EDUCATION IN THE AMAZON REGION

English version

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CONTENTS

1 EXECUTIVE SUMMARY

THE AMAZON REGION EXTENDS OVER EIGHT COUNTRIES: Bolivia, Brazil, Colombia, Ecuador, Guyana, Peru, Suriname, and Venezuela. Almost 37 million inhabitants, one third of them under 18 years of age, currently live in its 7 million km^2. This vast area comprises similar geographic, cultural, and environmental features, as well as a common challenge: the Amazon urgently needs a new development model that allows its population to thrive socioeconomically while protecting the forest. Educational investment stands at the basis of this model as a fundamental process at all stages of life.

Compiling statistics to analyze the state of education in the Amazon requires coping with an inherent data comparability-challenge, as disaggregated data is not always available for the same territories. This document focuses on delivering information and solutions aimed at policymakers. Its analyses and comparisons consider four main groups of indicators on **national averages, Amazon region, rural Amazon areas, and Indigenous territories**, based on a framework that relates a diverse set of problems, causes and solutions, as shown in the table below.

This document focuses on delivering information and solutions aimed at policymakers. Its analyses and comparisons consider four main groups of indicators on national averages, Amazon region, rural Amazon areas, and Indigenous territories.

Education in the Amazon Region: Summary of problems, causes and potential solutions

Problem	Cause	Solutions and programs/initiatives
1. Low completion rates Less students are finishing education at the right time in the Amazon compared to other regions	**i. Late and disrupted pathways** Children enroll later, leave earlier than expected, and/or have interrupted educational pathways	**Expansion and quality of infrastructure** **Provision of alternative educational models** • Synchronous remote teaching and hybrid learning experiences • Schools with adapted calendars and spatial organization **Availability of qualified teachers** **Pertinent abilities** • Green citizenship • Skills for green economy (Technical Education and Vocational Training) • Intercultural bilingual education **Learning recovery and permanence:** • Acceleration programs • Pregnancy prevention and schooling of parenting teenagers • Systems to protect educational pathways
	ii. Barriers to access Reduced access to educational centers, preventing students' enrollment	
2. Low learning outcomes Students perform less in standardized tests. This suggests that they are learning less than their peers outside Amazonian territories	**i. Lack of pertinent education** Low relevance/applicability of classes, especially for traditional communities and high school students	
	ii. Insufficient availability and quality of teachers Lack of qualified teachers in remote areas	
	iii. Low quality of infrastructure Inadequate infrastructure for specific needs in the Amazon and lack of equipment for a 21st century-education	

Challenges in the Amazon region

The Amazon region faces several educational challenges in terms of access, quality, and cultural relevance, leading to lower levels of skill development and, therewith, to lower outcomes in terms of opportunities, growth, and environmental attention.

Low completion rates (less students in the Amazon complete their educational trajectories at the right time): The overall secondary education completion rate in the Amazon is lower than national averages (54% vs. 69%). A trend can be identified along the two stages of basic education: in primary education, in the Amazon region most countries have net attendance rates above 90%, which are comparable to their national averages. But in secondary education, the attendance-gap between the Amazon region and the national average widens as students get older. Going deeper in the analysis, when comparing urban and rural areas, differences are even greater. For instance, in Colombia, 7 out of 10 adolescents in school age attend secondary learning nationwide, while in its rural Amazon areas, the secondary attendance rate drops to 5 out of 10.

Low learning outcomes (students who stay in school are not learning as expected): The results of learning assessments in science, mathematics and reading show differences of up to 17 p.p. between national and Amazonian averages. One of the biggest factors affecting this challenge is the the lack of **pertinent education**, where the curriculum often fails to reflect the cultural contexts or

environmental realities of the region. This issue affects the engagement of all students in the Amazon but especially impacts indigenous populations, who have a 7 p.p. higher rate of early **school leavers** in secondary education, together with a completion rate 14 p.p. lower than their non-Indigenous peers. Other important factors are insufficient **teacher's training**, with less teachers having a college degree, and high temporary contract rates; alongside a lack of **infrastructure**, with schools in the Amazon having less access to items such as electricity and electronic devices.

Solutions and Cases of Success

Overcoming these challenges requires a consistent and committed set of policies and programs. The document describes different interventions assessed in the Amazon and similar contexts, as well as their ability to contribute to this aim. They include successful practices on how to expand infrastructure and provide quality education to remote places; how to improve teachers' quality and offer pertinent education; and how to stimulate permanence and accelerate learning among retained students.

Expansion and quality of infrastructure: The observed solutions include the use of technology to map the demand for school services, and prioritizing investment to build schools that are climate change-resilient, sustainable and mindful of the learning community's traditions (ethno-engineering). Three cases from Brazil and Peru are presented: *Aldeia Infantil, Mazaronkiari* and *Chuquibambilla*.

Provision of alternative educational models: These models include examples of how to reach students in remote communities and overcome geographical distances:

- **Synchronous remote teaching and hybrid learning experiences:** Technology-Mediated Education forms, such as Media Centers in Brazil, are providing remote synchronous education to regions in which building schools and hiring specialized teachers is particularly challenging. Asynchronous learning platforms such as *Kolibri* (implemented in Honduras), are also described in detail.
- **Schools with adapted calendars and spatial organization:** An additional option to ensure education in remote communities, where the number of students is small and distances are long, is adapting a boarding school-regime. In this regime, students spend a few consecutive days at school, where they are able to study, socialize, eat and rest, interspersed with the time spent at home.

Availability of qualified teachers: The document describes cases that offer alternatives to attract and retain teachers in remote areas. Examples from Peru and Ecuador show that implementing centralized systems to select and allocate professionals can have a significant impact. Interventions to attract qualified students to the teaching-career may also make a positive difference.

Pertinent abilities: The ability to teach pertinent abilities means conveying useful knowledge for the local context and environment, thus making classes more interesting for Amazonian students.

- **Green citizenship:** Students living in the Amazon region must be empowered to care for and protect the forest. Adaptations in education systems can foster the development of green citizens with the knowledge, values, and capacity to act on behalf of the environment.
- **Skills for green economy:** Technical and Vocational Education and Training (TVET) can allow transitioning to sustainable development models with biodiversity conservation and resource management, sustainable development of local value chains and poverty alleviation. Examples of a Technical Training Course on Açaí Processing in Brazil and a project to help young people enter the audiovisual industry in Colombia are presented.
- **Intercultural bilingual education (IBE):** IBE regards the promotion of relevant education for Indigenous students from communities with distinct languages, cultures, and ways of life. The successful case of JADENKÄ, a mathematics program created in Panama which has been replicated in other countries, is shown.

Learning recovery and permanence: The document also presents promising programs that can help students keep up with the content, and act to address the factors that prompt them to abandon school:

- **Acceleration programs:** Acceleration programs prioritize fundamental skills, customized learning, constant monitoring with a focus on results, and the enhancement of connections and socio-emotional skills. Positive cases include a remote tutoring program in the Brazilian state of Pará, and the implementation of program *Teach at the Right Level* in four Amazonian municipalities.
- **Pregnancy prevention and schooling of parenting teenagers:** Integrated interventions such as sexual education, access to health services and support to young mothers' continued studies have a positive impact in reducing dropout rates among girls.
- **Systems to protect educational pathways:** Include Early Warning Systems (EWS) to predict which students may face challenges in their educational process and prevent dropout. Examples from Peru, which implemented the *Alerta Escuela* platform, and Brazil, with a program that helped prevent student absenteeism and dropout, are presented.

An additional layer of complexity, encompassing both challenges and solutions, regards governance and management. Educational management involves assessing demands and creating strategies and guidelines to steer action, as well as monitoring and accountability mechanisms. This process has not yet unfolded with the desired harmony in several parts of the Amazon, especially between governance instances representing the national, local, and school levels. National governments have difficulties in identifying specific needs in the region, while local governments frequently experience a lack of technical or financial resources. Engaging in open dialogues with the relevant stakeholders and considering the region's particular challenges are key factors that may contribute to improving the implementation of sound educational solutions.

2 OBJECTIVE OF THIS STUDY

THE AMAZON REGION IS A LIVING MOSAIC of countries and peoples. But despite their distinctions, these countries comprise similar geographic, cultural, and environmental features. In 2023, the Inter-American Development Bank (IDB) launched **Amazonia Forever**, a comprehensive umbrella program with the aims of expanding funding, sharing strategic knowledge with decision makers and increasing regional coordination to bolster inclusive and sustainable development. Considering the climate crisis and the growing scientific consensus that the Amazon Basin is approaching an ecological tipping point, a new development model has become urgently necessary. This new model must keep the forest standing, while fostering environmental consciousness and creating new economic possibilities beyond extractivism for populations of the region.

Investing in education is an imperative requirement for establishing this new development model. Education is a fundamental process at all stages of individual development, with significant impacts on wellbeing, quality of life, income levels, health conditions and life expectancy (Ortiz et al., 2021). As the present document shows, the Amazon region is facing several educational challenges in terms of access, quality and cultural relevance, leading to lower levels of skill development and, therewith, to modest outcomes in terms of opportunities, growth and environmental attention.

Amazonian citizens may realize the relevance of the region where they live, as well as the seriousness of the need to preserve it. Yet, they must count on the necessary tools for adequately exercising their stewardship of the forest. Likewise, they must be empowered to produce a positive impact as they grow up and develop their

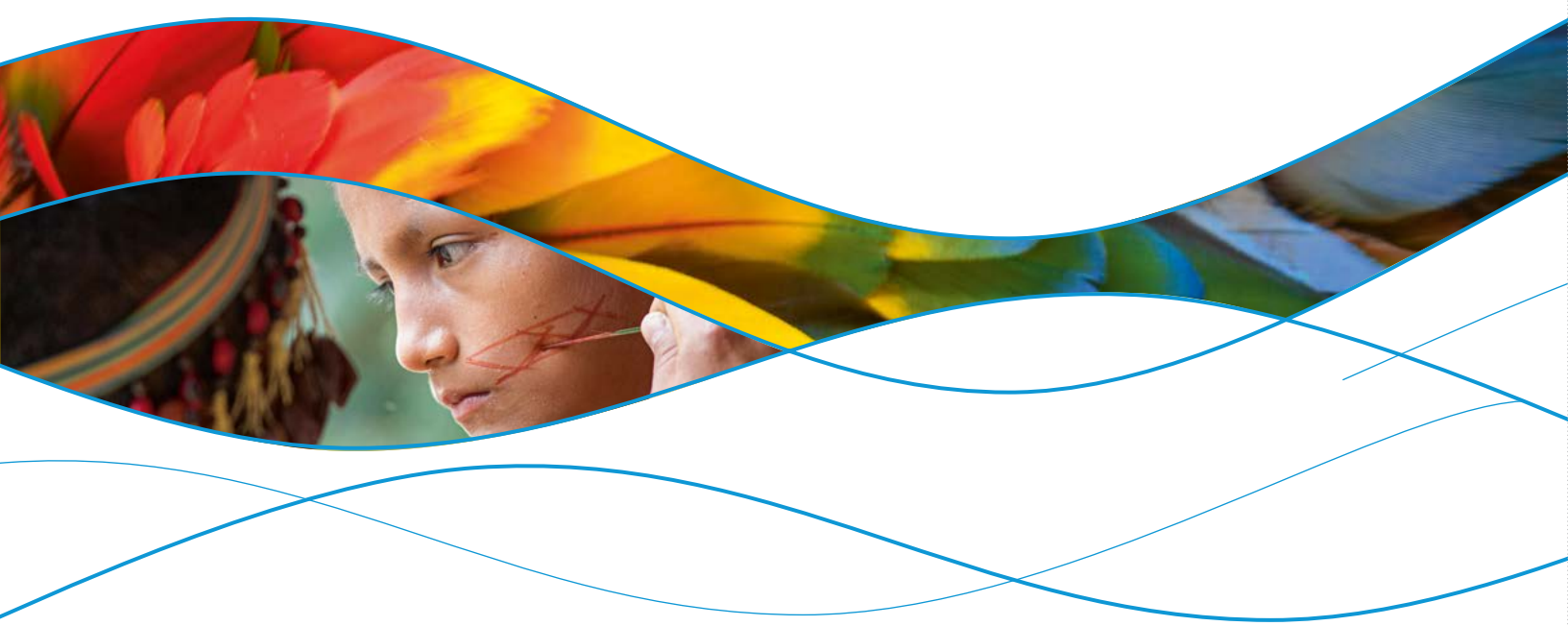
skills. For the new generations, this consciousness may be fostered at schools, where the local populations may develop the necessary skills and knowledge.

Bearing in mind this imperative challenge, the IDB is concentrating efforts on discussing the challenges and opportunities for education in the region, with particular attention to its unique features and, at the same time, to its inner heterogeneity.

This study presents key educational challenges identified in Amazonian countries as a contribution for understanding their causes and outlining potential solutions. It is the first IDB document of its kind, bringing specific information with this focus. As such, it gathers data from a large number of countries on education and seeks to convey a vision of the distinctions identified between the national perspectives and the overall scene in the Amazon.

The document has three sections. The first section introduces the Amazonian setting and explains the criteria used for its definitions in connection with it. The second section, in turn, examines the current structure of regional challenges by approaching its two main educational problems – low completion rates and low learning outcomes –, as well as the key causes that account for them. Finally, the third section explores potential solutions and presents ideas for overcoming current challenges, with examples of opportune initiatives that have been tested either in the Amazon or in similar contexts.

The ability to investigate such challenges helps us reflect on intervention paths that may contribute to reversing the current scene. Further, the IDB's Education Division is already active in the region, working in partnerships with governments and other organizations that are implementing concrete projects. The results of these projects are also valuable inputs for assessing effective alternatives, as we look to the future. Finally, the regional focus underscores how much policy makers across Amazonian countries can mutually benefit from their exchanges to address common challenges, identify optimal solutions and implement them.



3 CONTEXT

THE AMAZON IS KNOWN WORLDWIDE for its exuberant biodiversity, which extends across eight countries: Bolivia, Brazil, Colombia, Ecuador, Guyana, Peru, Suriname and Venezuela. The Amazonian area covered by this document encompasses a population of approximately 37 million inhabitants, including 12 million children and adolescents under 18 years old. The school-age population from 6 to 17 years old includes a total of 8 million children and adolescents, of which 6% (or 0.5 million) are Indigenous and 60% (or 4.8 million) are Afro-descendants.[1]

Three definitions stand out in regard to the Amazon region:

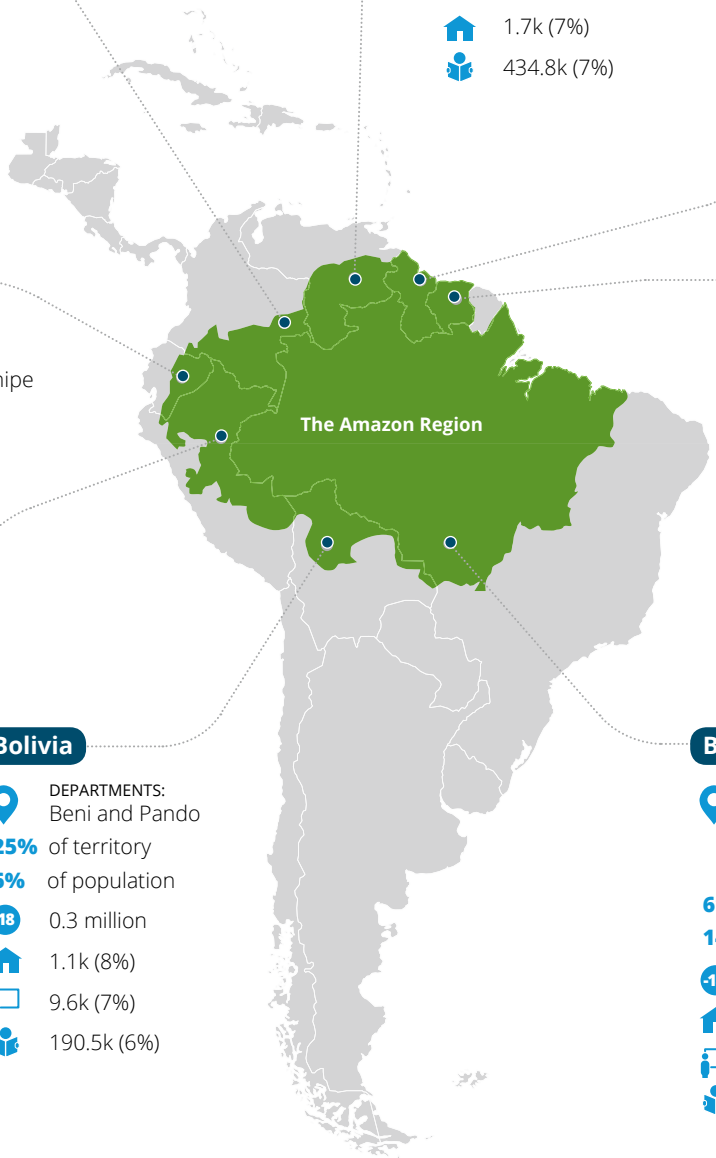
i. **the Amazon Basin**, which is related to hydrological criteria and includes high land areas;
ii. **the Amazon Biome**, defined as the area covered predominantly by the dense moist tropical forest, with relatively small portions of other types of vegetation such as savannas, floodplain forests, grasslands, swamps, bamboo and palm forests; and
iii. **the Amazon Rainforest**, also called Amazon jungle or Amazonia, which is a moist broadleaf tropical rainforest in the Amazon biome covering most of the Amazon Basin.

The initial aim of this document was to use the first definition – the Amazon Basin – for prioritizing intervention areas in the eight countries covered by the **Amazonia Forever** initiative. However, a number of small adaptations[2] were required, since disaggregated data was not always available for the same territories. As presently considered, the Amazon Basin encompasses a total of 7 million km², of which 5.5 million km² are covered by rainforest.

1. From this total, 4.7 million Afro-descendants live in Brazil. Most of the countries have a small Afro-descendant population in the Amazon Region. Yet, in Suriname, the proportion of Afro-descendant children aged 6-17 is 45%. According to Guyana's Census of 2012, the country's largest ethnic groups are: 39.8% inhabitants of East Indian descent, 29.3% of African descent, and 10.5% of Amerindian descent (National Bureau of Statistics).

