevant to the entire production chain of recycling. It aims to increase the income of members of associations and cooperatives, the percentage of appropriate destinations for recyclable materials, and the hiring of organized collector groups.

Target 4.7: The program also supports the development of formal and non-formal educational practices in the community with a focus on sustainable development and conscious consumption. The actions are based on the support of Itaipu to the municipality through agreements on conducting environmental educational activities in municipal selective collection programs. Itaipu's support involves training strategies for environmental educators used to amplify the methodology and as distributors of educational and dissemination materials.

Challenges

A big challenge for the educational processes was to raise awareness of the population about the proper separation and destination selection of recyclable materials, as well as the organizing of collectors of such recyclable materials into associations and cooperatives. Additionally, it has been challenging to maintain support for the continuous and technical training of the collectors and the municipal managers, in addition to the involvement of public management.

Lessons learned

Environmental educational processes must be continuous, with a constant evaluation of their results, in order to change ineffective training when necessary. As recommended in legislation, management should be shared, so all members involved in the process can receive ongoing training to develop knowledge, skills, and attributes relevant to socio-environmental actions focused on solid waste management. It is also important to emphasize that for proper and effective waste management, the entire waste separation and disposal process should be considered.

Results

The results of this initiative are monitored through reports on progress and an indicators platform that was developed in 2018 called the Recyclemeter. The Recyclemeter measures, among other things, the amount of recycled solid waste by categories, market value and sales in relation to the total garbage generated in the municipality. The main results of this initiative in the last few years are as follows:

- 53 workshops conducted in two years for recyclable materials collectors.
- Six meetings held between networked technicians and municipal managers in three years.
- A course in solid waste management conducted for 100 public managers of the 55 municipalities in 2018.
- Training for 1,200 technicians, public managers, and waste collectors in ACARESTI in two years.





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4.

**EDUCATION IN HEALTH
FOR SUSTAINABLE
DEVELOPMENT**



Itaipu Binacional

Objective and Description

The purpose of this initiative is to promote sustainability with a focus on education and health by enabling and empowering education professionals and school communities to continuously improve their lifestyles into healthier ones, in order to achieve a high level of environmental, social, economic, and physical well-being.

In order to achieve this, Itaipu conducts ongoing training for the development of competencies (such as knowledge, skills and attitudes) for education professionals in the municipalities located in the area of influence of Itaipu. Participants are organized by groups depending on their geographical locations. Each class participates in four formative meetings of eight hours in person. After each in-person meeting, the participants then develop their own activities in their schools and/or family communities. This initiative has been implemented since 2015 and includes 54 municipalities in Western Parana and one in Mato Grosso do Sul.

Before starting this training process, awareness-raising seminars are held for all education professionals in

municipal secretariats. These seminars are on education, health and the sustainability of the school, in which members are encouraged to reflect on the health of their people, relationships, and the planet.

In order for this initiative to be successful, it is expected that seminar participants will be able to act as examples and promoters of integrative health, transforming their schools or communities into a sustainable frame of reference for education and health promotion, both for students and the communities of parents, neighbors, and friends.

One health campaign in Itaipu was centered on Oral Health Education. With the "Recovering Smiles" campaign, students from about 15 educational institutions in the city of Ypacarai in Paraguay were educated in preventive oral health. In total, 2,423 school-aged children and adolescents were trained in the prevention of cavities with fluoridation, diagnostics and controls in oral health, and the actions were recorded in individual data sheets. In addition, 9,000 oral hygiene kits were delivered. (ITAIPU, 2018)

Related Targets

The main related target for this action is target 4.7, as it strives to ensure that all learners acquire knowledge and skills needed to promote sustainable development, specifically in the areas of sustainable lifestyles.

Lessons learned

Some lessons learned from this initiative were the following:

- The importance of sensitizing all education professionals on the subject, through municipal seminars, before starting the training process
- Recognizing when people might lack the ability to change lifestyles
- Recognizing that defining actions that improve the quality of education may presuppose including the full care of professionals, especially teachers, who are themselves directly involved in the pedagogical processes.

Results

In order to monitor the results of this initiative, Itaipu does the following:

- Evaluates reports submitted by the participants of the ongoing trainings at the end of the process
- Evaluates reports from the participants of the experiences that were incorporated as a healthy habit in their lifestyle, and the sustainable actions in their school and family space
- Evaluates reports on pedagogical practices that were implemented in the classroom based on the content from the trainings
- Provides an evaluation form completed by participants at the end of each module

As a result, during the 2017-2018 cycle, 360 teachers have been trained in the process of continuing education. More than 4,000 professionals of basic education participated in the municipal seminars and there were clear and measurable changes in the participants' lifestyles. There was also an implementation of sustainable and innovative pedagogical practices, and the interpersonal relationships of the professional teams working in the municipal public schools of the region were strengthened.



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5.

WORK INITIATION AND INCENTIVE PROGRAM (PIIT)



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Objective and Description

Since 1988, the Work Initiation and Incentive Program (PIIT) has been promoting personal and professional development of adolescents from the cities of Foz do Iguaçu and Curitiba, in Brazil, creating conditions for them to develop the values of responsibility, attendance, organization, honesty, and others that – from childhood and even more so in adolescence – contribute to the formation of a model citizen. The purpose of this initiative is to promote the right to professionalization of adolescents who are members of families in situations of vulnerability or social risk. In order to implement this action, PIIT was founded in accordance with Brazilian laws related to the admission of young workers in companies that include more than five employees. The Program monitored the legislative and conceptual changes regarding the relationship between children and adolescents with issues related to education, work, family, and society in general. The program was legalized by the 1988 constitution of Brazil and specified in the Statute of the Child and Adolescent (ECA) in 1990.

PIIT offers two types of participation:

1. Apprenticeship - Professional Learning Program.
2. Beginner - Professional Technical Training Program.



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Students between the ages of 15 and 17 who are attending elementary or high school and come from low income families participate in the program. The length of participation is up to two years, and the adolescent receives a monthly allowance in the amount

Students between the ages of 15 and 17 who are attending elementary or high school and come from low income families participate in the program. The length of participation is up to two years, and the adolescent receives a monthly allowance in the amount of the current minimum wage, life insurance, transportation voucher, food stamps and medical and dental assistance. In 2017, the program offered more than 300 young people their first job, as well as courses, workshops and lectures in the areas of education, culture and leisure. More than 6,000 adolescents have participated in the program.