2. The methodological criteria used to compile the best possible statistics for this study are explained in Annex 1.

MAP 1. Amazon Definition for this Study[3]



Colombia

DEPARTMENTS: Amazonas, Caquetá, Guainía, Guaviare, Putumayo, and Vaupés

42% of territory

<2% of population

-18 0.2 million

2.9k (6%)

10.3k (3%)

155.7k (2%)

Venezuela

STATES: Amazonas and Bolívar

51% of territory

7% of population

-18 0.5 million

1.7k (7%)

434.8k (7%)

Guyana*

Entire territory is considered part of the Amazon region

-18 0.23 million

729 (100%)

15k (100%)

150k (100%)

Ecuador

PROVINCES: Sucumbíos, Napo, Orellana, Pastaza, Morona Santiago, and Zamora-Chinchipe

43% of territory

5% of population

-18 0.5 million

2.3k (14%)

16.2k (8%)

273.3k (7%)

Suriname*

Entire territory is considered part of the Amazon region

-18 0.19 million

572 (100%)

10.4k (100%)

140k (100%)

Peru

DEPARTMENTS: Loreto, Ucayali, Madre de Dios and Amazonas

60% of territory

7% of population

-18 1 million

5.4k (13%)

26.4k (9%)

486.3k (10%)

Bolivia

DEPARTMENTS: Beni and Pando

25% of territory

6% of population

-18 0.3 million

1.1k (8%)

9.6k (7%)

190.5k (6%)

Brazil

STATES: Amazonas, Acre, Roraima, Rondônia, Pará, Amapá, Tocantins, Mato Grosso, and Maranhão

61% of territory

14% of population

-18 8.9 million

38.7k (23%)

314.3k (17%)

5,222k (18%)

KEY FOR INFORMATION WITHIN THE AMAZON REGION

k=Thousands

Province/ Department/ State

Number of Schools (country's %)

-18 Population under 18 years old

Number of Teachers (Country's %)

Number of Students (Country's %)

Note: Both Suriname and Guyana are fully considered as parts of the Amazon. However, for a number of intra-country comparisons necessary for this report, proxies are used to differentiate Amazon and non-Amazon areas. For Guyana, wherever possible, there are comparisons between hinterland (interior) and coastal (non-hinterland) areas as proxies for Amazon and non-Amazon areas. Although hinterland regions contain urban settlements, most urban concentrations appear at the coastal areas. And for Suriname, wherever possible, there are comparisons between urban and rural areas as proxies for Amazon and non-Amazon areas.

Sources: Household surveys for population data (ages 0-18). For the number of schools, teachers, and students in the Amazon, information is from school censuses. Household surveys: the same used in Figure 1 and onwards. School censuses: Data on primary, lower, and upper secondary education from the most recent school census available for each country close to 2022.

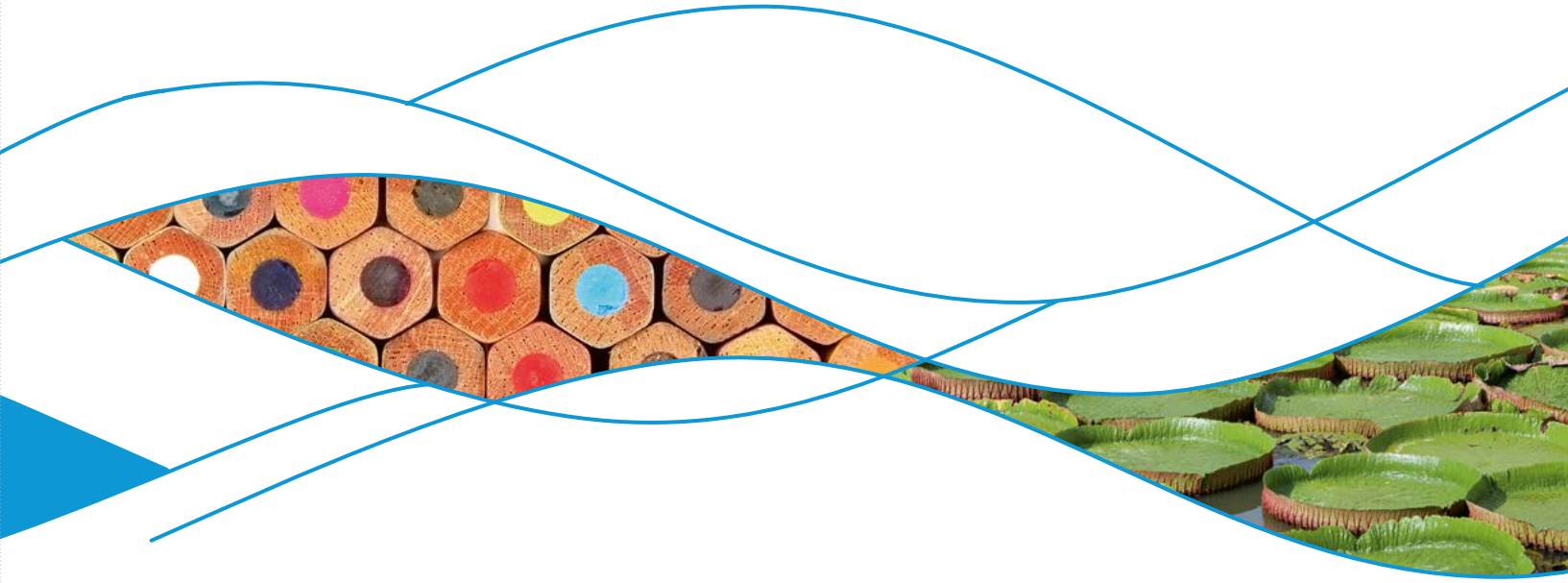
3. Details regarding the criteria used, demographic data, basic learning figures and educational structure for each country are presented as a table in Appendix 1.

The attempt to compile statistics on education for the entire Amazon region must cope with an inherent data comparability-challenge. First, the available educational statistics officially publicized by the countries of the region are highly heterogenous. Further, the data reported by each country is based on a specific definition of indicators and its respective criteria, which limit the ability to make comparisons and carry out aggregated data analyses. Bearing in mind these limitations, the countries' national household surveys become the main source of information for obtaining a reliable overview of the state of education in the Amazon. Household surveys have two key comparative advantages. First, they enable the obtainment of updated data that reflects the post-pandemic situation in the region. Second, by means of a harmonization-process, they allow building comparable indicators across the countries of the study, making aggregated analyses possible. However, national household surveys still present challenges in terms of ensuring sufficiently large samples for specific geographic areas or populations, such as Indigenous groups, requiring specific methodological strategies to ensure statistical representativeness. It is worth pointing that while the use of national censuses would allow for a larger number of observations – and, therefore, for enhanced statistical representativeness –, the data from national censuses dates back to more than a decade ago in some countries, which would not enable an updated overview of the state of education in the Amazon.

The concerted effort to compile data on the education-landscape in the Amazon enables the identification of key shared challenges throughout its vast territory.

Importantly, one of the key findings is the need for more comprehensive, quality data on education across Amazonian countries, to fully enable an adequate understanding of the educational landscape and inform future policies and interventions. This may be achieved through initiatives that harmonize the official data from the national ministries of education, so that comparable indicators may be built for the entire region, as well as through extensive work with other statistical information sources such as household surveys, as has been done within the framework of this report.

The concerted effort to compile data on the education-landscape in the Amazon enables the identification of key shared challenges throughout its vast territory. The region is facing infrastructure-obstacles, including limited access to basic services such as electricity, water and internet connectivity. In the realm of education, all countries were found to have lower completion rates, as well as lower learning outcomes in Amazonian areas vis-à-vis their national averages. This means that a significant number of children and young people are not finishing school, and that those who are finishing might not be learning adequately. The gap widens even more in rural areas of the Amazon and among Indigenous populations.
These challenges will be further detailed in the next sections.



4 EDUCATIONAL CHALLENGES

TO IDENTIFY THE KEY CURRENT CHALLENGES, the available educational data[4] on Amazon areas in each country was compared with the national averages and/or data on non-Amazonian territories. In general, the territories comprising the Amazon tend to have slightly lower educational outcomes than the national averages of the eight countries. Specific analyses were conducted for better understanding the main challenges within the Amazon region by comparing urban and rural areas, as well as Indigenous and non-Indigenous populations. Considering the heterogeneity of the Amazon's territory and the diversity of its features, this type of analysis is greatly important for understanding the principal challenges and ways in which they are particularly concentrated in interior/rural areas and Indigenous communities.

The outcomes of this analysis were categorized into **problems** and underlying **causes**, with the aim of providing clearer insights into the challenges faced by the region and factors that affect its long-term development. In an ideal educational setting, students would complete basic education and attain satisfactory learning levels before leaving school. However, in the Amazon, a large number of children are experiencing deficiencies in these essential results.

The analysis identifies **two main problems:**

i. **Low completion rates:** Less students in the Amazon are staying in school long enough to complete their educational trajectories at the right time;
ii. **Low learning outcomes:** The students who stay in school are not learning as expected, both in terms of basic skills such as math and reading, and of pertinent contents for the Amazon context.

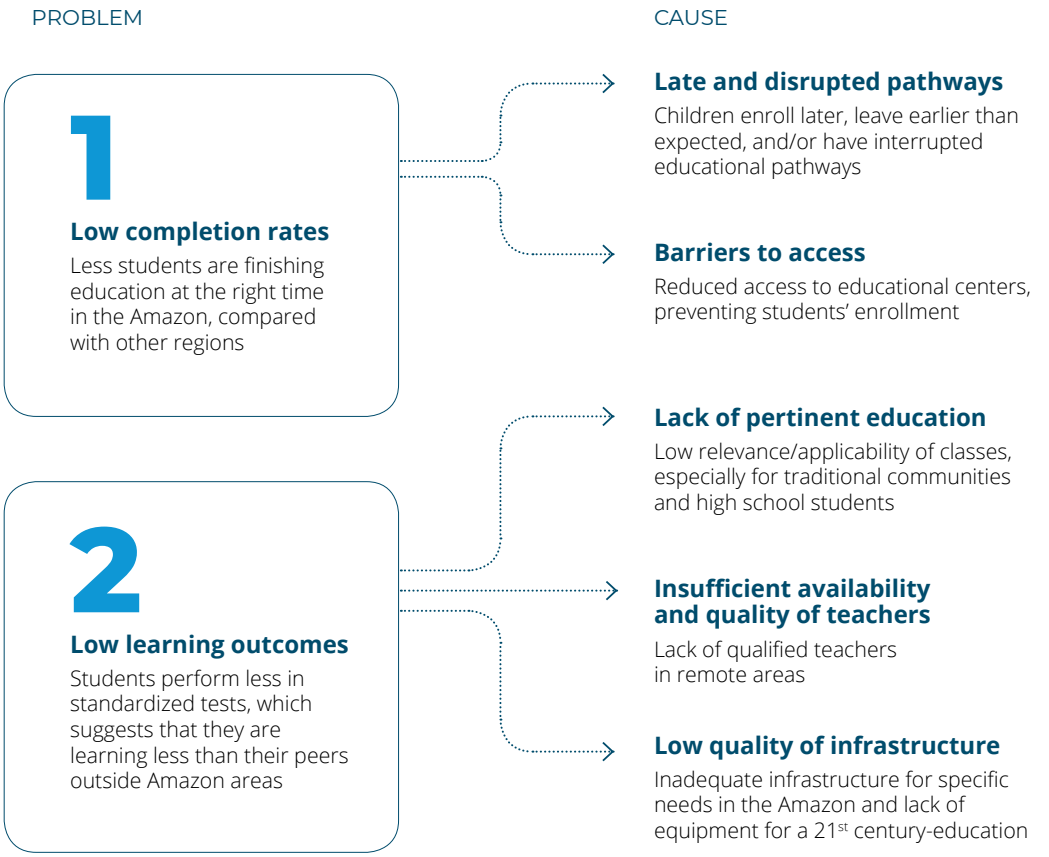
4. The analysis was performed considering primary and secondary education. Educational structures vary among countries but, on average, primary education includes students aged 6 to 11 years, while secondary education covers students aged 12 to 17 years. For further details on the groups and ages covered by primary and secondary learning in each country, see Appendix 1.

In an ideal educational setting, students would complete basic education and attain satisfactory learning levels before leaving school. However, in the Amazon, a large number of children are experiencing deficiencies in these essential results.

The first problem is associated with causes such as late enrollment, interrupted educational pathways and low school coverage. Consequently, children do not enter school at the appropriate time, and, for various reasons, they leave school sooner than they should. One of the main factors for this is the high personal burden of attending class, since schools are often distant from students' homes. The second problem, in turn, is linked to factors such as the low pertinence or applicability of the content taught, teacher shortages and the lack of quality infrastructure. Altogether, these factors tend to result in insufficiently meaningful experiences and prompt low learning levels.

Sections 4.1 and 4.2 below offer a deep dive into each of these two problems and their main causes, which are summarized in the following table.

FIGURE 1. Overview[5] of Problems and Their Causes



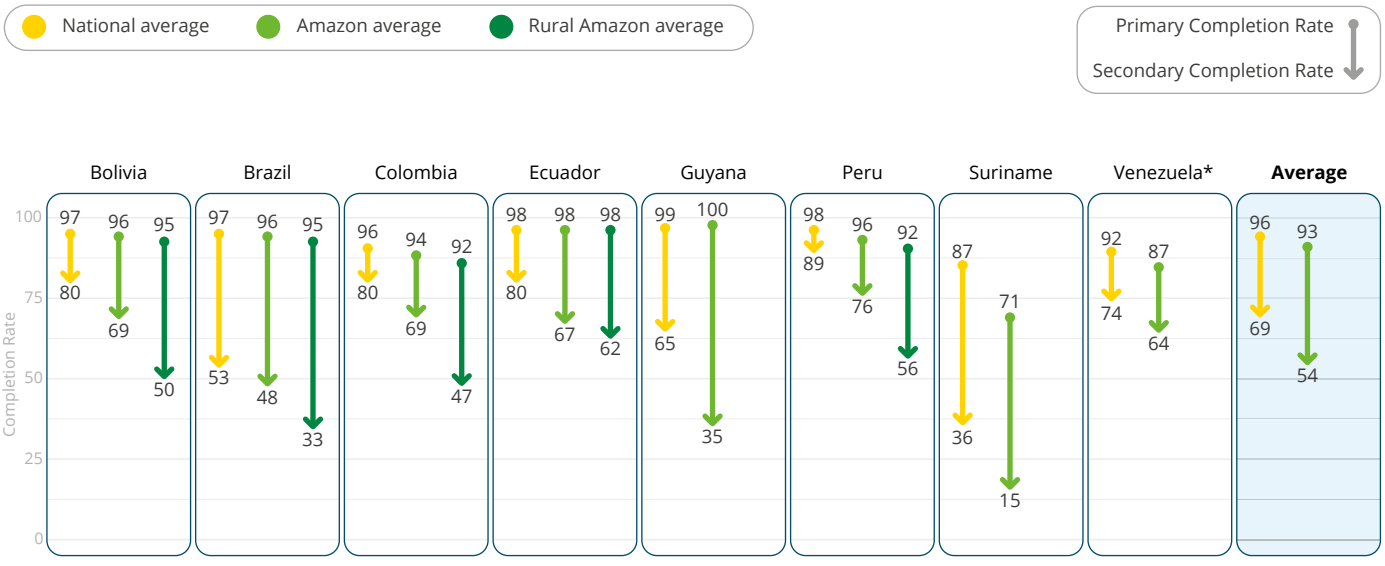
5. This structure and definition of problems, causes, and variables aims to facilitate a comprehensive understanding of the issues involved in the topic of this publication, based on the available data. However, the authors acknowledge the complexity of the educational obstacles and the inter-relatedness of factors such as access, retention, learning quality, and completion.

4.1 Low Completion Rates

In the Amazon, less students are staying in school throughout the basic educational cycle and finishing studies at the right time. In **primary school**, completion rates are practically universal. Considering the average of the eight countries, **96%** of children are currently finishing primary school. The figure drops to **93%** in the Amazon region – which can still be seen as a positive rate, considering the context.

However, in **secondary education**, a severe overall drop becomes visible. For the average of the eight countries, only 69% of young adults aged 18 to 20 years have completed secondary education. This percentage decreases to 54% among young adults residing in the Amazon region. While completing secondary education remains a challenge for the entire Latin American region, the situation is more critical in the Amazon, particularly in rural Amazonian areas. The data from Bolivia, Brazil, Colombia, Ecuador and Peru reveals differences of approximately 20 p.p. in secondary education completion rates between national averages and rural areas of Amazonian territories.

FIGURE 2. Completion Rates, Primary and Secondary Education:[6]
National Averages vs. Amazon Region vs. Amazon Rural Areas (8 Countries), circa 2022



Sources: Data from harmonized national household surveys. ECH 2018-2021, Bolivia; PNADC 2021-2022, Brazil; GEIH 2022, Colombia; ENEMDU 2022, Ecuador; LFS (1st, 2nd and 3rd trimesters of 2021), Guyana; ENAHO 2022, Peru; SLC 2022, Suriname; ENCOVI 2021, Venezuela[7]. The average is calculated as a simple mean of the national and Amazon region rates, except for Venezuela, where the indicator's calculation is slightly different. Data on some rural Amazon areas is either unavailable or insufficient for producing statistical significance. In these cases, the data was not presented.

6. Completion rate in primary education: percentage of individuals aged 12-14 who completed primary education.
Completion rate in secondary education: percentage of individuals aged 18-20 who completed secondary education.

7. In Venezuela, the data on primary education completion rates represents the percentage of the population aged 15-64 who have completed primary education. Additionally, the secondary education completion data reflects the percentage of the population aged 20-24 who finished secondary education. This method diverges from the standardized data approach used for the other countries, as these figures were obtained directly from the official Venezuelan ENCOVI webpage.

The main causes of low completion rates identified in this document are:

i. **Late and disrupted pathways**, with less children attending school as a result of having started later than the appropriate age, or of having their trajectories interrupted and/or leaving school early; and
ii. **Barriers to access**,[8] leading to difficulties in finding a nearby school or available school seats.

i. Late and Disrupted Pathways

The challenge of completing basic education starts with the challenge of enrollment at the appropriate age. Students typically begin primary education in the Amazon at the age of 6 years old. Despite the overall high enrollment rates at the expected entry age, there is a trend of lower coverage in the Amazon region compared to the national averages, particularly in Bolivia, Brazil, Colombia, Guyana and Peru, which can impact the students' future educational pathway.

TABLE 1. Age of School Entry in Each Country and Percentage of Children Enrolled in School at Entry Age (7 Countries), circa 2022

Country	Entry age (primary school)	National average	Amazon	Difference in p.p. (Amazon average – National average)
Bolivia	6	97%	95%	-2.0
Brazil	6	97%	95%	-1.9
Colombia	6	93%	91%	-2.0
Ecuador	5	97%	98%	0.4
Guyana	5	94%	91%	-3.5
Peru	6	86%	83%	-2.2
Suriname	6	99%	99%	0.1
Average	**6**	**95%**	**93%**	**-1.6**

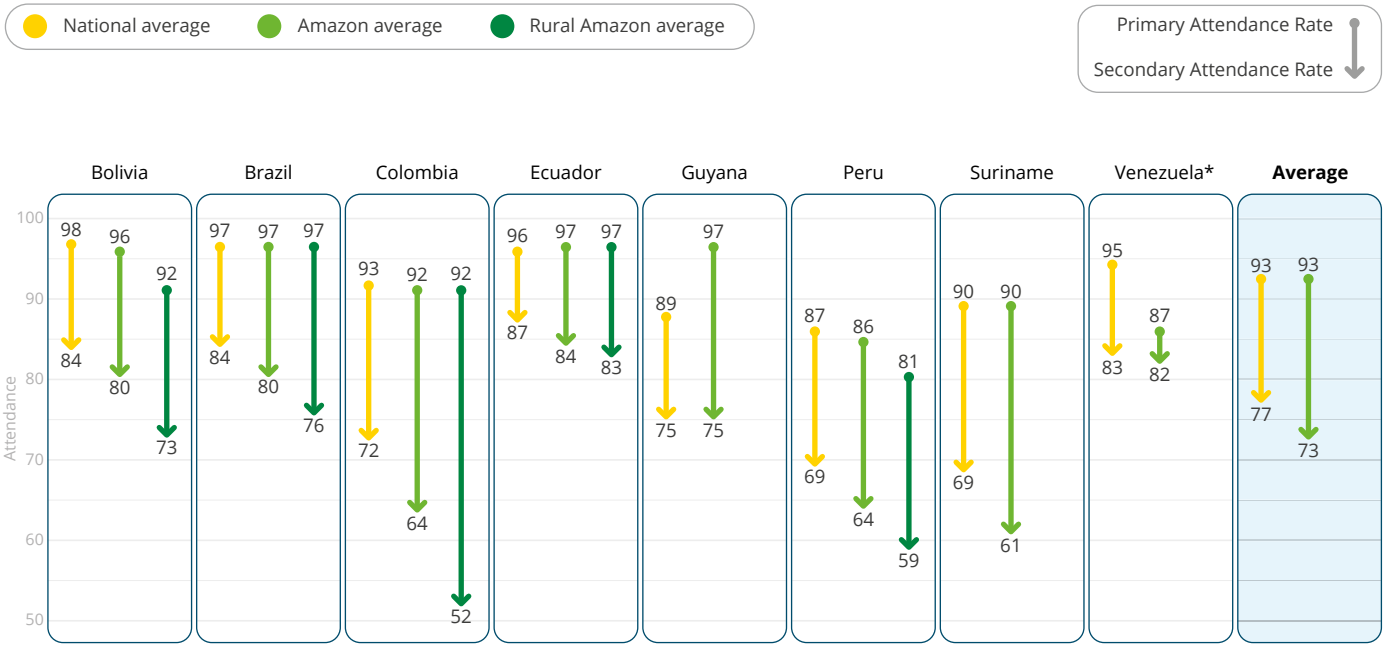
Sources: Harmonized data from national household surveys. ECH 2018-2021, Bolivia; PNADC 2021-2022, Brazil; GEIH 2022, Colombia; ENEMDU 2022, Ecuador; LFS (1st, 2nd and 3rd trimesters of 2021), Guyana; ENAHO 2022, Peru; SLC 2022, Suriname. The average is the simple average of the countries listed in the table.

Note: Brazil requires child enrollment starting at the age of 4 years old, in pre-school. However, this study does not cover preschool, only primary and secondary education.

Students also stop going to school during their educational trajectory, as shown by attendance rates. In primary education, most countries have net attendance rates above 90%, both in Amazonian and non-Amazonian regions. However, in secondary education, the gap widens as students get older, thus revealing the challenge of retaining them. The situation is more acute in the Amazon region, where the gap between primary and secondary education increases. This gap becomes even wider when comparing urban and rural areas within the Amazon. For instance, in Colombia, 7 out of 10 adolescents in school age attend secondary school nationwide. In the Colombian rural Amazon, the rate drops to 5 out of 10.

8. Because of its importance, low school coverage is presented as a separated cause, even though it is known that it can increase late enrollment or interrupted trajectory rates.

FIGURE 3. Net Attendance Rates in Primary and Secondary Education[9]: National Averages vs. Amazon Region vs. Amazon Rural Areas (8 Countries), circa 2022



Sources: Harmonized data from national household surveys. ECH 2018-2021, Bolivia; PNADC 2021-2022, Brazil; GEIH 2022, Colombia; ENEMDU 2022, Ecuador; LFS (1st, 2nd and 3rd trimesters of 2021), Guyana[10]; ENAHO 2022, Peru[11]; SLC 2022, Suriname. ENCOVI 2021, Venezuela (*).[12] The average is calculated as a simple mean of the national and Amazon region rates, except for Venezuela, where the indicator's calculation is slightly different. Data on some rural Amazon areas is either unavailable or insufficient for producing statistical significance. In these cases, the data was not presented.

The evidence above shows that many students are leaving school early. Some national surveys can help identify the reasons behind it. In Colombia, Ecuador, Peru, Guyana, Suriname and Venezuela, the main reasons for dropping out are economic problems, challenges of access, and a lack of interest in education. The situation is generally worse in secondary education, reaching particularly alarming levels in the Amazon region.

9. Percentage of children within the officially recognized age range for primary and secondary education who are effectively attending school.

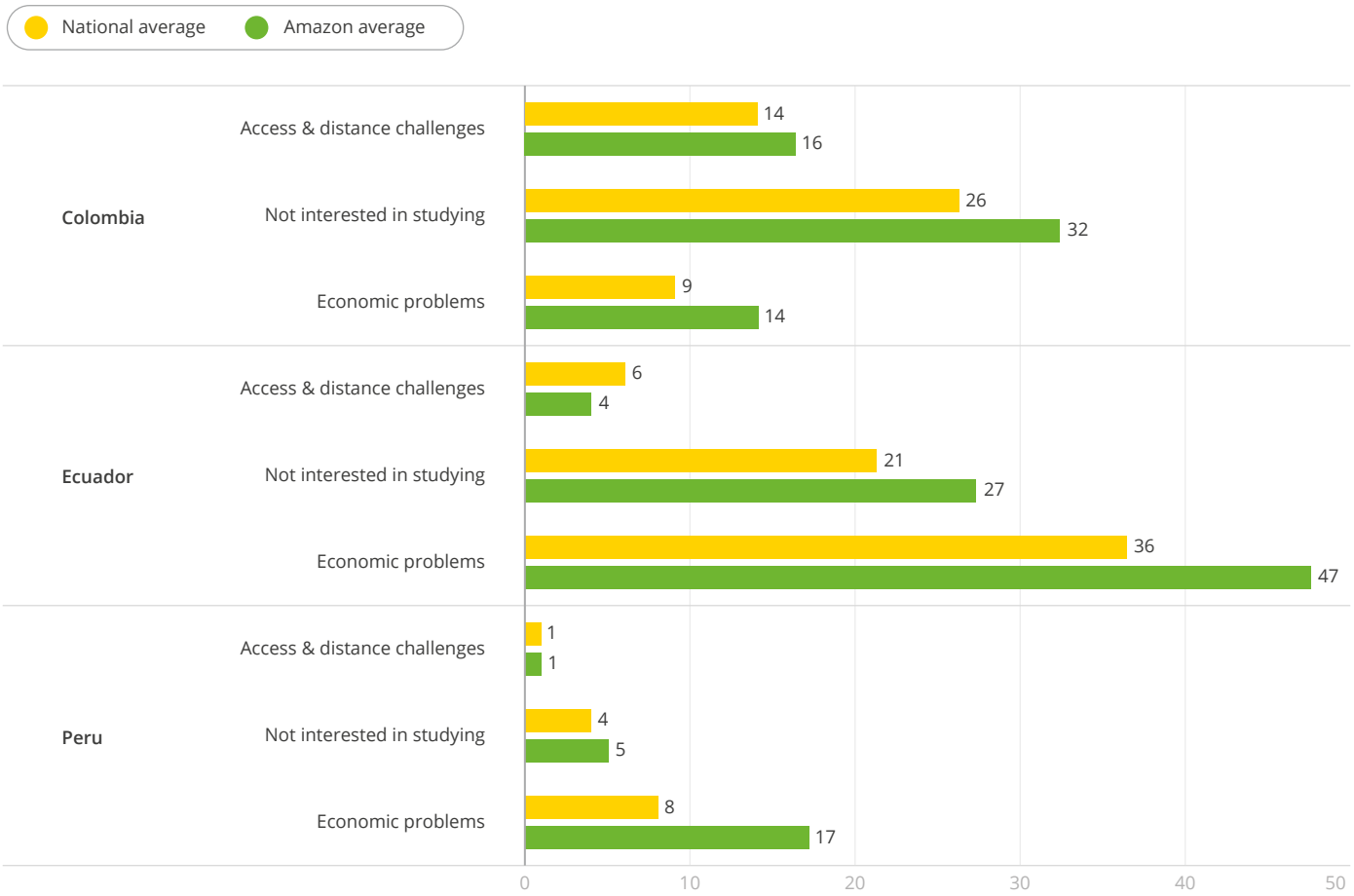
10. The interpretation of Amazonian figures requires careful consideration in the case of Guyana. The samples of the country's Labour Force Survey (LFS) diminished significantly in 2020, both nation-wide and on the Amazon. Such reductions persisted in the first trimesters of 2021, specifically within Amazonian regions, and could introduce a selection bias affecting indicators on the Amazon. Our analysis focuses on data from the first three trimesters of 2021, a remark which must be born in mind when reviewing its results.

11. Data on Peru differs from the official statistics provided by MINEDU and INEI, due to age cut-offs and periods. This document presents children's self-reported ages, whereas ESCALE MINEDU applies a March 31st cut-off according to Ministry regulations. The info presented here spans from January to December, in contrast to the official April-to-December period. Harmonized annual data is maintained across all eight Amazonian countries, to ensure consistent comparisons.

12. While data on Venezuela comes from the published ENCOVI 2021-indicators, data on the other seven countries comes from harmonized datasets. In the case of Venezuela, the published data from ENCOVI 2021 represents attendance rates at educational institutions for children aged 6-11 and 12-17 years. This data does not confirm attendance at the educational level appropriate for their age, in contrast to the harmonized data-approach adopted for the other countries.

Despite the overall high enrollment rates at the expected entry age, there is a trend of lower coverage in the Amazon region compared to national averages.

FIGURE 4. Main Reasons for Dropout in Secondary Education: National Averages vs. Amazon Region in Colombia, Ecuador and Peru, circa 2022



Sources: Harmonized national household surveys. ECV (3rd trimester) 2022, Colombia; ENEMDU 2020, Ecuador; ENAHO 2022, Peru.

In Guyana, the long distances between homes and schools were identified as a main barrier to children's attendance, affecting it in at least three ways: a) households' inability to afford the children's daily transport; b) children who walk, cycle or paddle for long distances to school are often fatigued and unable to concentrate in class; c) the numerous risks to which children are exposed while traveling unsupervised to school (UNICEF, 2017). In addition to student transport-problems commonly shared by urban and interior areas, such as the availability of school buses, the inhabitants of rural and forest regions have described to field visitors an additional factor of complexity linked to the alternation of dry and wet seasons. While most of the time, boats come and go near to students' homes and schools, during the dry seasons, they may stop at distant spots, making it more difficult for students to arrive to class and return home.[13]

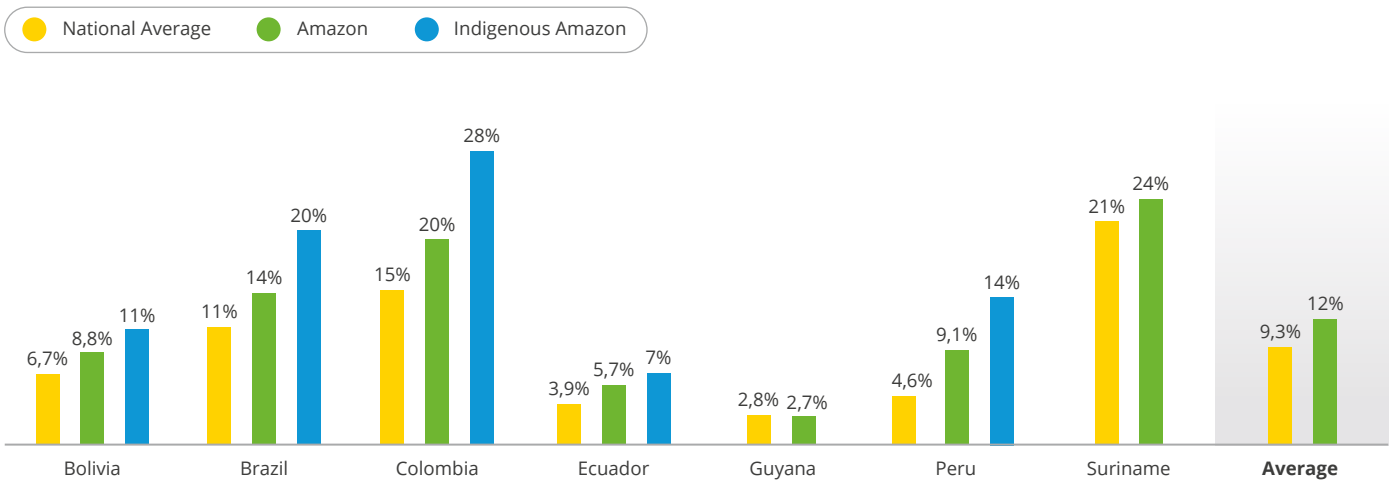
Other barriers to children's school attendance included: poverty and scarcity of financial resources in households; lack of parental awareness about the ultimate benefits of education; child labor; children left unsupervised for long periods;

13. These logistics challenges, associated with disrupted and incomplete educational pathways, will be addressed in the next sub-section focusing on school coverage.

and teachers' absenteeism (UNICEF, 2017). In Suriname, the main reason for not continuing studies is economic: almost one third of respondents (29%) said that they could not afford the expenses, and one fourth (25%) stated that they needed to work (Beuermann, 2024). In Venezuela, young people aged 12 to 17 drop out of school mostly because they choose not to continue or do not consider it relevant to further pursue their studies (ENCOVI, 2022).

The cumulative evidence regarding educational exclusion strongly evinces that over-age students and, in particular, grade repetition, stand out as significant dropout-predictors (EPDC, 2009). Children and adolescents who are older than their peers and struggle to keep pace with the curriculum are more likely to experience feelings of academic failure. Consequently, their likelihood of not completing their studies increases. Overage learning is a challenge for all countries covered by this study, but the indicators worsen significantly in the Amazon region, as the following figure shows.

FIGURE 5. Percentage of Over-Age Students in Primary and Secondary Education:[14] National vs. Amazon Region and Indigenous Populations (7 Countries), circa 2022



Note: Percentage of over-age students: Percentage of students over two years older than the theoretical age for their grade.

Sources: Harmonized data from national household surveys. ECH 2018-2021, Bolivia; PNADC 2021-2022, Brazil; GEIH 2022, Colombia; ENEMDU 2022, Ecuador; LFS (1st, 2nd and 3rd trimesters of 2021), Guyana; ENAHO 2022, Peru; SLC 2022, Suriname. The average is the simple average of the countries listed in the graph. Data on some Indigenous Amazon areas is either unavailable or insufficient for producing statistical significance. In these cases, the data was not presented.

An additional factor associated with dropout is the lack of encouragement by parents (Barger, et al., 2019). In Brazil, a national survey gives insightful evidence of parental involvement in children's education, as well as of the disparities observed in the Amazon region and, particularly, in the rural Amazon. According to the data of SAEB 2019, while 44% of non-Amazon students report to be "always or almost always" discussing school activities with their parents, the figure drops to 41% in the Amazon and 39% in rural Amazon. This decreased engagement-trend is also noticeable in other aspects: 84% of parents outside the Amazon often encourage studying, compared to 81% in the Amazon and 77% in the rural Amazon;

14. The over-age students-metric shows the percentage of students who are two or more years older than the recommended age for the grade in which they are enrolled.

encouragement for homework completion drops from 79% outside the Amazon to 74% in the Amazon and 70% in rural Amazon areas; and encouragement to regular class attendance decreases from 89% outside the Amazon to 85% in the Amazon and 81% in the rural Amazon. These figures reveal the challenges of educational engagement in rural Amazonian areas, as well as their singular position within the broader national context.

In Guyana, qualitative interviews have shown how the parents' attitude toward education can be a barrier to school attendance by children. Some parents, particularly in rural and hinterland regions, do not have adequate knowledge about the benefits of education. Such unawareness, in turn, is a product of their own low levels of educational attainment (UNICEF, 2017). One of the few studies to date about parental engagement in Indigenous populations, held in Guatemala, shows that respondent Indigenous parents do impel their children to enroll, but have lower aspirations regarding academic performance (Ishihara-Brito, 2013).

Delving deeper into the complexities of educational engagement, particularly for girls, an additional impact factor is teenage pregnancy. Early motherhood has a disruptive effect in the educational path of young mothers. An estimate indicates that 36% of school dropouts among girls in the Latin American and Caribbean region were related to this factor (Miquilena & Lara, 2021). For the four countries where data is available, teenage pregnancy rates among young women living in the Amazonian region surpass the national averages significantly, with disparities ranging from 12 births per 1,000 adolescents in Ecuador to 47 births per 1,000 adolescents in Peru.