At Itaipu, the adolescent works, on average, four hours a day, for up to 24 months. In addition to the Learning Course, a series of workshops are offered to adolescents following learning cycles. The workshops total approximately 170 hours, distributed over 18 months of work, and are seen as complementary actions to the daily life of adolescents. Some examples of these workshops are sexual education, environmental education, socio-emotional skills, interpersonal communication, drugs and current consumer contexts, and professional orientation.

Related Targets

The PIIT program supports adolescents in building a professional project that is organized through education (studies) and not from immediate work (Target 4.4).

In this new orientation, expanded and detailed by Brazilian Learning Laws, the program promotes the right to professionalization of adolescents who are members of families in situations of vulnerability or social risk (Targets 4.4 and 4.5), living in Foz do Iguaçu or Curitiba, both cities of the state of Paraná.

Through its content and practices based on UNESCO's Four Pillars of Education and the Life Skills program of the United Nations Children's Fund (UNICEF), PIIT supports adolescents in building their identity, in the conquest of their autonomy and in their process of

interaction with other adolescents and co-workers, with the family and the community (Targets 4.4, 4.5 and 4.7).

Through the implementation of this program with a group of public and private entities involved in the defense of adolescent protective rights, it is possible to promote the participation of adolescents in the world of labor and their access to quality health, education, leisure, culture, information, and social and political participation (Targets 4.4, 4.5, and 4.7).

Challenges

It is important for the PIIT program to be able to operate in local communities in order to promote the municipal network of social protection of children and adolescents. Networking is fundamental so that the program can, from this insertion into the working environment, guarantee an integral development of the adolescent and consolidate in the adolescent a right to a dignified life. Therefore, it can be challenging to find a suitable workplace environment or local community in which the PIIT program could operate in an effective manner.

The program could not be carried out without strategic support of the supervisors, who have the role of encouraging, motivating, and supporting the adolescents in order to develop their maturity and responsibility, self-trust, continuation with their studies, and the competence to set targets for the future along with the ability to realize them. As a result, having a quality supervisor who can actively participate in this initiative can sometimes be a challenge as well. Supervisors are supported by a multidisciplinary team with professionals specialized in psychology, social assistance, and the relevant pedagogy. The multidisciplinary team must also act as a mediator and facilitator of the municipal protection network and be a partner of other supervisors.

Lessons Learned

As this is a program of initiation and incentive to work where most of the workload is focused on work activities, it is fundamental and strategic to continue developing and implementing activities that promote the development of professional competencies in an integrated manner. The program needs to consider the adolescents' interest in learning, their level of education and knowledge, the work environment in which they are placed, and the role of the person supervising them.

The Work Initiation and Incentive Program is directly connected to the Brazilian Child and Adolescent Rights Guarantees System, and thus it must support the implementation of public policies aimed at adolescents, focusing on the promotion of the right to professionalization. To this end, it is part of the Child and Adolescent Protection Network with the support of its partners. Through this network and its partners, in addition to the watchful eye of the supervisor, monitoring can take place and a space for dialogue can occur for the development and improvement of activities.

Results

The initiative resulted in Itaipu earning the title *Child-friendly Company*, which was awarded by the *Abrinq Foundation*, a Brazilian NGO which works with childhood protection. Since 1988, the PIIT program has served more than 6,000 adolescents from the municipalities of Foz do Iguaçu and Curitiba. Twenty young former participants were approved for jobs through Itaipu's external selective processes. In addition, currently, PIIT alumni are now students or teachers at the Itaipu Technology Park Foundation (FPTI) and other institutions such as SENAI (National Industrial Learning Service), in Brazil. There are also participants employed as technicians and engineers in large companies such as Petrobras, Copel and Banco

do Brasil. Many enter as trainees at these enterprises, upon completion of the PIIT Program. Also, when the adolescent enters the Program (PITT), the new income earned increases his or her family's income in approximately 60%.



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6.

EDUCATION FOR SUSTAINABILITY IN ITAIPU BINACIONAL AND ITS SURROUNDINGS



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Objective and Description

This action aims to promote awareness and train people through content, concepts, practices and methodologies for sustainable development. The actions are designed to promote care for the surrounding communities and those related to educational tourism involve students and teachers of all levels of education, as well as community leaders, municipal authorities, farmers, police, and military personnel. Topics include the importance of renewable energies and hydroelectricity, the rational use of water, conservation of biodiversity, conscious consumption, selective waste collection and the consequent reduction of the ecological footprint, as well as the drafting and execution of sustainable environmental projects. The actions of corporate education involve 3,000 Brazilian and Paraguayan employees and seek to develop in them the essential skills for the execution of business strategies.

The actions are subdivided into three focal service points, namely:

1. The Company corporate public:

Itaipu Corporate Education focuses on developing the skills of all its employees, who need training in the context of work. The training is in a formal education environment, or in a virtual environment through customized content and methodologies that tackle the skill gaps. Employee development is organized through educational actions including Learning Pathways. After the skills to be developed in the employees are identified, different educational programs are available in various formats and methodologies, such as in-person learning, remote learning, or a mix of the two modalities. This availability occurs in three contexts: the workplace (on-the-job), a virtual environment, and in a classic environment (the classroom). In addition, educational campaigns are carried out with the internal public (employees, service providers, trainees and young apprentices, and outsourced companies) via lectures, workshops, technical visits, dissemination of reports and the distribution of ecological products. Many of the activities are about environmental issues

with the purpose of generating a change in attitude, which in turn would allow more sustainable positions and practices in the use of resources, contributing to the positive change of the organizational culture and the conservation of natural resources. Responsible consumption, selective waste collection and dissemination of corporate sustainability strategies are encouraged.



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2. The surrounding communities of Itaipu:

Teaching environmental education to the external public, such as teachers and high-school students with an emphasis on environmental sciences and environmental university careers, increases the number of projects based on self-management and thus contributes to the fulfillment of sustainable development objectives and solves local environmental problems. Weekly activities are held with members of the communities at the Ecomuseum, the Bela Vista Biological Refuge (on the Brazilian side) and at the Tierra Guaraní museum (on the Paraguayan side), all spaces maintained and administered by Itaipu. These activities present the dynamics of land occupation, local history, the importance of preserving ecosystems and the use of renewable energy sources for sustainability and the development of society. The activities in the museums, for example, involve dissemination of the technical and didactic aspects related to the museum's collection and the local heritage through lectures, symposia, talks, didactic workshops and traveling exhibitions, and exchanges with national and international institutions to enhance and improve the actions undertaken by Itaipu for heritage management.



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3. Educational tourism:

School groups attend the Itaipu Ecomuseum and the Bela Vista Biological Refuge, in Brazil, and the Itaipu Tierra Guaraní museum and Tati Yupi nature preserve, in Paraguay. In this scenario, children and teenagers participate in hiking trails and pedagogical activities with the facilitation of a team of environmental educators. Both spaces are also open to visits from people from various parts of Brazil and the world. In the Ecomuseum, the route covers, Paraguay everything from the colonization of the territory to the construction and operation of the project and a sample of Itaipu's environmental actions. In the Biological Refuge, the trails address the importance of water conservation and biodiversity, providing interaction with the local ecosystem. In 2017, over 65,000 people visited the Itaipu Tierra Guaraní museum, which had temporary exhibits on such topics as the indigenous peoples and images of the Triple Frontier (the border area shared by Brazil, Paraguay, and Argentina). In 2017, pedagogic programming included workshops for 520 children 3-12 years of age, covering topics like "incredible animals," and creating toys from recycled materials. The Tati Yupi nature preserve, which is part of the Itaipu tourism complex, had over 45,000 visitors learning about biodiversity conservation.

During 2017, in Paraguay, 17,000 people were sensitized to the need for environmental care through different activities fostered by Itaipu, such as courses, conferences, dialogues, hiking, workshops on creating arts and crafts from waste, and many others. In Brazil, 28,000 people from educational institutions were assisted in the educational tourism action at the Biological Refuge and Ecomuseum.



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Related Targets

These actions are linked to Target 4.7, since the activities have been developed with the action aim to promote the dissemination of concepts and practices for sustainable development. The action lies in the promotion of sustainable lifestyles through strategies used to sensitize and empower the population of the area of influence. The corporate education is more directly related to Targets 4.5 and 4.6, since the intention is both gender equality and opportunities for access to technical and human development. This takes into account the principles of education for development and sustainable lifestyles by focusing on human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and the enhancement of cultural diversity and the contribution of culture to sustainable development.

The Corporate environmental education is carried out within Itaipu, both on its Brazilian side (Foz do Iguaçu, Curitiba, Brasília) and on the Paraguayan side (Hernandarias, administrative areas of natural reserves, Ciudad del Este and Asunción); however, the effects of Itaipu Corporate Education subjectively affect the family and social space of Itaipu employees. By involving the surrounding communities, it covers 55 municipalities on the Brazilian side and 15 municipalities on the Paraguayan side, a total population of almost 1.7 million people.

This action went through different stages of implementation until reaching the current format, and could be considered active since 1987 in Brazil and 1990 in Paraguay. Corporate education has been implemented since 2015.

Challenges

A major challenge with this initiative is the mobilization of the public and governmental authorities, considering the activities require voluntary participation and take place at times outside normal business hours or in work contexts. As a result, a constant dialogue is necessary to reinforce the importance of participation in actions for environmental preservation and rational use of resources. It is also a challenge to encourage the participation of agricultural producers to cooperate with the different activities of environmental education that are being carried out in the municipalities where they are settled. In addition, it is sometimes difficult for the training team to get to remote institutions with all their equipment.

In relation to the corporate public, achieving the change of habits and attitudes in adults is a slow process that requires constant support for cultural change. Some challenges include: generating positive and significant environmental impacts is difficult and can be costly; genuinely involving the public is not a simple task; systematizing the measurement of the impact requires a lot of work; and encouraging participation requires levels of financial investments that have a greater scope, impact, and that can improve monitoring of results.

Thus, the greatest challenge is cultural if one considers the classic academic model – passivity to the detriment of proactivity. In the Corporate Education model adopted by Itaipu, what is advocated for is the sharing of responsibilities between work and skill development, i.e. an active perspective of learning by the employee.

Lessons Learned

In the case of educating communities in the area of influence, the solution of local environmental problems in most cases depends directly on the identification of these problems by the inhabitants, so that the best educational strategy can be used to sensitize this population and encourage the appropriate environmentally sustainable practice for the community.

Regarding training the educators, it is very important to consider the multiplier effect that “teach the teachers” or “train the trainers” has on environmental education. It is recommended to maintain a strong connection between trained environmental promoters and to provide frequent feedback on current issues to them within the framework of environmental protection.

As for corporate education, it is important to respect the time and energy required to break paradigms and, as a result, the transformation of mental models and the focus on the use of active methodologies that prioritize “how a human being learns” is paramount. Respecting limitations, potentials, and the need for structuring indicators can be helpful in measuring assessment results and its consequent convergence with the company strategy. In addition, it is necessary to acquire and implement technology to have greater scope and permanent impacts, such as environmental education through technology, systems that measure the impacts in real time, and enabling the monitoring of actions in all sections or dependencies of the Entity.

It is also extremely important to emphasize the fundamental role that a large enterprise has in its environment and in its own functional body as an opportunity to develop skills that add value to the business, facilitating its operational performance. Furthermore, it contributes to strengthening the positive image of the business before society.

The service to the surrounding communities of the Itaipu power plant is monitored through visits to the

municipalities, educational institutions, or neighborhoods that have featured the intervention of the actions, or through accompanying different community environmental projects that emerged as a result of these actions.

The activities of corporate education are based on an assessment model which considers four aspects: reaction, learning, application of knowledge and impact. At the current stage, the results are monitored based on the assessment of the type of reaction/learning and application of knowledge. The most tangible results are in the “reaction” aspect with results expressed as percentages of satisfaction (Kirkpatrick, 2014).

In the “learning and application of knowledge” aspects, the approach is qualitative and therefore the results are still subjective. However, they still need to maintain close convergence with Itaipu’s strategy. For more objective monitoring of these two types of assessment, indicators are under construction so that the measurement of results can take place.