TABLE 2. Comparative Adolescent Fertility Rates for Women Aged 15-19 in the Amazon Region vs. National Averages (4 Countries)

		Fertility rate, Women 15-19 (births per 1000)		
Country	Year	Amazon	National Average	Difference
Peru	2021	80	33	47
Brazil	2022	62	40	22
Colombia	2022	61	46	15
Ecuador	2022	65	53	12
Average	**2022**	**67**	**43**	**24**

Sources: Fertility rates were determined by analyzing population projections for women aged 15-19 and the recorded births by mothers within this age group, where data was available. For Brazil, data was obtained from the Live Birth Information System (SINASC) under DATASUS in 2022, supplemented with population projections from the Brazilian Institute of Geography and Statistics (IBGE). In Colombia, 2022 data on births by mother's age group and department of residence was gathered by the National Administrative Department of Statistics (DANE), along with appropriate population projections. For Ecuador in 2022, the National Institute of Statistics and Censuses (INEC) provided information on fertility rates by age for the whole country, Amazon and non-Amazon regions, calculated as the averages of the provinces. In Peru for 2021, data was compiled from population projections by the Peruvian Statistics Institution (INE), and birth figures by mothers' age group and department of residence by the Online Live Birth Certificate Registration System (CNV). The average fertility rate presented in the table is the simple average of the four countries.

An important cause for low completion rates in the Amazon is the lack of access to schools, either due to the physical distance of schools or to the lack of seats.

While the table covers countries only with data for both national and Amazonian rates, Guyana stands out with a strikingly high adolescent pregnancy rate. With 74 births per 1,000 girls aged 15 to 19 years, the country not only surpasses the national and Amazonian averages, but also has the highest rate in the English-speaking Caribbean. As regards the factors associated to teen pregnancy, studies conducted in the Amazon basin in Ecuador (Goicolea et al., 2009 and 2010) show that adolescents from the poorest households have much higher pregnancy rates (28%) compared to the wealthiest households (11%), and that adolescents with low or limited education have higher teen pregnancy rates (44%) compared to those with secondary education (11%).

These figures show that poverty and geographic and cultural barriers restrict the adolescents' access to reproductive health services and education. They also suggest that in order to improve educational outcomes in the region and maintain students in school, it is crucial to a) make learning more engaging, especially in secondary education; b) create interventions that help students attain the expected levels of learning for their age and grade; c) provide student financial support (via cash transfer programs or scholarships); d) engage parents and guardians to support their sons and daughters, to prevent early pregnancy and improve access to schools. This subject will be further explored in the next section.

ii. Barriers to Access

As mentioned in the previous section, an important cause for low completion rates in the Amazon is the lack of access to schools, either due to the physical distance of schools (which makes it difficult for students to come and go daily) or to the lack of seats. The results of a research project shown that building schools can lead to an increase both in the number of years of education and in wages – and, therewith, to higher economic returns to education (Duflo et al., 2021). But considering the low population density in the Amazon, access to education can also be increased by better means of transportation and technological solutions.

In Colombia, the absence of a nearby school is among the most frequently cited reasons for students' non-attendance to primary education (*Encuesta Nacional de Calidad de Vida*, 2022). In the country's Amazonian region, 21% of primary school-age children are declaredly not studying for this reason, compared with only 8% in other parts of the country. The difference persists in secondary education: the problem affects 17% of children in the Amazon region and 5% in other parts of the country.

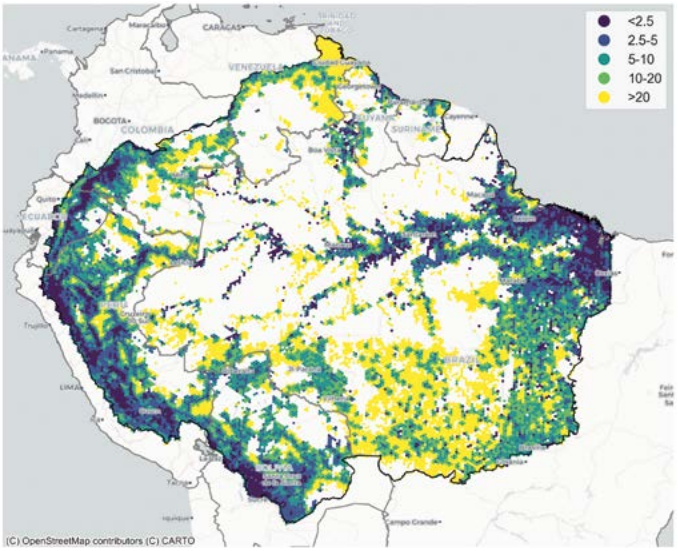
The challenge of low coverage is common throughout the Amazon region. The following maps allow visualizing the availability of educational services, which point to reduced levels of access by the school-age population.[15]

15. For examining distances to educational centers, a geospatial analysis was conducted by integrating layers of georeferenced primary and secondary schools across the Amazonian territories of the eight countries using official data and statistics on school-age children from WorldPop's 2020 dataset. The territorial boundaries of the Amazon Region are defined by AFP segments of the land limit established by the *Amazon Forever* Initiative. This analysis facilitated the computation of the average distance to the nearest educational center, highlighting the minimum distance for school-age populations residing in areas of resolution 7 (5.2 km²). It is worth noting that the analysis' accuracy may be influenced by incomplete or low-quality georeferenced data on educational centers, particularly in the case of Venezuela.

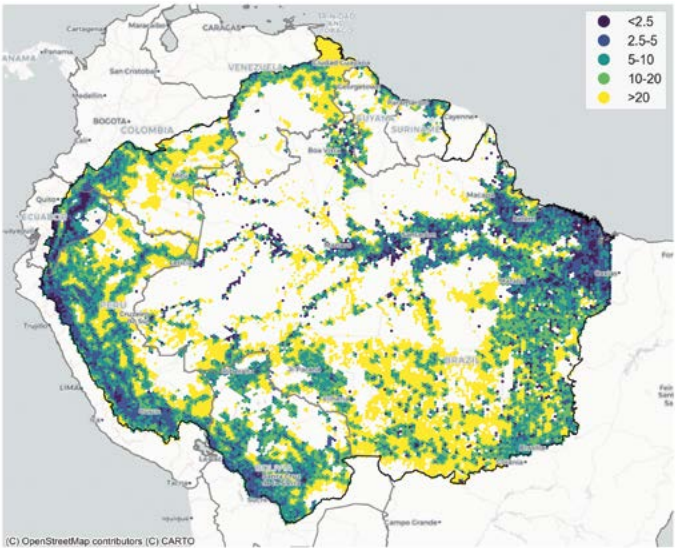
29% of the Amazonian population aged 10 to 19 are located more than 5 km from the nearest secondary school. On average, the secondary school-age population is located 6.8 km from the closest secondary school.

MAPS 2 AND 3. **Distance (in km) of School-Age Population to the Nearest School, Primary and Secondary Education (8 countries)**

PRIMARY EDUCATION

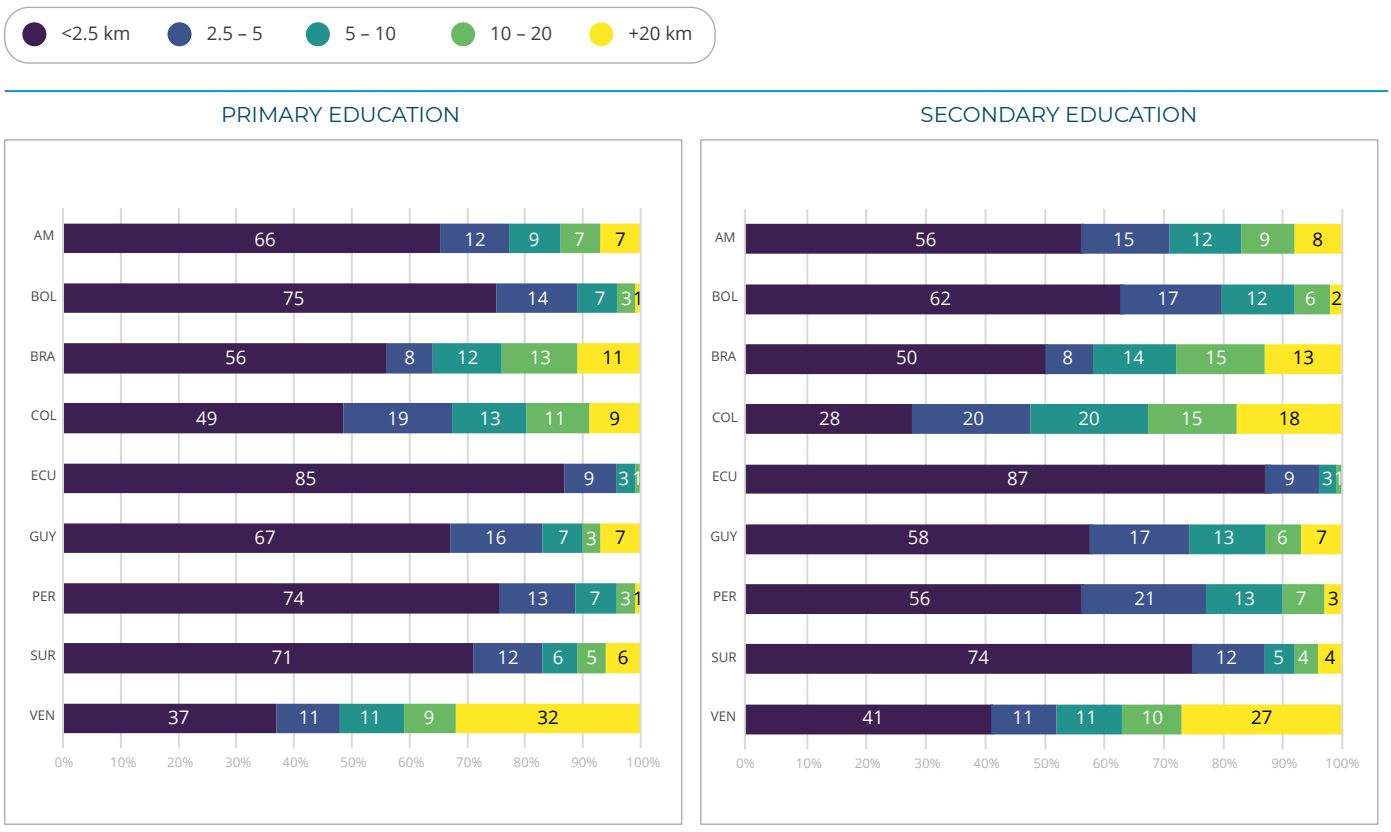


SECONDARY EDUCATION



Source: Created by the authors, with the collaboration of Claudio Ortega.

FIGURE 6. **Percentage of School-Age Population according to Distance from the Nearest Educational Center (in km), Primary and Secondary Education (8 countries)**



Source: Created by the authors, with the collaboration of Claudio Ortega.

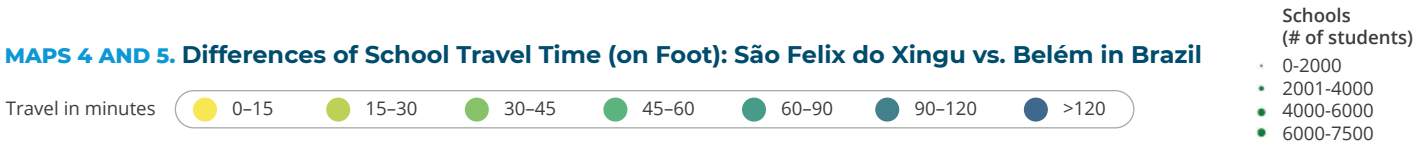
Nearly 1 in every 4 (23%) of children in primary school-age in the Amazon region lives more than 5 km away from the nearest primary school, which requires over an hour of walking assuming direct routes. On average, the primary school-age population is located 5.9 km from the closest primary school. Ecuador has the highest percentage of children living within a 2.5 km-radius from the nearest school (85%) while in Venezuela, a staggering 32% of children live more than 20 km away from the closest school. In terms of secondary education, 29% of the Amazonian population aged 10 to 19 is located more than 5 km from the nearest secondary school. On average, the secondary school-age population is located 6.8 km away from the closest secondary school. In Brazil, Colombia, and Venezuela, over 40% of young people live more than 5 km away from the nearest secondary school.

Low school coverage leads to longer commuting journeys. In Brazil, the rate of children who spend more time commuting to school is higher in Amazon-states (SAEB, 2019). Students in the 5th grade (the final grade of primary education) who need more than an hour to get to school represent 9.1% of the total in the Amazon region, compared to 5.7% in other states. This contrast becomes starker in the rural Amazon, where the figure rises to 14%.

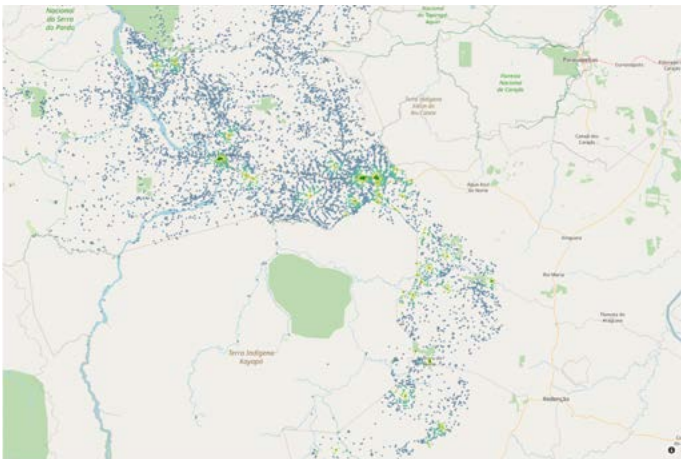
Access to school transport is also lower in the Amazon. School transport is the main means of going to school for only 12% of students, compared to 23% on average in other parts of the country. Car use rates are also lower, while boat and bicycle use are more frequent in the Amazon region, compared to the rest of the country. This suggests that the journey to school and back home is undertaken by slower means of transportation (SAEB, 2019).

The coverage-challenge is even bigger in inner parts of Amazon-territories. An ongoing study in Brazil's Amazonian state of Pará is gathering data on population density and school travel time for microregions. In larger cities, such as the state capital Belém, 92% of the population is situated at a 0-15-minute walking distance from the nearest school, and less than 1% is situated farther than a 2-hour walking distance from school. The figures are quite different in São Felix do Xingu, located a thousand kilometers from the capital. There, 37% of the population is situated at more than a 2-hour walking distance from the closest school (IDB, study in progress).

MAPS 4 AND 5. Differences of School Travel Time (on Foot): São Felix do Xingu vs. Belém in Brazil



MAP 4. SÃO FELIX DO XINGU



MAP 5. BELÉM

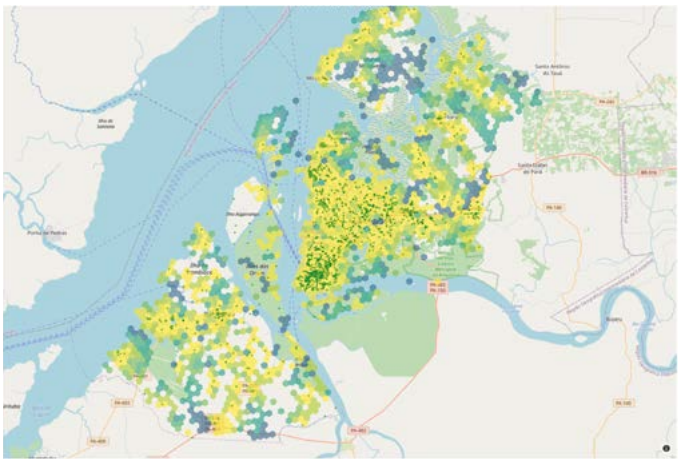
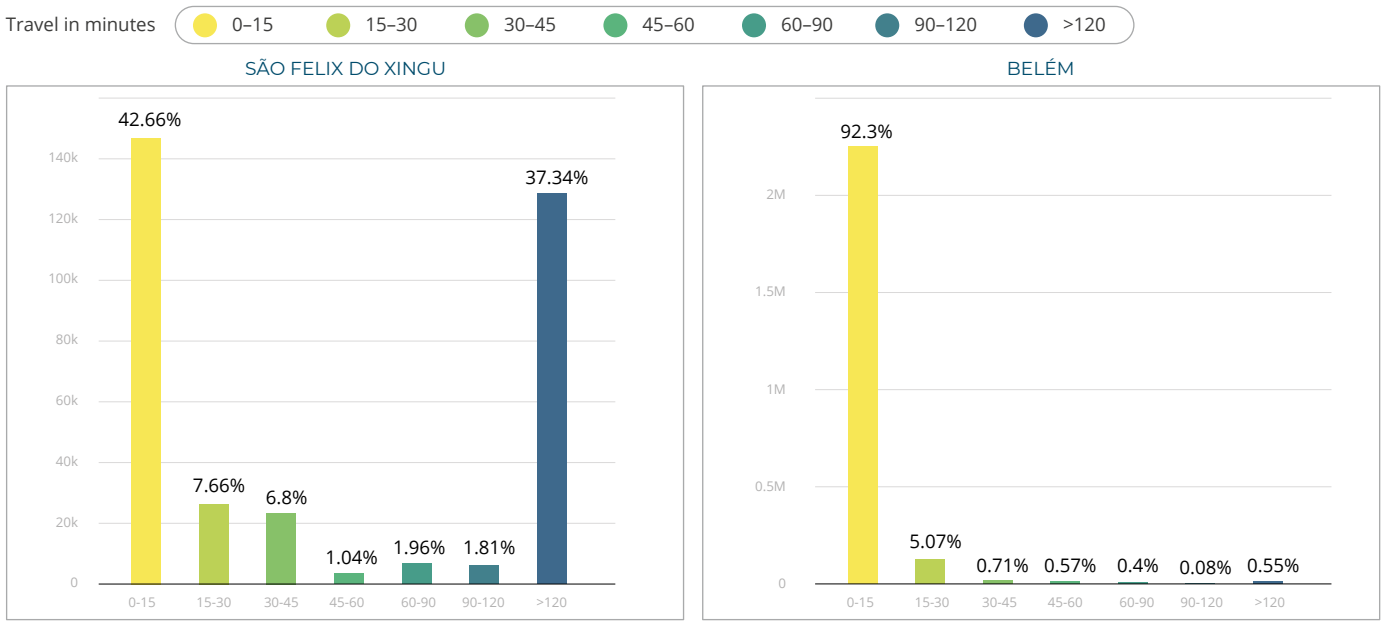


FIGURE 7. Percentage of School-Age Population according to Travel Time to School on Foot (in km), São Felix do Xingu vs. Belém in Brazil



Source: Created by Claudio Ortega with the authors' collaboration, using data from UrbanPy, C2DB and the Brazilian School Census.