Results

The following are the main results of this initiative:

- More than 20,000 children and teenagers each year take part in the pedagogical routes and trails of the Bela Vista Biological Refuge and the Itaipu Ecomuseum on the Brazilian side, in addition to 15,000 people on the Paraguayan side. This also features partnerships with other associations such as the Itaipu Technological Park, City Hall, and other associations and schools
- Training of more than 700 environmental promoters
- Strengthening of the pedagogical capacities for teachers in the Itaipu area and other areas of interest to Itaipu
- Organizing lectures, congresses, seminars and conferences

- Providing conferences of educational exchange between indigenous communities and local schools
- Publishing books and scientific materials
- Organizing temporary and itinerant exhibitions on topics related to cultural and natural heritage
- Involvement of 3,000 Itaipu employees in corporate campaigns and lectures
- Strengthening of intellectual capital and raising the level of excellence in the company's activities
- Promoting and strengthening of self-development actions and skill-development in different learning contexts
- Promoting of meaningful learning according to methodologies for adult education based on didactic practices consistent with the profile of the public and the activity
- Disseminating of the culture of knowledge sharing multiplied by knowledge management
- Transforming tacit knowledge into explicit knowledge by those involved in the process
- Awareness raising about the environment of over 10,200 people, through dialogues on different environmental issues in educational institutions, national and regional exhibitions, neighborhood commissions and with other members of civil society in the area of influence and other areas of interest to Itaipu.
- Commemoration of five environmental dates: International Forest Day, World Water Day, International Earth Day, International Recycling Day, World Environment Day and Tree Day, on which over 3,000 people were sensitized.
- A workshop course in the department of Canindeyú with the participation of 159 people for the training of

Environmental Promoters, which culminated in 2018.

- Environmental awareness of 1,918 people through awareness-raising workshops and training on proper waste management and 5 commemorated environmental dates: International Forest Day, World Water Day, International Earth Day, International Recycling Day, World Environment Day and Tree Day.
- Follow-up to the "Unite and properly separate waste" campaign at the headquarters of Asunción and in various units of the organization, through constant monitoring to verify the correct waste management was being enacted, collaborating positively to the Itaipu goal of achieving leadership as a company with best sustainability practices in the world by 2020.
- Environmental awareness campaign for over 1,700 people on the proper management of solid waste and rational water management in the Ypacaráí Lake basin.
- Training of 100 people in the construction and assembly of ecological gardens, from reusable materials, of 100 people, through the Artisan Production course of Reusable Solid Waste.



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7.

EDUCATION FOR SUSTAINABILITY OF INDIGENOUS COMMUNITIES



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Objective and Description

Itaipu seeks to contribute to the sustainable development of indigenous communities, aiming to improve their quality of life and the environment they live in. Itaipu's actions depend on several partnerships and involve, above all, respect for the cultural identity of the indigenous communities that are located in Itaipu's area of activity on the Brazilian border.

The work strengthens the role of indigenous school education as an agent of social integration, cultural strengthening, environmental preservation, and sustainability of the indigenous communities. All decisions to intervene in the villages with programs related to education, culture, or infrastructure, are discussed and agreed with the indigenous leaders and their school communities.

Some examples of actions developed with the support of Itaipu are: the technical and structural support for the construction of vegetable gardens; the acquisition of equipment for a computer laboratory; the construction of a space for environmental studies in schools; technical assistance for collective food production for subsistence and surplus marketing; workshops and

meetings to add value to local crafts and tourism; as well as the annual promotion of indigenous games and a cultural week, which involve an integration program among the indigenous villages.

The actions in Brazil for this initiative have been taking place since 2003 and serve approximately 290 families distributed in three indigenous communities in the area of influence of Itaipu Brazil: Tekoha Ocoy village, in the municipality of São Miguel do Iguacu (250 hectares and 720 people); Tekoha Añetete (1,744 hectares, 337 people) and Tekoha Itamarã (240 hectares, 193 people) in the Municipality of Diamante do Oeste.

In the Paraguayan bank, all the work carried out by Itaipu has complied with the National Law and the provisions emanating from the signing of the Convention with the International Labor Organization (ILO) and other existing Indigenous Laws. Previous consultations are always carried out for any work and intervention in indigenous communities. The consent and participation of the indigenous people has been continuous throughout the whole process, and the work is carried out with the indigenous population directly.

Some examples of actions related to education developed with the support of Itaipu in the area of influence are: environmental education (15 communities), assistance to obtain university scholarships for people of the indigenous communities (131 students from indigenous communities received scholarships from 2017 to 2019), assessment of the Socio-Environmental Impact and permanent monitoring of the zone where the two indigenous communities of Acaraymi (district of Hernandarias) and Itabó Guaraní (district of Nueva Esperanza) are located. Itaipu has also been supporting meetings for the organizational strengthening of the communities of Paso Cadena, Mariscal López, Carreria'i, Loma Tajy, Ka'aguy Roky, Uruku Poty, Ka'aguy Poty and Ka'aguy Yvate in Itakyry district. This activity was also carried out with the Kirito community in Mbarakaju district; Acaraymi and Acaraymi Independiente in Hernandarias district; and Itabó Guaraní, in the district of Nueva Esperanza (ITAIPU, 2018 b)

Related Targets

These activities are related to Targets 4.5 and 4.7. This initiative contributes to quality education with respect to the specificities of the Guaraní culture, stimulating equal access to all levels of education and training for the most vulnerable ones which represent activities directly linked to the objectives of Target 4.5. The activities also support the development of formal and non-formal educational practices in the community, focusing on sustainable development and conscious consumption, and valuing cultural diversity which are more related to Target 4.7.

Challenges

The educational and training processes in indigenous villages have the challenge of adapting to the specificities of Guaraní culture, such as time, language, and way of life. Another challenge is the different way of organizing the community in management processes, from the perspective of the non-indigenous, which makes it difficult to establish partnerships.

Lessons Learned

The educational and training processes must be continuous, and the evaluation of results must also be constant in order to modify training to best fit the indigenous community's needs when necessary. Engaging the indigenous community in decision-making is essential in order to build trust and effectively promote sustainability. Schools play a crucial role in promoting citizenship and supporting relationships between community, school, and partners.

Results

Some of the results of this initiative are as follows:

- Continuing efforts are being made to preserve the culture, language, and way of life of the indigenous communities.
- Training courses have been conducted for the qualification of local handicrafts and the tourist potential of the villages.
- Organic vegetable gardens were developed in the schools of indigenous communities, serving both as an eco-pedagogical tool for sustainability issues and a source for food for meals at school.
- A total production of approximately 270,000 kg of food per year (cassava, maize and pumpkin), in addition to 26,000 kg of organic maize, 585,000 kg of honey, and 5,372 kg of fish produced in net tanks. In the indigenous communities, food is used for both subsistence and commercialization, when there is a production surplus.
- Computers and printers for IT rooms were acquired, supporting the digital inclusion of indigenous peoples.
- An outdoor space for theoretical and practical classes (natural classroom) was constructed in the indigenous communities, allowing for adaptations to cultural specificities.
- More than 3,000 indigenous people were involved in the annual cultural week and in indigenous games.





8.

EDUCATION FOR SUSTAINABILITY IN AGRICULTURE AND FOOD SECURITY



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Objective and Description

The objectives of this initiative are to promote environmental and economic sustainability as well as food and nutritional security in the operational territory of Itaipu (all 55 municipalities in Brazil), encouraging the inclusion of food and nutrition education in the school curriculum, and the development of healthy living practices. This initiative has been in action since 2007.

Itaipu carries out this action in compliance with the principles of government programs such as the National School Feeding Program (PNAE) and the National Sustainable Rural Development Plan (PNDRSS). It is a continuous training process for nutritionists and cooks who work in the municipalities involved. It prioritizes locally produced foods, minimizing environmental impacts of production and boosting the local economy.

In partnership with municipalities, Itaipu offers training courses and organizes healthy recipe contests developed by the cooks who prepare school meals. The selected recipes make up a “healthy recipe book” distributed to all schools and municipal secretariats of education that can use this book as a pedagogical tool.

In this context, the rural extension promoted by Itaipu and partners plays an important complementary role in the research and generation of agricultural knowledge and its diffusion to the rural environment, mainly by working with more sustainable practices and producing organic food.

Related Targets

These actions relate to Targets 4.4 by working to substantially increase the number of youth and adults who have relevant skills, specifically regarding technical and vocational skills of healthy eating and meal preparation, and including indigenous peoples and children in vulnerable situations. This action also relates to Target 4.7, by helping to ensure that all learners acquire the knowledge and skills needed to promote sustainable development and lifestyles by learning how to sustainably grow and consume proper healthy and organic foods.

Challenges

One challenge was the acceptance of change by the cooks. Those who were used to receiving canned food from suppliers started receiving food to be processed instead, which caused changes in thought and routine in the school kitchens. Another challenge was the resistance from municipal education secretariats to organize a new purchasing system that would give value to local production. At this stage of re-education and reorganization, the continuing education courses and healthy recipe contests were fundamental for the acceptance and change in the behavior of the population involved.

- Promoting local family farming
- Integrating school feeding management, the ATER network (Brazilian Entity for Technical Assistance and Rural Extension), farmers and cooks
- Contributing to the drafting of the National Law that determines hiring a nutritionist for the PNAE
- Contributing to the implementation of municipal public policies and fields of action complementary to the PNAE

Lessons Learned

There was greater integration among the segments involved in school meals, such as nutritionists, cooks, technical assistance and families of the farmers, bringing the relationship between production and consumption closer. The use of locally sourced food has resulted in both quality increases and financial empowerment of the small farmer and the retailer, who sells products to the small farmer. This cycle of short chains in the commercialization of family agriculture and public policies contributed to the guarantee of sales and to the safety of planting, keeping small farmers in the field and improving the quality of life of the farmers and the population.

Results

Itaipu witnessed the results of these actions in the following ways:

- Training 480 nutritionists and cooks
- Having over 1,000 school lunch women participate in competitions
- Getting 169 recipes published in healthy recipe books
- Prizes (either in cash for the cooks or in kitchen equipment and utensils for schools)





9.

RESEARCH, DEVELOPMENT AND INNOVATION (R&D+I)



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Objective and Description

One of the objectives for Itaipu is to prospect new lines of research. As a result, Itaipu conducts internal workshops that focus on the demand of employees to improve the plant's operational performance. It also establishes partnerships with educational institutions to provide PhD, Master and specialization courses in the scope of its research projects. This scientific and innovative environment can be seen in the Itaipu courses from UNIOESTE and UNILA. Areas of interest for the organization in R&D+I include production of energy, transmission technologies, dam safety, modernization of the plant, the environment, information technology, social technology, renewable energy technologies, and sustainable electric mobility.

The Dam Safety Advanced Research Center (Ceasb) of the Itaipu Technological Park (ITP) has already trained more than 700 people in dam security, with 22 PhDs. The center develops research solutions for plant safety, mainly for Itaipu. The objective of these studies is to increase the understanding of various phenomena that are involved in the dam and the turbines, which helps increase the safety and useful life of these structures. Ideally, this will allow Ceasb to develop computational

intelligence techniques related to the behavior and safety of dams, and apply their research on the behavior of structures and their respective materials. The simulations, made in high-performance computers at Ceasb's laboratory, are based on data provided by Itaipu to promote technological modernization of the hydroelectric plant. In 2018, Ceasb celebrated 10 years with the objective of expanding its operations through national and international partnerships.

Itaipu also conducts hydrogen research, the objective of which is to develop studies at the Nucleus of Hydrogen Research (UNPHI) that would allow Itaipu to extract hydrogen from surplus water and energy in the future. Stored in large cylinders in the form of gas, hydrogen can be used in fuel cells and can produce electricity to power homes, industries, and even electric vehicles.

In addition, Itaipu's Hydroinformatics International Center, a binational initiative, strives to improve the management of water resources with hydroinformatics solutions, promoting development and innovation, and building capacities to use and disseminate in the field of science and water (ITAIPU, 2018 b).

In 2016, the International Hydroinformatics Centre (CIH), installed in the Paraguayan margin of Itaipu, was certified by the International Hydrological Program Network (PHI-UNESCO) as a Category 2 center. These centers do not receive resources but contribute to the International Hydrological Programme (PHI), mainly through the exchange of knowledge, research and other specialized lines of action. In June 2017, the renewal of the cooperation agreement between the Itaipu and UNESCO was finalized for a new period of 5 years in order to carry out actions in the areas of water sciences, in particular watershed management, hydrological modernization, the development of territorial management tools and environmental monitoring systems. In this way, the aim is to promote a work agenda that will enhance CIH's work and foster its relationship with other similar centers in the region (ITAIPU, 2018 b).