One possible solution for the problem of long commuting journeys is boarding schools, but they tend to be more expensive and more complex to manage. Consequently, they are not commonly found. According to the Brazilian School Census of 2019, only 0.3% of schools offered alternative calendars, known as "Alternation Regimes", which combine activities at school (where children also sleep), and activities at home, so they may apply the knowledge taught at school (for further information, see 5.2.b in this document). The data above indicates a common problem, namely bigger obstacles for accessing an educational center in the Amazon. The lack of school coverage increases the personal burden of

studying vis-à-vis other regions. This could be solved by means such as the use of technology to deliver lessons in remote areas, creating alternative schools with adapted calendar and boarding regimes, improving access to transportation, and expanding the infrastructure. Such solutions will be addressed in section 5. The theme of technology is also addressed in section 4.2.iii., which shows that although it could in theory compensate for barriers to access, in practice, there are many connectivity and equipment issues to be solved.

As seen in 4.1.i. and 4.1.ii. above, low completion rates in the Amazon are linked to factors such as interrupted pathways, late enrollment and barriers to access. However, for the children who stay in school and finish their studies, there is an additional problem, namely low learning outcomes. It will be addressed in detail in the next section.

4.2 Low Learning Outcomes

The learning crisis in Latin America is an old problem. 2022 data from PISA – the international study that measures learning in fields such as mathematics, reading and science – shows that the region is currently lagging behind in relation to OECD countries.

TABLE 3. Percentage of Low Performers: 15-Year-Old Students Not Meeting PISA Benchmarks for Reading, Mathematics, and Science (4 countries, LAC and OECD)

	Mathematics	Reading	Science
Brazil	73%	50%	55%
Colombia	71%	51%	51%
Ecuador*	71%	51%	57%
Peru	66%	50%	53%
Latin America and the Caribbean average	**75%**	**55%**	**57%**
OECD average	**31%**	**26%**	**24%**

Sources: PISA 2022 for Brazil, Colombia, and Peru. PISA-D for Ecuador(*).

Note: According to the OECD, proficiency level 2 or higher is indicative of the knowledge and skills essential for adult life. Students not meeting this threshold lack the basic skills in evaluated subjects and are classified as low performers (as defined by PISA Level 2).

While the overall data points to significant learning challenges, the educational landscape within the Amazon region also presents an even more critical issue. Despite the diversity of national assessments, with each country applying its own set of metrics and benchmarks of adequate learning, the intra-country comparisons reveal that students in the Amazon consistently underperform in mathematics and reading, when compared with the national averages.

The disparity observed in primary education is reflected by secondary education, which indicates a persistent issue. This report, however, will not delve into the specifics of secondary education-gaps. The general trend across countries, regardless of the metric or grade level assessed, strongly reveals the crucial need for educational strategies specifically designed for the Amazon region.

FIGURE 8. Students with Adequate Learning Levels in Math and Reading in Primary Education, according to the Results of National Standardized Tests (6 countries)

Results from different learning assesments **are comparable only within countries, not between them.**

Note: Datasets, measures, and benchmarks vary among countries. Thus, this graph is aimed not at cross-country comparisons, but, instead, at illustrating differences within countries. It shows the percentages of students who meet adequate learning standards in mathematics and reading, as per national assessments. Amazonian areas consistently display lower percentages compared with the national averages. For further information on the tests, benchmarks, and what constitutes adequate learning in each context, see Annex 2. Information on Bolivia and Venezuela are not included, due to the absence of corresponding national learning assessments' data.

Sources: Brazil, SAEB 5 (2021); Colombia, SABER 5 (2017); Ecuador, Ser Estudiante – SEST 4th Grade (2022-2023); Guyana, National Grade 6 Assessment – NGSA (2022); Peru, Evaluación Censal de Estudiantes – ECE 4to. Grado Primaria (2022); Suriname, Multiple Indicator Cluster Surveys – MICS UNICEF (2018).

Teaching more about the Amazon biome, which is usually the main regional economic and subsistence source, would help increase students' engagement.

Lower learning outcomes are persistent throughout the Amazon region in all eight countries. This means that even when children are attending school, they will likely not finish the primary and secondary levels with the expected knowledge.

Three main causes have been identified for this problem:

i. **Lack of pertinent education;**
ii. **Insufficient availability and quality of teachers;** and
iii. **Low quality of infrastructure.**

These causes will be examined below.

i. Lack of Pertinent Education

The low levels of learning identified in the Amazon are partly related to the difficulty of making classes relevant or applicable to the students from a regional and cultural standpoint. It is important to assess whether the content taught makes sense within the living context of these students, or whether it is producing limitations and undermining their interest.

From a regional standpoint, for instance, it is necessary to teach much more about natural phenomena such as rain and tides in Amazon schools compared to what is taught about these topics in large urban centers removed from the forest. This means that teaching more about the Amazon biome, which is usually the main regional economic and subsistence source, would generate more engagement among students. A study on students' interest in the surrounding biodiversity in Brazilian high schools shows that half (50.4%) of the respondents' who live in the Amazon region are willing to study plants and animals in their region, whereas 33.1% show the same level of interest in the country' southeast (Franzolin et al., 2020).

A symptom of the low pertinence of current educational content is the fact that students and other members of the educational community lack knowledge about the critical role of the forest in global biodiversity and climate regulation. The available data is limited, as there are no comprehensive measures that cover knowledge on climate change, values and capacity for action among children and young people. However, it suggests that students in Amazon countries are not acquiring the necessary knowledge to develop a sustainable and environmentally friendly lifestyle. In the 2006 edition of the PISA tests, when Brazil and Colombia were among its participant countries, it was possible to assess the environmental knowledge of 15-year-olds by means of specific topics on environmental science and environmental sustainability. In that edition, students in Latin America and the Caribbean scored 426 points, compared to the OECD average of 495 points (the test's maximum scored was obtained by the students from Finland, with 563 points). Moreover, the ERCE results show that in the 6th grade, on average, only one in five students attain the minimum learning levels in science – the field in which climate change-topics are traditionally taught.

TABLE 4. Percentage of Students Meeting ERCE Benchmarks for Science Proficiency (5 countries and LAC)

	Students Proficiency in Science
Bolivia*	10%
Brazil	26%
Colombia	21%
Ecuador	27%
Peru	25%
Latin America and the Caribbean average	**21%**

Source: ERCE 2019; TERCE 2013 for Bolivia(*).

Note: 'Level 2 or above' indicates proficiency demonstrating the required knowledge and skills in the subject. The results refer to 6th grade students in most countries, with Brazil reporting on the 7th grade ("7° ano") and Ecuador on the 7th year of basic general education (7 EGB).

In addition to these findings, educational policies and primary and secondary education curricula have low levels of integration regarding environment-related themes. A study on the education plans and national curriculum frameworks of 100 UNESCO member states analyzed the incorporation of climate change by mapping specific keywords (greenhouse gases, global warming, climate change, climate crisis and carbon). Among the Latin America and Caribbean countries that participated in the study, only 19% mentioned climate change-elements in their curricula (UNESCO, 2021).

Especially in higher levels of secondary education, one important way of increasing the pertinence of education is via technical and vocational education and training (TVET) activities. They have the potential to decrease dropout rates, in particular, as students recognize that TVET courses may facilitate the development of pertinent abilities and help them find or develop a vocation and economic activity in the future. However, the share of students in TVET courses is lower in the Amazon than in other parts of the countries.

Data from Brazil shows that only 15% of young students enrolled in high school are registered in TVET courses, and the number drops to around 10% when only the Amazon is considered. Moreover, for a region that needs a new development model, with economic possibilities beyond the collection of forest resources, the share of courses on bioeconomics is still quite low. When considering only the students enrolled in TVET in the Amazon, 25% of them are attending a bioeconomics course (only 2.5% of the total). In rural Amazon areas, this number rises to 60% (or 6.5% of the total), but there is still room for improvement, since most of the adults in these areas deal with the production and management of biological resources.

TABLE 5. Percentage of Students Enrolled in TVET Courses – Brazil

	National	Amazon	Rural Amazon	Indigenous Amazon
High School Enrollment	7.676.743	1.172.507	185.297	18.599
Registered in TVET	15,0%	9,8%	10,9%	0,5%
Registered in TVET Bioeconomics Courses[16]	2,1%	2,5%	6,5%	0,1%

Source: Brazil School Census 2023.

Note: Indigenous Amazon Territories in this table are defined according to the 2023 Brazil Schools Census, which outlines areas according to specific geographic and demographic criteria, one of which is indigenous lands. Bioeconomics courses were categorized by the Bank.

Another pertinence-issue regards Indigenous peoples. The Amazonian region covered by this document is home to 1.4 million Indigenous persons with diverse languages and traditions, 32% of which are in school age (6 to 17 years old). However, little attention is given to their specific educational needs. Even though most countries allow Indigenous peoples to have their own curricula and classes in their native languages, a considerable gap still remains to be bridged between the law and their reality.

TABLE 6. Legal Rights Regarding Indigenous Peoples' Education (8 countries)

Country	Indigenous or Adapted Curricula	Education in Native Languages
Bolivia	Yes	Yes
Brazil	Yes	Yes
Colombia	Yes	Yes
Ecuador	Yes	Yes
Guyana[17]	No	No
Peru	Yes	Yes
Suriname	No	No
Venezuela	Yes	Yes

Note: The "Indigenous or Adapted Curricula" and "Education in Native Languages" columns reflect the legal frameworks established by the national legislations on the education of Indigenous peoples and do not necessarily indicate their full implementation. A detailed assessment of each country's data, either in qualitative or quantitative terms, is recommended to verify the effective application of these legal provisions.

Sources: Bolivia, Ley 1565 de Reforma Educativa (1994) and Ley de Educación "Avelino Siñani y Elizardo Pérez" (2010); Brazil, Federal Constitution (1988); Colombia, Constitution (1991, Articles 10, 55)[18], and Ley General de Educación (1994); Ecuador, Acuerdo No. 044 0-13 (2013)[19]; Peru, Decreto Supremo N.º 006-2016-MINEDU (2016)[20]; Venezuela, Ley de Educación de los Pueblos Indígenas.[21]

For persons who speak different languages and live in specific cultural contexts, the lack of adapted teaching methods and learning materials creates a barrier to their participation and understanding of the lessons. Most of the Indigenous youth in Latin America often attend an educational system taught in a language over which they have virtually no command (Morrison et al., 2017). In the interior of

16. Bioeconomy encompasses the sustainable production and management of biological resources, and their transformation into value through science and technology.

17. In Guyana, there is currently no separate curriculum or teaching in Indigenous languages. Guyana's Ministry of Education is planning to develop a language policy in 2024/25, and started a pilot initiative in Wapichan language prior to the pandemic, which is being revived in 2024.

18. https://www.corteidh.or.cr/tablas/r29519.pdf

19. https://educacion.gob.ec/wp-content/uploads/downloads/2014/03/MOSEIB.pdf

20. https://biblioteca.spda.org.pe/biblioteca/catalogo/_data/20210519161238_El%20derecho%20de%20los%20pueblos%20indigenas%20a%20una%20educacion-2.pdf

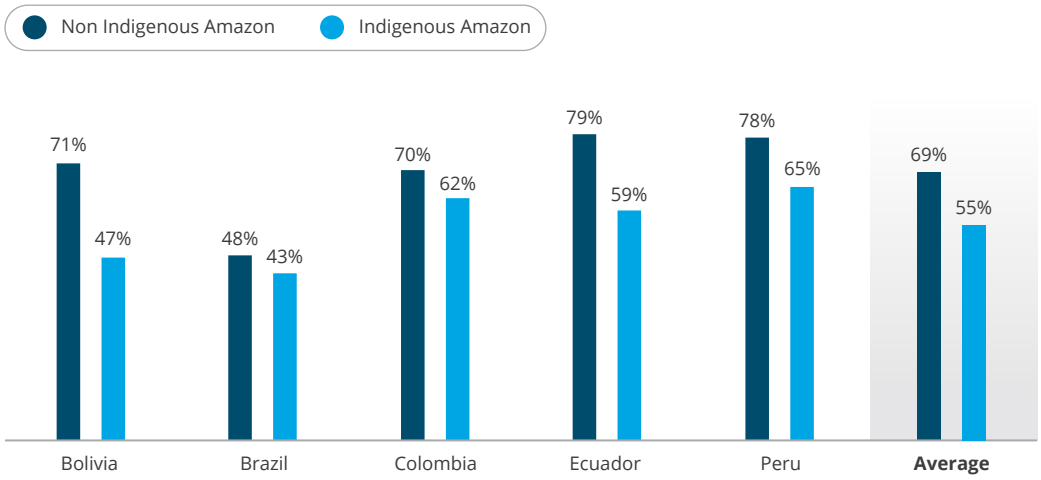
21. https://www.unicef.org/lac/la-educacion-intercultural-bilingue-eib-en-venezuela

Suriname, for example, 91% of students aged 7 to 14 speak Indigenous languages at home, but most teachers are only fluent in Dutch (UNICEF 2018).

In the Colombian Amazon, out of a total of 461 schools located in Indigenous territories, only 66% operate under an ethno-educational system, and only 52% implement a comprehensive educational proposal in line with the Indigenously Based Educational System (Educ Formal, 2022). In the Brazilian Amazon, in turn, out of a total of nearly 3,000 schools located in Indigenous territories, 20% have classes only in Portuguese (School Census, 2022). Among those that also teach in Indigenous languages, only 55% of municipal schools and 37% of state schools provide access to teaching materials in native languages. And in the Peruvian Amazon, approximately 60% of the schools that serve Indigenous groups[22] pursue intercultural bilingual education for the preservation of native languages (School Census, 2022).[23]

This gap in terms of culturally and linguistically appropriate education leads many Indigenous students to disengage from the educational process, contributing to lower completion rates and a higher incidence of early school leavers from Indigenous groups compared to their non-Indigenous peers. On average, secondary completion among Indigenous students in the Amazon is 14 p.p. lower than their non-Indigenous peers, whereas the early school leavers' rate is 7 p.p. higher.

FIGURE 9. Disparities in Secondary Completion: Indigenous and Non-Indigenous Populations in the Amazon (5 Countries), circa 2022



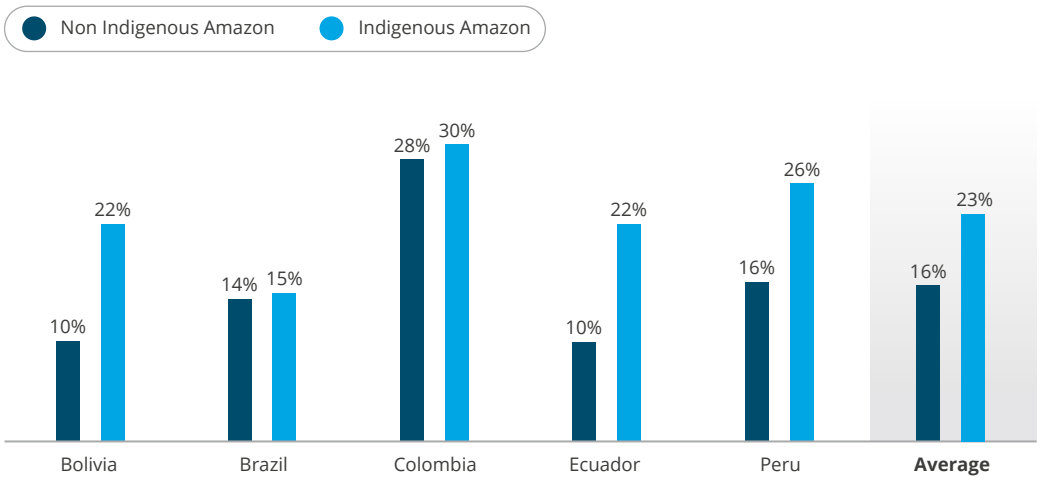
Sources: ECH 2018-2021, Bolivia; PNADC 2021-2022, Brazil; GEIH 2022, Colombia; ENEMDU 2022, Ecuador; Guyana; ENAHO 2022, Peru. The average is calculated as a simple mean of the national and Amazon region rates, except for Venezuela, where the indicator's calculation is slightly different. Data on some Indigenous Amazon areas is either unavailable or insufficient for producing statistical significance. In these cases, the data was not presented.

22. Censo Escolar 2022. The school census includes a specific question on whether, according to customs and family background, the respondent believes their educational service/level covers students from different ethnic groups. In this regard, 'Native or Indigenous from the Amazon' is listed as a unique category of analysis.

23. https://elpais.com/america-futura/2022-12-10/peru-defiende-la-educacion-intercultural-bilingue.html

Indigenous youth in Latin America often attend education lacking adapted teaching methods and materials related to their language and cultural context. This gap leads many to disengage, prompting lower completion rates and increasing early school drop-out.

FIGURE 10. Early School Leavers: Indigenous and Non-Indigenous Populations in the Amazon Region (5 Countries), circa 2022



Note: Early school leavers are considered as the percentage of persons aged 18-24 with, at most, lower secondary education, who were not pursuing further education.

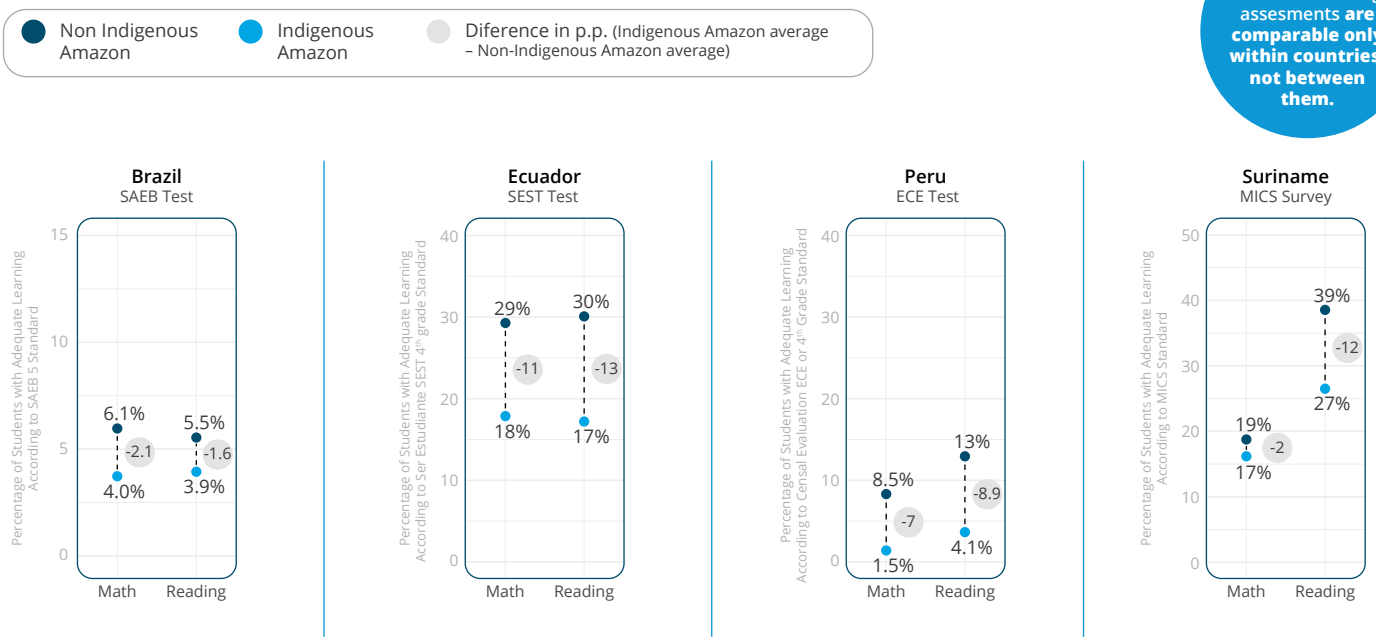
Sources: Harmonized data from national household surveys. ECH 2018-2021, Bolivia; PNADC 2021-2022, Brazil; GEIH 2022, Colombia; ENEMDU 2022, Ecuador; ENAHO 2022, Peru. The average is the simple average of the countries listed in the graph. Data on some Indigenous Amazon areas is either unavailable or insufficient for producing statistical significance. In these cases, the data was not presented.

In the Amazon region, the national assessments of learning levels also show a disparity in the level of educational achievement between Indigenous and non-Indigenous students. The national assessments reveal that a lower percentage of Indigenous students meet the established proficiency-benchmarks in math and reading than among non-Indigenous students.

For persons who speak different languages and live in specific cultural contexts, the lack of adapted teaching methods and learning materials creates a barrier to participation and understanding of the lessons.

FIGURE 11. Comparison of Adequate Learning Levels in Math and Reading between Indigenous and Non-Indigenous Amazonian Populations, Based on National Standardized Tests (4 countries)

Results from different learning assesments **are comparable only within countries, not between them.**



Note: Datasets, measures, and benchmarks vary among countries. Therefore, this graph is aimed not at cross-country comparisons, but, instead, at illustrating differences within countries. It shows the percentages of students who meet the adequate learning-standards in mathematics and reading, as per national assessments. Indigenous Amazonian populations consistently show lower rates compared to non-Indigenous groups in the same region and country. For further information on the tests, benchmarks, and what constitutes adequate learning in each context, see Annex 2. The countries mentioned in this graph are the ones that include a question on ethnicity in their national learning tests for primary education.

Sources: Brazil, SAEB 5 (2021); Ecuador, Ser Estudiante 4th grade (2022-2023); Peru, Evaluación Censal de Estudiantes – 4to. Grado Primaria (2022); Suriname, Multiple Indicator Cluster Surveys – MICS; see UNICEF (2018).

The data above shows two overlapping marginalization-layers. If learning conditions are already worse in the Amazon in general, compared to the national averages, the reality is even more complicated for Indigenous peoples.

ii. Insufficient Availability and Quality of Teachers

Teacher quality is one of the main factors that contribute to the quality of education, and one that has been extensively studied by the specialized literature (Cruz-Aguayo; 2020; Bruns and Luque; 2015). Schools in the Amazon are facing two particular problems in regard to it, with potential impacts for students' learning: first, the shortage of teachers, especially in the most remote areas; and second, teachers' quality, even in not remote areas.

One of the predictors of teacher quality is the level of teachers' qualifications. In Peru, the percentage of teachers with a university degree in education-related areas is lower in the Amazon region than in the rest of the country. In primary education, 21% of the teachers in Peruvian states located in the Amazon have a degree, compared to 30% in other regions. In secondary education, the percentages are 34% and 47%, respectively (Censo Educativo del Ministerio de Educación, 2022).

Improving teachers' qualification, as well as enhancing their hiring arrangements can have a positive impact on learning outcomes in the Amazon.

Qualification-differences are also found in Guyana and Suriname. In Guyana's hinterland regions, 36% of teachers have attained a higher education level (considering a bachelor's degree as a qualifier). In contrast, in the country's non-hinterland regions, the percentage of teachers with a degree rises to 73%. The disparities extend to the average experience of teachers, which is 9 years in the hinterlands, compared to almost 12 years in non-hinterland areas (2022 data shared by the Ministry of Education of Guyana).[24] In the interior of Suriname, in turn, only 29% of teachers were considered fully qualified for performing their functions (Heemskerk and Duijeves, 2013).

In Brazil, based on data from the 2020 School Census, an IDB analysis of the state of Amazonas showed that teachers' qualification levels are lower in Indigenous territories, both among Indigenous and non-Indigenous professionals. Among Indigenous teachers, 32% of those who work in these schools have completed higher education, compared to 86% of those working outside Indigenous territories. A difference was also observed in regard to non-Indigenous teachers at Indigenous schools: 58% of them have a higher education-degree, compared to 89% of those working outside the territories. Further, permanent positions are practically non-existent among teachers in Indigenous territories in Brazil, which makes it difficult to plan policies such as incentives, bonuses and on-the-job training. Only 9.4% of the Indigenous teachers working in Indigenous schools in Amazonas have permanent contracts, in contrast to 85.3% of Indigenous teachers with permanent contracts in non-Indigenous schools statewide.

Ecuador and Guyana face a similar problem linked to temporary contracts. In Ecuador, the percentage of teachers assigned to positions in the Amazon region is 52.9%, compared to 71% in other parts of the country (AMIE – MinEduc, 2022). Similarly, nearly a fifth (19%) of secondary schools in remote areas of Guyana (its Hinterland regions) do not have permanent teachers. This figure significantly decreases to less than 1% (0.9%) in other regions (2022 data shared by the Ministry of Education of Guyana).

Improving teachers' qualification, as well as enhancing their hiring arrangements can have a positive impact on learning outcomes in the Amazon. Bertoni et al. (2018) point that teachers in Latin America generally receive low salaries, and remuneration is not differentiated according to the particularities of schools, which makes it difficult to attract and retain qualified teachers in the most disadvantaged locations. A solution would be to create incentives for teachers to work in remote areas, a possibility that is further detailed in section 5.3 of this document.

In addition to being less available or having more unstable working contracts and/or less credentials, teachers in the Amazon face an additional challenge in dealing with heterogeneous classrooms. Schools in the region tend to have students with diverse cultures, ages and learning levels. In Brazil, approximately 3.9% of schools in the Amazon region offer multi-grade classrooms, where students of different grades learn in the same classroom (Censo Escolar, 2019), and the teacher should perform different activities for different groups of students. This creates a more complex environment, where teachers must manage and prepare students with different experiences and interests.

24. The disparities extend to the average experience of teachers, which is 9 years in the hinterlands, compared to almost 12 years in non-hinterland areas (Administrative data of the Ministry of Education of Guyana).

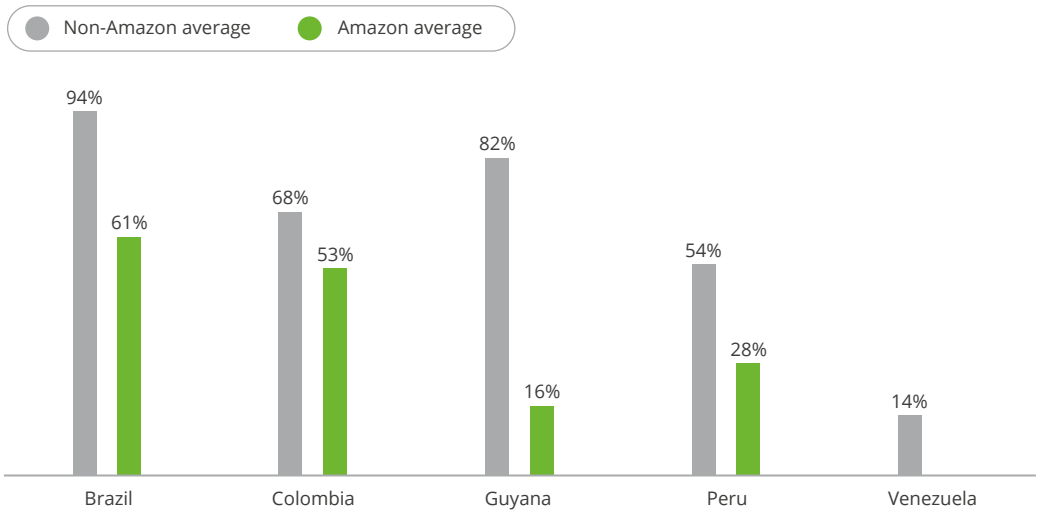
iii. Low Quality of Infrastructure

Student learning in the Amazon is also disadvantaged due to the lack of adequate infrastructure and conditions for 21st century-teaching. Evidence suggests that the quality of school infrastructure can motivate increases of up to 60% in student attendance rates (Leithwood and Jantzi, 2009; Paxson and Schady, 1999) whereas the lack of access to basic services such as electricity, drinking water and sanitation can lead to increased levels of violence and discrimination, as well as to fewer learning opportunities (Duarte et al., 2011), and higher dropout rates (Hallack et al., 2018)[25].

In the 21st century, infrastructure has been categorized in two main ways. The first category covers digital infrastructure (internet connectivity, devices), which allows for more innovative and efficient pedagogic activities. The second category, on its turn, covers traditional infrastructure (classrooms, laboratories, and so on).

By 2024, connectivity has become fundamental for the continuity of life in society. An educational model that helps young people connect to better financial opportunities and enjoy a better quality of life cannot be envisioned without access to the digital world. Further, the use of new educational tools offered by the Internet and technology can help accelerate learning in remote areas[26]. In the five countries where data about Internet access in schools is available, school connectivity is lower in the Amazon compared with regions outside the Amazon. In the long term, this shortcoming might widen the learning and economic gap between students.

FIGURE 12. Schools with Internet Access: Amazon Region vs. Non Amazon Region (5 Countries)[27]



Sources: Censo Escolar 2022, Brazil; DANE 2021, Colombia; Data provided by the Ministry of Education of Guyana 2023, Guyana; Escale MINEDU 2022, Peru; Encuesta Nacional de Edificaciones Educativas 2021, Venezuela.

25. https://publications.iadb.org/en/brighter-future-impact-rural-school-electrification-programs-dropout-rate-primary-education-brazil

26. https://www.iadb.org/en/story/three-reasons-boosting-educational-connectivity-schools

27. In Peru, the available data only covers primary education.

Another study about public schools in the state of Amazonas in Brazil shows that the schools located in Indigenous territories are facing even worse conditions in this aspect. Internet access is limited throughout the state, reaching only 49% of schools outside Indigenous territories, and an alarming rate of 18% inside the territories.

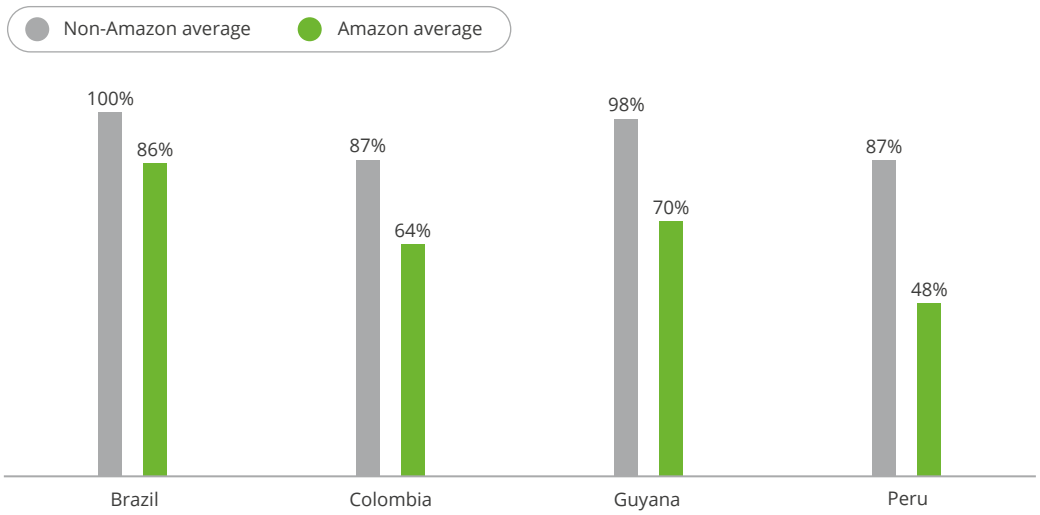
In addition to internet connectivity, the availability of devices is a key element for assessing the possibility of providing additional learning experiences. The available data points to a stark disparity: between 20% to 30% of schools not located in the Amazon do not have devices (computers or tablets) available to their students, while in the Amazon region, this number increases to between 50% and 75%, and in the rural Amazonian, it reaches 80%. In Indigenous territories, it rises to almost 90% in Brazil and Peru.

FIGURE 13. Percentage of Schools with No Operational Laptops, Desktops, or Tablets Available for Student Use (Brazil, Colombia, and Peru)

Sources: 2022 School Censuses of Brazil, Colombia, and Peru. The term 'Indigenous Amazon' in this graph refers to schools located in indigenous lands in Brazil and Colombia, and to schools serving Indigenous Amazonian students in Peru. The data covers from primary to high school education and considers operational laptops, desktops, and tablets available for student use.

The most basic condition for the use of digital devices is electricity; and even this essential condition is less present in the Amazon than in other parts of Brazil, Colombia, Guyana and Peru (the countries for which data on schools is publicly available).

FIGURE 14. Schools with Electricity: Amazon Region vs. Non Amazon Region (4 Countries)



Sources: Censo Escolar 2022, Brazil; DANE – Educación Formal EDUC 2021, Colombia; Data provided by the Ministry of Education of Guyana 2023, Guyana; Escale MINEDU 2022, Peru.

In addition to digital infrastructure, it is important to provide satisfactory conditions in the classrooms. The appropriate temperature is a key factor for improved learning. Heat waves and high temperatures negatively affect cognitive performance and the assimilation of knowledge, either because learning is challenging when the weather is too hot, or because school days are either shortened or cancelled to accommodate for high temperatures (Goodman et al., 2019; Zivin et al. 2017; Park, 2017; Park et al., 2021). Based on data from Brazil, Melo and Suzuki (2021) pointed that temperature-levels in the classrooms have a negative effect on learning, with a one standard deviation increase in temperature associated with decreasing exam scores by 0.036 standard deviations. The impact of higher temperatures on learning is expected to increase with climate change and will probably have disproportionate impacts on the Amazon region, where temperatures are expected to rise even more.

In Brazil, a detailed questionnaire answered by teachers indicates that classroom conditions are worse in the Amazon region compared to other states. On average across Amazonian states, natural lighting is considered adequate by 40% of teachers. This figure rises to 48% in the rest of the country. Furniture is seen as adequate by 44%, compared to 52% in other regions. Other items such as acoustics, natural ventilation, whiteboards and infrastructure follow the same pattern, with differences in responses ranging between 4 p.p. and 8 p.p. (SAEB, 2019).

In addition to the low availability of adequate infrastructure, the solution should not rely only on expanding infrastructure, but also on creating pertinent spaces that take the Amazon's reality into account and help raise the quality of education.

Looking to the future, it is necessary to consider that if schools are presently outdated in terms of their infrastructure, the situation is likely to worsen in the coming years with the effects of global warming. As was mentioned above, rising temperatures negatively affect children's ability to learn. Climate change also affects other determinants of student health necessary for their learning, such as access to water, nutrition, and clean air (Bos and Schwartz, 2023).