Itaipu also has the objective of disseminating knowledge and the use of renewable energy sources and efficient energy technologies, with an emphasis on biogas, through the development of projects that create new business opportunities and provide energy autonomy for the agricultural and agro-industrial sectors in conjunction with an environmental sanitation process.

Finally, in order to foster research and innovation in technology for the development of mobility solutions, Itaipu seeks to support initiatives for the development of clean and renewable energy sources through Electric Vehicles, with the objective of achieving energy efficiency and sustainable development in the transportation sector of its area of influence.

Itaipu has many partners for the implementation of all its R&D+I activities. Partners with this initiative include the ITP, International Energy Agency, UNESCO, Latin American Energy Organization (OLADE), Federal University of Parana (UFPR), Electric Energy Research Center (Cepel) and the Parana Sanitation Company (Sanepar), among others.

Related Targets

The R&D+I are related to Targets 4.4 and 4.7 since they promote the development of skills in relevant areas related to research, development and innovation. All the training and awareness as well as educational activities support the development of qualified people in the newest technologies, systems and advanced innovative areas relevant to accelerate sustainable development.

Challenges

One challenge is to maintain a close and concerted effort working and communicating with these different partners at the local, regional, national and international levels. Another challenge is staying up to date with the latest technology and development. The R&D+I initiatives are generally costly and the adaptation process related to implementing new technologies and innovative approaches is very challenging.

Results

The most important result from the R&D+I activities of Itaipu in relation to education is that these activities represent an advanced platform for training, education and skill development in the most advanced and relevant technology, systems and programs. The activities are particularly important to the new generations both in Paraguay and Brazil who will need to remain qualified in these promising areas to support sustainable development and prosperity in the future for all the people.

One main result for dam safety was the development of the Itaipu Data Collector System application, which assists in the recording and synchronization of the readings performed in the thousands of monitoring instruments of the Itaipu dam.

For Hydrogen research, analysis of experimental work on the hydrogen life cycle was achieved, along with an improved energy efficiency of the installed plant and the use of hydrogen fuel cells as auxiliary energy systems. Also, Itaipu was able to use the combustion of hydrogen-enriched biomethane and develop new polymer membranes for fuel cells.

For the Renewable Energy Platform, the biogas and biomethane demonstration unit was inaugurated in June 2017, installed in the Itaipu area in Foz do Iguaçu and developed with 100% national technology. An average of 800 kilos per day of grass and 600 kilos per day of organic waste from restaurants are being processed, producing 4,500 square meters of biogas per month, used as biofuel to supply 71 vehicles powered by biomethane (25% of the fleet). The first edition of the Mercosur Biogas and Biomethane report was also prepared, with success stories and information on the potential for the generation of energy from the biomass available in the four countries.

For electric vehicles, the electric vehicle Intelligent Sharing System (SCI) project completed one year of operation and assisted Itaipu and ITP employees in transportation within the Brazilian side of the plant. There have been plans to install another three posts in 2018. Cooperation agreements are under way with the Brazilian army for the installation of an energy storage system in locations that are difficult to access or are isolated. Completion of the Center for Innovation in Sustainable Electrical Mobility was achieved, with more than three thousand square meters distributed in laboratories, offices, warehouses and showrooms. The fleet of electric vehicles helped replace the would-be emissions of 23.84 tons of CO₂ in 2017 and the Electric Vehicle project generated approximately 370 spontaneous articles published in external media during the year.



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10.

**ITAIPU BINACIONAL
SCHOLARSHIP
PROGRAM – ENERGY
FOR EDUCATION**



Víctor Azcona / Itaipu Binacional

Objective and Description

The Itaipu Scholarship Program in Paraguay was established in 2006, with the goal of supporting university training of young, talented Paraguayans. The program provides opportunities to improve their quality of life and contribute to the sustainable development of their communities and the country.

Since its implementation, the Program has awarded more than 15,500 scholarships to young people throughout the country, who have pursued their studies in public and private universities at national level.

Starting with the scholarships awarded in 2019, in addition to support for tertiary education, training in technical fields and languages has been included for young Paraguayans who belong to low-income families and have achieved academic excellence.

The universities that can be eligible are those that have degree programs duly authorized by the National Council of Superior Education (CONES) and/or accredited by the National Agency for the Evaluation of Superior Education (ANEAES).

The requirements of the scholarship selection process

include: the average grades obtained since middle school, an academic evaluation of the basic fundamental competencies, and an evaluation of the socioeconomic situation of the candidate and the candidate's family.

The Ministry of Education and Sciences (MEC) of Paraguay is the State institution in charge of development of the test of basic competencies in Spanish and Mathematics and of delivering these tests to Itaipu. The minimum score required for approval in the test of basic competencies is 24 out of 40 (60% as a minimum performance).

In relation to the socioeconomic evaluation, there are four criteria, and each criterium has a highest point value of four and a minimum of one, with the greater socioeconomic vulnerability receiving the higher point, and vice versa.

Almost 5,500 students applied for the 2019 scholarship competition; almost 2,200 took the competency exams, and almost 1,600 scholarships were awarded for study at the university level, of which 28 were for young people with disabilities and 32 were for young people

from the indigenous communities. In addition, 125 scholarships were awarded for technical studies and 68 for students to learn languages. In total, 1,751 scholarships were awarded in this most recent round.

Related Targets

This program is closely linked to Target 4.3, promoting the equality of access to a higher education and training through the granting of scholarships in a competitive and transparent selection process. It is also linked to Target 4.4 because it allows the youth to gain employment, to a decent job and a good start at life, and to Target 4.5 because youth from indigenous communities or with disabilities can have an advantage from receiving a scholarship.

Challenges

One of the most important challenges for the program is the development of the regulations for the scholarships. These regulations allow scholarships to be awarded to youth with excellent academic qualifications but lacking the economic support necessary to achieve a tertiary or technical education. It was found that in the application process there were some loopholes that allowed some applicants with good grades but also with sufficient economic resources to be able to compete for the scholarships.

Therefore, the control systems to avoid fraud in the socioeconomic evaluation should be strengthened, so that cases can be detected in which applicants have declared domiciles that in on-site visits are found to be eligible for being in precarious conditions but are not the applicants' actual domiciles.

Lessons learned

Itaipu's scholarship program in Paraguay is unique given the number of beneficiaries and its public objective. The program has gained important educational prestige and thousands of youths without

economic means wait each year for the launching of the program to be able to apply and have the opportunity to complete a university career. Many winners become the first ones in their families with a university degree.