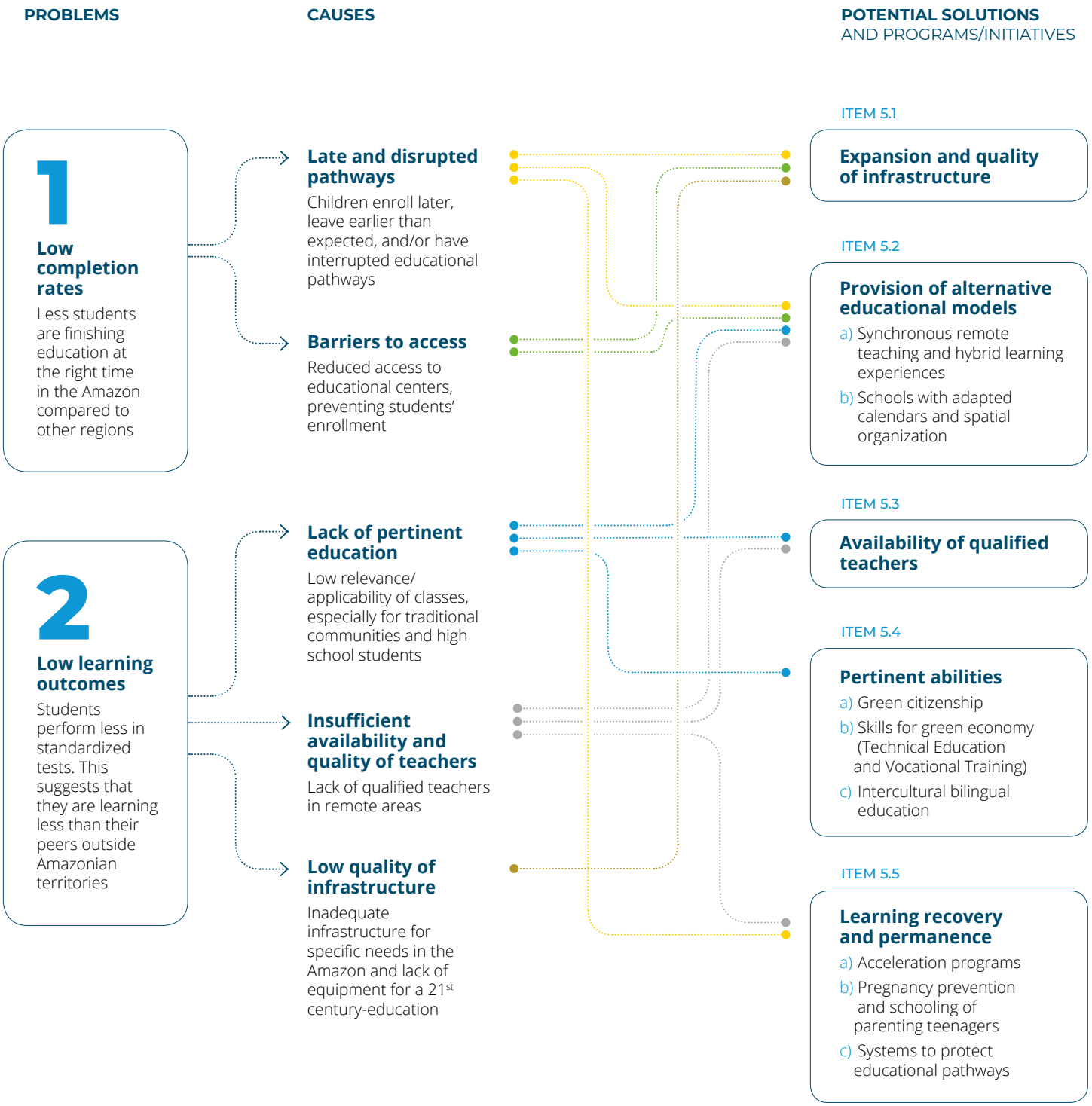
In addition to the low availability of adequate infrastructure, the solution should not rely only on expanding infrastructure, but also on creating pertinent spaces that take the Amazon's reality into account and help raise the quality of education. Designing and offering an adequate environment, including laboratories and student learning experiences outside traditional classrooms, may also improve learning.

As seen in 4.2.i. to 4.2.iii. above, low learning outcomes in the Amazon region are related to a lack of pertinent education, which can be addressed by solutions such as bilingual and culturally relevant teaching for Indigenous students, green citizenship-skills and TVET expansion, improvements in the quality and availability of teachers, and the creation of schools with better infrastructure and spatial organization.

5 POTENTIAL SOLUTIONS

IMPROVING EDUCATION IN THE AMAZON requires several action fronts to address both access obstacles and quality deficiencies. The IDB is present in all countries that make up this region and supports initiatives that have been tested and measured to enable adequate progress for students. This section presents solutions that have positively impacted students' experience and can serve as a reference for future actions to improve learning and completion.

FIGURE 15. Overview of Problems, Causes and Potentital Solutions



PROBLEMS
1. Low completion rates
2. Low learning outcomes

SOLUTION TO THE FOLLOWING CAUSES
- Late and disrupted pathways
- Barriers to access
- Low quality of infrastructure

5.1 Expansion and Quality of Infrastructure for Specific Contexts

By Liora Schwartz and Maria Soledad Bos

TO ADDRESS THE ACCESS-PROBLEM, first, there is a need to build more and expand existing schools in the Amazon region. One challenge when deciding where to build/expand schools is identifying where the demand is. To support governments in this task, through UrbanPy's open code,[28] the IDB is using GPS images to identify concentrations of population in cities and isolated communities, and estimate the number of students and age-groups in each area of up 0.7 km² (the area of a square with a side of 270m). With that, governments will be much more successful in prioritizing investments. Besides school coverage, there is a need to improve the quality of infrastructure; and there are three aspects to consider: i) resilience to climate change; ii) sustainability; and iii) ethno-engineering.

- **Resilience to climate change:** Schools in the Amazon region will also face increasing climate threats, including high winds and stronger rains, as well as rising temperatures that may disrupt learning. To ensure that schools will continue operating in the face of these threats, it is important to enhance the resilience of school buildings to extreme weather events and provide comfortable classroom conditions that are conducive to learning. Schools should be designed, built, and run to minimize disruptions to education by extreme weather events, as well as to provide classrooms that are as comfortable for learning as possible when temperatures are extreme. Further, schools should be prepared for use as community shelters in case of extreme weather events.
- **Sustainability:** Schools should incorporate climate sustainability strategies in their design, construction and operation. These strategies seek to minimize the use of energy and water, while including, for instance, elements such as sunshades, cross ventilation, renewal energy and water saving toilets, as well as energy efficient materials with low environmental impacts (local, recycled, and/or produced using less energy). In IDB projects, building works must reduce the consumption of energy, water and materials (and, subsequently, reduce maintenance) by 20%. This estimation is calculated by the open platform Edge.
- **Ethno-engineering:** For schools located near the cities, the current infrastructure-aspect is reasonably effective. But for schools located in the forest or in Indigenous communities, the spaces and materials based on traditional and urban infrastructure may not be effective. Ethno-engineering is an alternative aimed at creating quality spaces that meet the learning traditions of teachers and students in these communities. This discipline values traditional Indigenous knowledge as a source of inspiration, so that engineering works may be conducted in sustainable ways for the environment, while enabling the creation of infrastructure projects based on community agreements that consider the cultures of beneficiary Indigenous peoples and ethnic groups. Some of the features of ethno-engineering include the use of local materials and construction techniques, increased women's involvement and the design of solutions that take into account local practices and beliefs (Hess and Strobel, 2013). The schools

28. UrbanPy is an innovative open-source tool developed by Cities Lab within the IDB. It assesses accessibility to essential services in urban areas, identifies underserved locations, estimates populations, maps points of interest, and calculates travel times using local street networks. More features are available at the IDB's Code for Development repository at code.iadb.org.

Aldeia Infantil (Cristóbal Palma en Estrada, 2020)

built with ethno-engineering principles comprehensively address the specific learning models of Indigenous peoples and ethnic groups, facilitating interactions between teachers, students, families and the community in general, while drawing inspiration from community learning models and the use of contemporary pedagogical models and practices.

Three ethno-engineering projects stand out as successful cases; one in Brazil and two in Peru. The first of them is the reformed project *Aldeia Infantil*,[29] in the state of Tocantins in Brazil. Having originated in 1973, it went through a renovation in 2017 based on the principles of appreciation and respect for local knowledge and culture. The project's planning and design was undertaken with all members of the educational community – teachers, administrative staff and students. As a result of this planning and design model, the community adopted the use of adobe walls, a traditional technique in the territory. Further, due to the participation of teachers and students, the project's spatial configuration was updated. An exclusive central axis was defined for the educational program, and two villages were structured for student residence – one for boys and one for girls – at each end of the territory. There are dormitories for five to six students grouped into five units, located around three interconnected courtyards to facilitate sociability, while enabling the control of temperature and air humidity. A small lake was built in the central courtyard to collect rainwater and channel the surplus to the river. And in the upper part of the dormitories, common areas were defined which, in addition to student recreation, allow for expanding educational areas and providing services to the community outside of school hours.

The second project was carried out in the Indigenous community of Mazaronkiari[30] in Satipo, Peru.

29. Zegers et al., 2022; Estrada, 2020; Arquitectura Viva, 2023.
30. Zegers et al., 2022; ArchDaily (2023).

Mazaronkiari,
(ArchDaily, 2023)

Between 2013 and 2014, local enrollment increased from 30 to 120 students, leading to the need to expand the school. Through the community's active participation and contributions, in addition to the use of local materials and modern construction methods, a multifunctional arrangement was designed that harmonizes with the environment. Its main structure is built of wood and has a wall with handmade clay bricks. The side walls were designed with movable panels that can be converted into tables, to enable the creation of different learning spots within the same area. This also allows students to have a place for a cafeteria, classroom, auditorium or community meeting point, thereby adapting the space to different needs. The building follows guidelines that facilitate the entrance of natural light, constant air circulation and renewal, and the protection of its wooden structure against rain.

The third project is Chuquibambilla secondary school (Bos, Schwartz and Licheri, 2018), located in the eastern part of the Pangoa district in Peru's central jungle. This school serves a Nomatsiguenga community of approximately 60 families, where 250 children and young people are of school age. It is a result of conscientious communications with the community, and has an innovative and creative design appropriate to their economic, geographic, socioeconomic, and cultural reality.

The school infrastructure consists of a mixed construction system based on the use of concrete, cement brick manufactured on site and wooden structures typical of the region. Teaching spaces are built as three

modules arranged around a central patio. One of the modules includes a multifunctional space (for library activities, workshops, community assemblies and meetings), administrative facilities, teachers' area and a computer laboratory. The other two modules contain the classrooms. A separate small module contains the bathrooms, near which the water tank and an animal breeding area are located. Finally, a fourth module consists of student accommodations, next to which there is an open kitchen and dining area.

The school's infrastructure is linked to an extensive outdoor program and spaces dedicated to various activities, which connect students with nature and their traditions (workshops on art, clay, crafts, agronomy, animal husbandry and crops), and develop skills for local enterprises.

Chuquibambilla secondary school

Source: Bos, Schwartz and Licheri, 2018.

PROBLEMS
1. Low completion rates
2. Low learning outcomes

SOLUTION TO THE FOLLOWING CAUSES
- Late and disrupted pathways
- Barriers to access
- Lack of pertinent education
- Insufficient availability and quality of teachers

5.2 Provision of Alternative Educational Models

a) Synchronous Remote Teaching and Hybrid Learning Experiences

By Marcelo Perez and MegaEDU

THE VAST TERRITORIAL EXTENSION and regional specificities of the Amazon pose a challenge to the State's responsibility of ensuring quality education and providing adequate learning content for populations living far from urban centers. An alternative to overcoming geographical distances, in order to reach students from a diversity of remote regions, is Technology-Mediated Education (TME).

Brazil is an example of a country where this methodology has been applied in different formats. Over the past 15 years (even before the COVID-19 pandemic, when similar solutions were implemented in many places), three Brazilian states – Amazonas, Pará and Ceará – had been developing innovative initiatives to implement technological tools in the provision of basic education services. These technological tools were materialized in the so-called Media Centers (*Centro de Mídias*, or CM).

Initially, media centers in Brazil had an asynchronous approach in the provision of televised content to disseminate knowledge. The possibility of broadcasting videos over the internet opened the doors to synchronous teaching, with increased sound and image quality, and interactivity between teachers and students.

The first media center in Brazil was launched in 2001 by the State University of Amazonas (UEA) for distance learning activities aimed at teachers' training (program PROFORMAR). Law No. 9,394/1996 established that all teachers in early childhood and elementary education networks needed to have a degree in higher education. Due to the difficulties of access to rural regions, it was necessary to conceive a solution for training the teachers who were already working in these territories. Classes were broadcast live, either on television or through the Internet, and students sent questions to the teachers by phone, e-mail or fax in an asynchronous format.

With the experience acquired at the state-level, the Department of Education and School Sports of Amazonas (SEDUC-AM) opened a media center in 2007 for high school and middle school students, to distribute content through digital satellite technology. The initiative was designed for students of difficult-to-reach regions, where building schools and hiring specialized teachers is challenging. The goal was to create a synchronous arrangement, in which students could interact with teachers via a digital platform. The solution was to install microphones and cameras in the rooms, thus allowing the teachers to see and hear students, and vice versa, during the lessons.

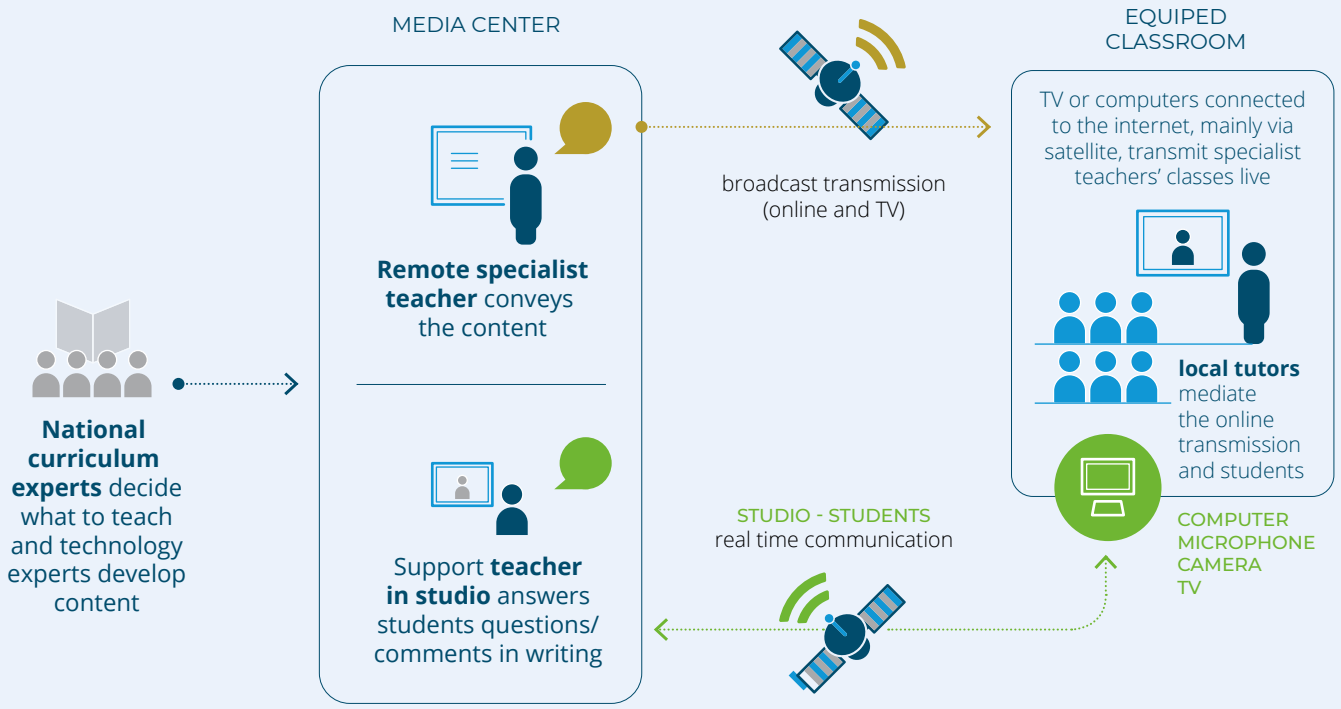
The implementation of this program was supported by specific human and technological resources:

- **Remote specialist teachers:** These are SEDUC-AM teachers who work in studios and develop lessons in a multi-step process. First, teachers consult national and state-based curriculum experts to decide which subjects to cover. The produced lesson-plans are then sent to technology experts, who create visual and video materials using online techniques. Finally, lessons are simultaneously broadcast to hundreds of classrooms across the state, where students follow a block schedule and study some subjects intensively for periods of two to four weeks. During the transmission, the teacher leading the class counts on the support of other teachers in the studio, who answer the questions sent by the students in writing by computer in real time;
- **Local tutors:** These are supervising teachers who mediate the relationship between the online transmissions and students. They do not have the skills of media center-instructors, and serve in each classroom to help students with the more difficult lessons and homework;

- **Infrastructure:** Municipal schools provide classrooms for installing equipment to watch and interact with the broadcasts. In the media center-format, studios are used for recording and distributing classes. The SEDUC-AM's media center infrastructure consists of seven studios located in the state capital Manaus, where specialist teachers give lessons synchronously and simultaneously to schools throughout the state;
- **Equipment:** In order to execute the project, specific equipment is necessary such as a TV-set for transmissions, computer, camera, speakers and microphones;
- **Connection:** In order to transmit lessons, the SEDUC uses a small satellite-internet bandwidth, in addition to transmitting content via a television channel.

Over 16 years, the content created and delivered by SEDUC-AM has impacted 60 municipalities and 26,830 students. There are currently more than 1,800 transmission points in these locations, reaching 2,000 classrooms, with an average of 13 students per classroom. Remote teachers have delivered synchronous lessons to lower secondary students on all subjects corresponding to each grade/level, with an average of 182 lessons and 2,439 students per school grade statewide. For high school lessons, which reach the largest number of beneficiaries, remote teachers give an average of 621 lessons to 1st year classrooms, 636 lessons to the 2nd year and 540 lessons to the 3rd year, with a total of more than 8,000 students per remote teacher simultaneously.

FIGURE 16. The Implementation of Technology-Mediated Education



SEDUC-AM's initiative has been widely recognized and received national and international awards, in addition to implementation funds from international partners such as the IDB, through the Amazonas Education Development Acceleration Program (PADEAM). This implementation design, which involves technology, human resources and a close coordination between the state and municipal departments of education, was replicated in the states of Ceará and Pará. In Pará, 135 localities are served by the program, with an impact on approximately 6,000 students. Finally, the program has also been replicated by the Federal Government, which launched the program "Media Centers for National Education" in 2018.

Simultaneous lessons are broadcast to all territories via platforms that may be either proprietary, as in the case of Ceará, or maintained by hired communication companies, as in the cases of Amazonas and Pará. In all these cases, the content taught to students is shared in advance with their local tutors. After being broadcast live, the lessons are recorded into what has become a remarkable collection of educational resources. During the pandemic, these videos and live materials produced by SEDUC-AM were made available to 11 other Brazilian states that adopted the program, through which the lessons were offered to nearly 7.2 million students. Despite the challenges faced by the state, its methodology was provided to almost half of the country and enabled the continuity of learning while schools were closed.

The media center-structure is used for other actions in education, such as the provision of continuous training to teachers, and for initiatives in other areas, such as the training of health professionals and court hearings. These actions facilitate communications and enable increased efficiency in the use of public resources, by delivering additional impact for communities and citizens.