A major lesson learned from years of implementation is that without this program, many talented youths lacking economic means would not be able to get their university education and thus would not be able to change their reality or the reality of their families. Therefore, it is very important to continue developing strategies that facilitate access to university education.

Another lesson learned was the need to have the support of the former winners of scholarships in the process so that their experiences could be transferred to the new candidates. Consequently, the Association of Former Itaipu Binacional Scholarship Holders was created. This Association cooperates with Itaipu in spreading awareness about the program, as well as the orientation and instruction of youths all over the country to help them apply to the scholarship program.

It is also important to note that Itaipu, in coordination with other relevant institutions and based on the lessons learned, decided to expand the scholarship program in specific areas aligned with the priority needs for the sustainable development of Paraguay.

Results

- 15,500 scholarships awarded to young people in Paraguay.
- 3,900 young people graduated to date, of which 379 with degrees in medicine, 353 nurses, 186 dentists, 304 graduates in the field of informatics and technology, 283 in areas related to agriculture and the environment, and 472 in business, among others.
- Currently, the program has more than 885 young people studying medicine, 345 civil engineering, 225 architecture, 145 electromechanical engineering, 114 energy and electricity, 97 electronic engineering, 51 mechanical engineering, 116 dentistry, and 178 chemistry, among others.



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11.

**EDUCATIONAL
INFRASTRUCTURE
SUPPORT**



Víctor Azcona /Itaipu Binacional

Objective and Description

Itaipu, in the framework of corporate social responsibility and the compliance of its business mission and vision, has supported the improvement of educational infrastructure in Paraguay, as well as providing equipment to the educational institutions. These actions are mainly taking place in support of the Ministry of Education and Sciences (MEC) and complementing the actions of the national government of Paraguay.

In relation to support for educational infrastructure, Itaipu builds classrooms, sports areas, technological areas, and carries out renovations, painting, improvement of sanitary facilities, electrical systems, and structural reinforcement of the public educational institutions and some private schools administered by for-profit institutions that grant services to persons in vulnerable situations. Concerning the task of providing equipment, the majority of the actions are complementary to the technical teams of the first level and are necessary for the efficient development of the classes.

Itaipu also provides mobile classrooms to support technical training in the specialty areas of welding,

informatics, mechanics, and gastronomy related to motorcycles, electronics, and refrigeration. The goal is to strengthen training in vulnerable areas and isolated zones of Paraguay, to allow for adequate entry into the labor market.

The Mobile Classrooms are structures designed and manufactured to provide security, resistance and durability that function correctly for the achievement of the courses offered by the National Service of Professional Promotion (SNPP).

The installations are covered with thermal and sound-proof insulation, shielded openings, equipped with machines, tools, and furniture for the specific coursework, with inclusive functionality that allows access and mobility for people in wheelchairs.

In addition, the installations have the ability to function even in zones without electricity, and they are equipped with generators that provide energy for the development of the courses.

The classrooms for gastronomy and welding, which are units with large scale equipment, are equipped with a

modular system that can be unfolded and enlarged to 6 by 2 meters, which allows the development of the theoretical part of the courses.

The classroom for the electrical/electronic course has solar panels as a source of energy, introducing students to the concept of renewable energy which is also a topic that is part of the course content.

All of the classrooms have dual bearing systems, with locking devices for trucks so they can be transferred to previously determined locations.

With this initiative, Itaipu seeks to reduce the digital and social gap in rural and urban areas, proposing solutions to the problem of access to educational resources.

Related Targets

With this action, Itaipu contributes to Targets 4.3 and 4.4, since it promotes access of people residing in isolated or vulnerable areas to high-quality technical training. This training allows people to improve their standards of living by means of inclusion in the work force.

Challenges

In relation to the support of infrastructure, it is necessary to coordinate the times of construction and renovation with vacation periods to avoid the disruption of classes. In some cases, the work is done during the school year which forces some classes to be relocated to other places while the construction and renovation work takes place.

Concerning the mobile classrooms, it is very important to secure the sustainability of the project in that, once the classrooms are constructed and delivered, the financing of the travelling and contracting of trainers is done by the state institution for technical training (Servicio Nacional de Promoción Profesional – SNPP).

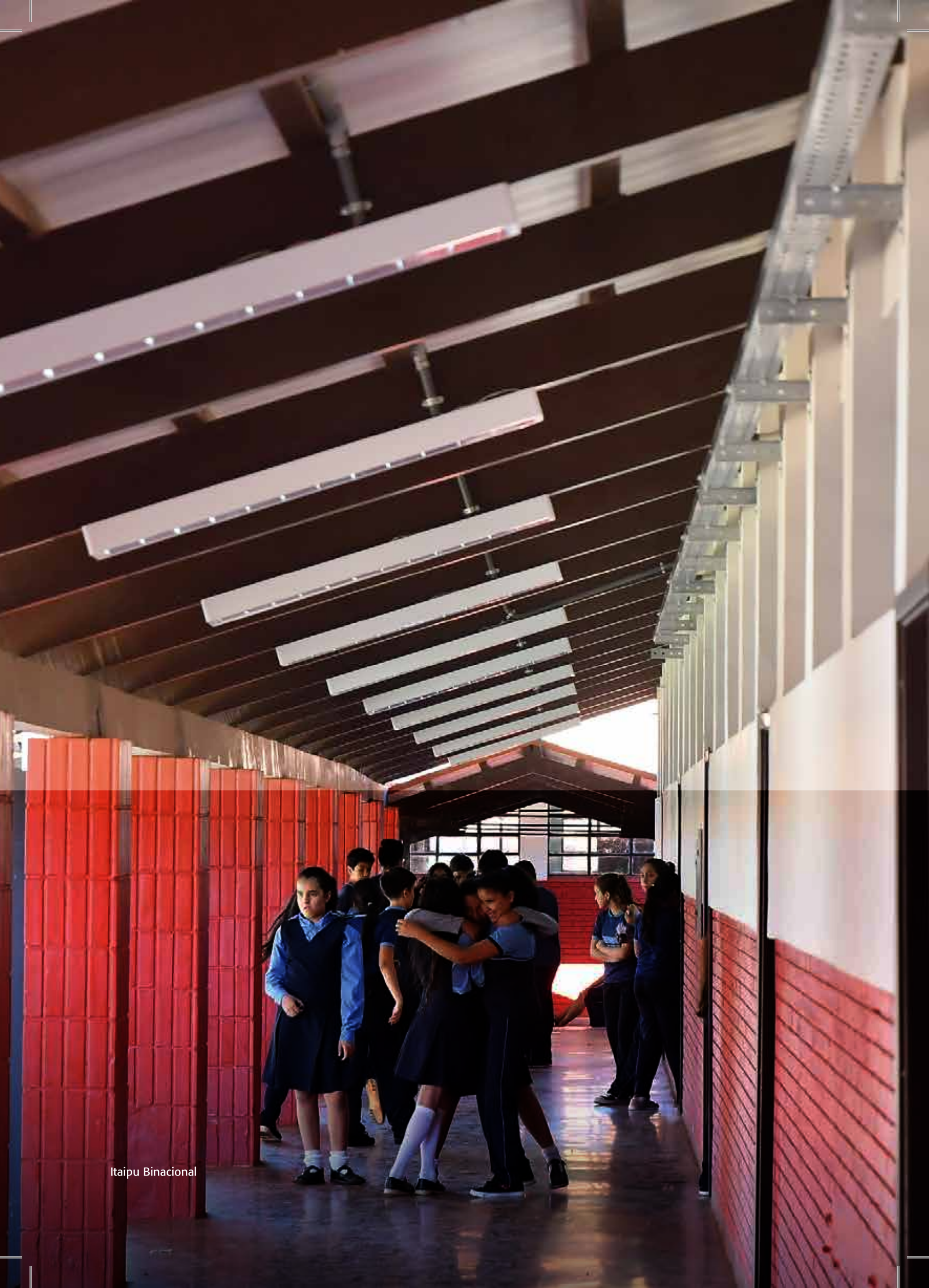
Lessons learned

The support that Itaipu gives to educational infrastructure has allowed people to have access to better educational facilities and conditions as reflected by higher enthusiasm expressed by students. It has also facilitated the coordination of activities with state entities that provide educational services to focus on areas of higher labor demand in the country. For example, the strengthening of agricultural technical schools and other technical schools specialized in industrial manufacturing, electricity and informatics.

Also, the option of technical education through mobile classrooms has been very successful. A large demand for courses offered through this option has been observed given the lower transportation costs for people living in isolated areas or areas with difficult access. Many of the students already have empirical training, and the access to specialized courses and subsequent certification have allowed them to expand their opportunities for jobs and/or for starting their own businesses.

Results

- Seven public educational institutions of Alto Parana were renovated and equipped for the first time in 25 years, benefitting more than 2,000 students.
- Construction, refurbishment and equipping of two technical colleges for more than 1,300 students.
- More than 300 local schools with better facilities, benefitting 240,000 students.
- Construction and equipping of basic schools for 700 students in the San Francisco housing project in Asuncion.
- 12 mobile classrooms built and more than 3,500 people receiving technical training.



Our actions in the SDGs

Our approach - Integrated actions in the territory

Many interlinkages of SDGs can be seen in Itaipu's activities, specifically related to education (SDG 4). It is clear that by assisting families with financial needs in the field of education and providing training opportunities, Itaipu addresses the poverty goal (SDG1) and some of its targets. Sustainable agriculture and food security (SDG 2) is also clearly linked to Itaipu's assistance to local farmers, commitment to sustainability in the environment, organic food, good nutrition and promotion of a sustainable agro-industry. Improvements in Health (SDG 3) with Itaipu's Health Education initiatives are also evident. One of the most valuable interlinkages with other SDGs is related to the environment (SDGs 6 and 15) as Itaipu works with the local partners to create awareness and educate people on the need to protect the Earth and its environment and to promote the maintenance of ecosystem services, including terrestrial and water ecosystems and wildlife. It is also clear that Itaipu's activities related to education, training and protection of adolescents and people with special needs as well as indigenous people are linked to SDGs 16 (peace) and 10 (equality).



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The many sustainable development strategies of Itaipu and its comprehensive programs related to SDG 4, Education, are very valuable for the region. Not only are educational opportunities available to the members of Itaipu's staff, but they are also available to people who live in the region of Itaipu. The Entity's commitment to all aspects in the realm of sustainable development encompasses the many contributions in education as well. The Itaipu Technological Park (ITP) provides specialized technical education and helps socially vulnerable people by providing them with technical qualifications and developing their skills, allowing them to become self-empowered and improving their quality of life. Itaipu's PPCA initiative protects children and teenagers by providing them with employment opportunities, training, and offering them athletic opportunities that promote healthy values while combating potential problems. Itaipu also provides extensive educational courses on sustainability in the fields of Solid Waste Management, Health, Indigenous Communities, Agriculture, and Itaipu Binacional's surroundings.

Therefore, Itaipu is decisively contributing to many targets within SDG 4, ensuring inclusive and equitable quality education, and promoting lifelong learning opportunities for all. Through the use of scholarships and free courses, Itaipu supports education that is affordable to everyone, while focusing on leveraging sustainable networks in order to provide technical and vocational skills for all.

SDG 4 EDUCATION



ITAIPU TECHNOLOGICAL PARK

Awarded **1,800** scholarships and conferred over **3,400** undergraduate graduate, and technical degrees

ITP trained over **700** people in dam safety



Center for **Innovation and Sustainable Electrical Mobility**



Renewable Energy Platform – biogas and biomethane demonstration unit

RESEARCH, DEVELOPMENT AND INNOVATION



ITAIPU scholarship Program benefitted over **3,300** students in 2017, including over **55** from indigenous communities and over **20** with disabilities in Paraguay



Over **2,400** children and adolescents trained in preventive oral health

More than **6,000** adolescents participated in Program for Initiation and Incentive to Work



1,600 youth participate in Program for **Protection of Children and Adolescents** activities annually (Over **1,800** in first half of 2019)

SOCIAL DIMENSION



3 indigenous communities supported in development of organic farming and markets for traditional handcrafts



55 municipalities incorporating food and nutrition education to improve school meals



AWARENESS, MONITORING AND CAPACITY DEVELOPMENT

1,200 people trained in recycling and sustainable solid waste management



Over **35,000** children and adolescents annually visit Bela Vista Biological Refuge, Itaipu Ecomuseum, and Tierra Guarani Museum

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QUALITY
EDUCATION