An interesting adaptation of media center activities has been carried out by program *Educa+ Manaus*. The program started in 2023 under the Municipal Secretariat of Education (SEMED) to raise the local performance in Brazil's Basic Education Development Index (IDEB) and enhance quality, inclusiveness and equitability in education. In order to strengthen fundamental competencies in reading and mathematics, the program prioritizes a total of 34,000 5th and 9th grade students. *Educa+ Manaus* is a training assessments-cycle that aligns tests to curricular-needs, to enable the effective customization of teaching and learning. This method facilitates the early identification of areas that need reinforcement, promoting the continuous and adaptive development of students. Teachers' training is essential for meeting the needs diagnosed in the assessments and overcoming specific challenges. The program is supported by Manaus' media center and introduces support materials both for teachers and students, while aligning them to the challenges identified by the assessments. Despite not being synchronous, *Educa+ Manaus* has shown its capacity to expand access to education through technology by emphasizing interactivity and student engagement.

An alternative to overcoming geographical distances, in order to reach students from a diversity of remote regions, is Technology-Mediated Education (TME). In Brazil, this methodology has been applied over the past 15 years through the so-called Media Centers.

Although media centers are already a viable solution, there are improvements that could increase the quality of its learning experiences:

- **Technological improvements:** The bandwidth enabled by satellite dishes is only 2MB, which does not make possible additional interactions beyond classes, such as the use of administrative systems or the pedagogical use of connectivity for accessing digital educational content, learning platforms and other digital resources. Furthermore, In distant locations, equipment maintenance is another challenge, as is the promotion of digital culture among teachers;
- **Teaching pairs:** Since the program is a synchronous arrangement, the interactions between remote teachers and local tutors, and between students and remote teachers is fundamental. It is necessary to incorporate digital skills and the use of innovative pedagogies based on technological means (Marconi et al., 2018). Each remote teacher broadcasts the synchronous lessons to all classes corresponding to the assigned grade/level, but the high proportion of students per remote teacher restricts the real capacity for interaction. In addition to weak tutor training practices, such limited capacity debilitates the quality of teaching. It would also be ideal to redesign the content taught with a focus on students' learning and experience, as well as on challenges faced by the local community;
- **Expansion with quality:** The significant demand for synchronous education requires equipment purchases, the expansion of maintenance contracts and a focus on monitoring services and – in particular, to reduce school dropout among adolescents and young people.

Learning platforms are another way of expanding learning opportunities in regions with a low availability of teachers. Yet, the challenge in the Amazon is not only the lack of connectivity, but also of devices. As regards connectivity, a possible solution is the use of offline or, at least, asynchronous platforms. And recent experiences in Tanzania, Malasia and Indonesia have shown significant results. In Tanzania, students have developed foundational skills, such as learning syllables, words and numbers, using a pre-loaded tablet with basic learning experiences (Lee and Choi, 2020). The solution, in this case, was designed not to require instruction, but allowed educators to guide and manage learning pathways through a specific learning management system.

In the Amazon region, similar interventions have not been implemented to date. The closest known experience comes from Honduras. An intervention to reduce learning gaps among vulnerable students due to the COVID-19 pandemic used the Kolibri platform, which allows remote access to quality learning content without the need for Internet connection. The program was implemented in the department of Intibucá, where most families live in rural areas with low connectivity (32% of them have internet access), low electricity coverage (64%) and high poverty (79%) levels. It was aimed at 7th to 9th grade students and teachers. 102 schools from 15 municipalities in Intibucá were covered by the study, with half of them taking part in the treatment group. The schools received technological equipment (tablets, computers and routers). Tablets and laptops had the Kolibri platform preloaded. Training was provided to teachers on the platform's features and content, in order to prepare them for assigning materials and tasks based on it to the students. Kolibri is originally an open-source educational platform developed by the Learning Equality Foundation, an institution with the mission of creating, adapting and distributing open educational resources and tools for innovative pedagogy.

Although implementation challenges prevented the obtainment of significant quantitative results to date, program agents have provided inspiring feedback: caregivers considered the program as positive for learning, insofar as it gave students increased access to a diversity of materials and content, and raised their motivation to study. Key program agents are in favor of including technologies such as those of the Kolibri platform in education, and teachers stated that using the platform was not difficult (IDB, 2024, forthcoming).

PROBLEMS
1. Low completion rates
2. Low learning outcomes

SOLUTION TO THE FOLLOWING CAUSES
- Late and disrupted pathways
- Barriers to access
- Lack of pertinent education
- Insufficient availability and quality of teachers

5.2 b) Schools with Adapted Calendar and Spatial Customization

By Carolina Paseto

AS SHOWN IN THE INITIAL PAGES of this study, in many parts of the Amazon children spend more time than their peers of other regions commuting to school, or do not enroll at all, as a result of the absence of a nearby educational center. In some places, the distances are so long that it is impossible to travel every day from home to school.

However, there is an alternative for ensuring education in remote communities where the number of students is small, access to school transport and other services such as food are scarce, and distances are long, in addition to the continuous impacts of seasonal events. Some schools can operate under an adapted boarding school regime, in which students spend several consecutive days at school, where they are able to study, socialize, eat and rest, interspersed with the time spent at home.

An important characteristic of these schools is the adaptation of their calendar to the regional reality, which enables them to follow production patterns and climatic cycles. The teaching method dialogues with the reality of students' daily lives and with traditional knowledge, enabling knowledge exchanges between the school and the community. There is a strong focus on the topic of youth leadership, as well as on project-based learning. The authors of a recently published book, "Education and the pedagogy of alternation in the Amazon: the protagonist role and resistance of the young *alternante*" (in free translation) reiterate that this practice materializes the educational curricula according to the reality of the Amazonian peoples, harmonizing studies with their work of production units, while enabling an interrelationship with Technical and Professional Education.

The Pedagogy of Alternation has its roots in France, and is active in Brazil since the 1990s. It has been implemented by several civil society organizations in partnership with the State, by means of spaces considered as "community schools" maintained through government financial support and donations. Since 2008, locations in the country's northern region – which comprises most of the Amazonian states in Brazil – have been the sites of most Family Alternation Training Centers in connection with it (Teixeira et al., 2007), with a total of 437 schools operating under this regime (INEP, 2024). The country's Ministry of Education updated the guidelines for this type of partnership and reinforced the Pedagogy of Alternation in its Rural Education-actions in 2024. The Federal Government sanctioned a law that amends the Law on Brazilian Education Guidelines and Bases to officially include the Pedagogy of Alternation as an accepted methodology for field schools.

Some schools can operate under an adapted boarding school regime, in which students spend several consecutive days at school, where they are able to study, socialize, eat and rest, interspersed with the time spent at home.

In the state of Pará, the Unibanco Institute is supporting the strengthening of the Association of Rural Family Homes, where the children of rural producers and family farmers have free access to primary and secondary vocational education without having to abandon activities in their properties. Typically, they stay a week or longer at the Rural Family Home and a week at home, applying the practices and technical-scientific knowledge learned at school. This methodology, aligned with the National Common Curricular Basis, favors the permanence of students in the field and encourages them to contribute to the stewardship of their territories, including a focus on emerging issues related to climate change. The educational projects developed in their courses include agroforestry systems, vegetable production, poultry farming, pig farming, fish farming, cattle and buffalo rearing, production of seedlings in nurseries, and cocoa, passion fruit, papaya and pineapple plantation, in addition to beekeeping, meliponiculture and agroindustry.

The challenge in implementing schools with a boarding regime is the infrastructure that they require. Students must study, eat, rest and sleep in the educational centers. Thus, they must provide not only adequate learning spaces, but also cafeteria and adequate accommodation premises. Teachers and support teams must also remain in the school with the students, and their extended dedication can make the hiring process more difficult. Further, these schools are not yet formally part of the public education systems, and are considered to be hybrid schools. Even though they receive funds from sources such as Brazil's FUNDEB, these resources must be complemented by private funds from the civil society. This situation increases the challenge of monitoring learning activities and providing training to teachers and education professionals, as well as the overall challenge of institutional sustainability, although it may also convert itself into a great opportunity of rethinking partnership arrangements with local communities.

The challenge in implementing schools with a boarding regime is the infrastructure that they require.

PROBLEMS
1. Low completion rates
2. Low learning outcomes

SOLUTION TO THE FOLLOWING CAUSES
- Lack of pertinent education
- Insufficient availability and quality of teachers

5.3 Provision of Qualified Teachers

By Gregory Elacqua and Luana Marotta

OVERCOMING THE SHORTAGE OF TEACHERS is essential for improving the quality of education in the Amazon region. In their efforts to overcome the difficulty of attracting and retaining teachers in remote areas, some countries have implemented centralized systems to select and allocate professionals. This structure makes it possible to identify geographic areas with acute shortages more easily and implement mechanisms that attract qualified teachers to these regions. Peru and Ecuador have had successful experiences in this regard. In both countries, initiatives were designed and evaluated by the IDB, and implemented together with the governments, showing positive results.

In Peru, a low-cost intervention consisting of small incentives was implemented to promote teacher applications in disadvantaged schools, including those in the Peruvian Amazon. The program provided for the implementation of two types of incentives. The "Altruistic Identity" approach highlighted the altruistic identity of teachers on the platform, while the "Extrinsic Incentives" approach focused on increasing the visibility of monetary advantages for those teaching in remote schools. Both interventions had a positive impact in terms of filling vacancies. The impact was stronger among high-performing teachers, especially in the altruistic identity group (Ajzenman et al., 2020). This result is particularly important in the context of a country like Peru, where many vacancies, especially in rural areas, are often not filled by any candidates (Bertoni et al., 2023).

In Ecuador's case, an experiment was conducted based on the order effects-principle, which consisted in first showing the difficult-to-fill vacancies to an experimental group of candidates, in contrast to a control group that viewed all vacancies in alphabetical order. The results show that the initiative increased the teachers' likelihood to apply for positions at schools with hard-to-fill openings, by classifying these openings as their own priority and agreeing to assignments in one of these schools. Therefore, it can be concluded that the program contributed to reduce the unequal distribution of qualified teachers in schools from different socioeconomic contexts (Ajzenman et al., 2021).

One of the main factors that contribute to the teacher-shortage in the Amazon region is the additional requisite of certification in native languages, which is often asked from those working in this field. The region's wide diversity of native languages, together with the typical requirement of academic credentials, often makes it difficult for some schools to find teachers who meet all of these conditions. In order to overcome this situation, in 2021, Ecuador held for the first time a centralized competition to select teachers specifically for intercultural bilingual schools. The initiative not only made it possible to identify and centralize information on teacher hiring needs at schools, but also made it possible to adapt the knowledge test to the specific curricular requirements of these schools. The Ministry of Education added a second phase to the competition, so that teachers who did not obtain a place in the first phase could apply for one of the vacancies that were still available. This competition's implementation was accompanied by strong publicity, including information about vacancies and schools, as well as more personalized information on the teachers' chances of being assigned to a certain position and recommendations for alternative vacancies (Bocarejo et al., 2022).

There are relevant initiatives, which, though not directly implemented in the Amazon, have attained promising results and stand out as alternatives to be considered for this region. Ecuador, for example, provided personalized information to candidate teachers about their chances of being assigned to a particular school. The study revealed that recipients of the alert,

To overcome the difficulty of attracting and retaining teachers in remote areas, some countries have implemented centralized systems to select and allocate professionals. Peru and Ecuador have had successful experiences in this regard.

feedback and recommendations not only showed a stronger inclination to expand their options and prioritize the suggested schools, but were also more likely to find employment (Elacqua et al., 2022).

Another essential step to improve teacher quality is improving learning among the students who pursue the teaching career. In Chile, the IDB team developed an experimental intervention to promote educational careers during the country's centralized university admissions' process. The intervention was carried out via WhatsApp conversations, using both trained human enablers and chatbots working based on rules to replicate the human program. This intervention aimed to test the potential to attract qualified students to a teaching career and, through chatbots, offer an alternative that may be implemented on a large scale and is cost-efficient. The authors found that the human-based approach successfully increased the search for and enrollment in educational careers, especially among high-performing students. The chatbot-approach also showed a positive effect, although of lesser magnitude (Ajzenman et al., 2023).

5.4 Pertinent Abilities

a) Green Citizenship

By Liora Schwarz and Maria Soledad Bos

THE AMAZON IS HOME to nearly 10% of the world's known biodiversity, 20% of its liquid freshwater and 10% of its stored carbon stocks. These characteristics, in addition to its ecological structure and location, contribute to the stabilization of the regional and global climate, in addition to generating conditions that impact precipitation in South America.

Given the importance of biodiversity in the Amazon, students and youth living in the region must be empowered to care for and protect the forest, while using its natural resources in sustainable ways. Schools perform a key role in developing green citizens with the knowledge, values and capacity to act on behalf of the environment. Education can empower students to be agents of positive changes for the environment through individual and collective action, developing the behaviors and habits so that they may live a life more integrated with nature and build sustainable, resilient societies with the capacity to adapt to the impacts of climate change (Bos and Schwartz, 2023).

Three factors influence the exercise of green citizenship and can be developed throughout the school years:

- **Knowledge:** Students must obtain knowledge based on scientific evidence about the environment, biodiversity and climate change, including causes, impacts and possible solutions;
- **Values:** To develop green citizenship, it is essential that schools encourage the appreciation of nature, the environment and biodiversity, and promote values associated with increased climate action;
- **Capacity for action:** These are the transversal skills, through which students can feel capable of influencing and acting as green citizens. The range of such skills is wide, including problem-solving, communication, collaboration and leadership.

In order to encourage the development of green citizenship throughout school age, education systems can implement interventions such as reforming national curricula, plans and study materials to embed the knowledge, values and capacity of acting for the environment; further, they can train teachers with the knowledge and skills necessary to educate students about climate change; promote the use of effective pedagogical practices based on projects and problem solving, and stimulate lifelong learning; promote extracurricular programs that allow students to complement, deepen and contextualize education on climate change; and harness sustainability practices and strategies used in educational institutions to promote learning about sustainability and the environment.

An example of current activities in the Amazon region to empower students to be agents of change are strategies to incorporate climate change and biodiversity into the educational system in the state of Amazonas in Brazil. In 2005, the Interinstitutional Environmental Education Commission of the State of Amazonas (CIEA-AM) was created by State Decree No. 25,043 to be the managing body of the Environmental Education Policy of the State of Amazonas. Its role is to plan, coordinate, monitor and evaluate the execution of environmental education statewide, in addition to acting as a liaison with Federal and Municipal institutions. In 2007, the State Policy on Climate Change, Environmental Conservation and Sustainable Development of Amazonas was established with the aim of promoting actions to expand environmental education on the impacts and consequences of climate change to traditional communities, vulnerable groups and students of the public education network, and raise awareness among the state population about global warming and its consequences. The policy also establishes the State Education Pro-

gram on Climate Change, with the main objective of disseminating knowledge about global warming within the state education network.

As a more hands-on approach, the Brazilian state of Pará designed sustainable education-curriculum and established it as a mandatory requisite for all students in the state-system. Since 2024, students enrolled in the 1st to 12th grade will have at least one class about sustainable education per week. The State Department of Education will also provide specific resources to schools, so that they may develop learning activities in the topic and award prizes and quality seals to experiences of excellence. The state will also make the sustainable education-curriculum and its activities available for municipal schools from municipalities that decide to join its program.

Schools perform a key role in developing green citizens with the knowledge, values and capacity to act on behalf of the environment. Education can empower students to be agents of positive changes for the environment through individual and collective action.

5.4 b) Skills for Green Economy and Conservation

By Maria Fernanda Prada, Fabiola Saavedra and Itaú Educação e Trabalho

IN THE PRESENT, the predominant development models in the Amazon region are still non-sustainable and non-inclusive, based mainly on primary production and extractivism. Despite benefiting specific regions and segments of the population, past and current economic activities in the Amazon have not proven to be inclusive or conducive to substantial progress toward the Sustainable Development Goals (UNDP 2016). Therefore, the transition to sustainable development models that reduce poverty, increase productivity and protect the environment represents a significant challenge (Barbier, 2020).

Technical and Vocational Education and Training (TVET) is one of the promising ways to promote a new development model in the Amazon, by providing its population with adequate skills and appreciating their talent. As defined by UNESCO (2015), TVET comprises education, training and skills development relating to a wide range of occupational fields, production, services and livelihoods. As part of lifelong learning, it can take place at secondary, post-secondary and tertiary (higher) levels of education and includes work-based learning, as well as continuous training and professional development of qualifications. TVET also includes a wide range of skill development-opportunities attuned to the national and local contexts, and can positively impact the region in three different ways.

The first way is through Biodiversity Conservation and Resource Management. TVET programs can provide specialized training in sustainable resource management and ecological practices. Thus, even in extractivism, workers are trained to generate compensation mechanisms for the loss of biodiversity and ecosystem degradation. TVET plays a key role in equipping new generations with the skills to utilize and conserve biodiversity, whether through sustainable practices (such as climate-smart agriculture, soil bioengineering and guided nature walks) or land management resources (water, lithium and green hydrogen). In this way, TVET connects regional economic development with the promotion of sustainable practices.

Technical and Vocational Education and Training (TVET) is one of the promising ways to promote a new development model in the Amazon, by providing its population with adequate skills and appreciating their talent.

The second way is through the sustainable development of local value chains. TVET plays a key role in advancing value chains for unique Amazon products, which require interaction between local, national and international drivers. By providing appropriate skills to local producers, it is possible to avoid exploitative social relationships between traders and producers, and reduce the unequal distribution of benefits and power among actors in product value chains commonly found in the region (Labronici, 2020). Further, TVET, apprenticeship and scholarship programs can be included in formalization strategies to empower marginalized groups such as women and youth, increasing their employability (Haan et al., 2020; Dales & Ramasamy, 2019; Potter & Lupilya, 2016). Finally, due to its characteristics such as flexible and short-term training, when compared to other types of education, TVET allows including knowledge learned from native experts and applying it to ensure a balance between use and conservation.

An example of a solution currently implemented in the Amazon, which can improve conservation and sustainable development, is the Technical Training Course on Açaí Processing. Its curriculum-design began in 2022 through an intersectoral partnership between the IDB, the Brazilian state of Pará and *Itaú Educação e Trabalho*. Until then, no similar course had been available in the state, which nonetheless accounts for almost 90% of Brazil's açaí production. The development of the course-content included the participation of specialized researchers on the field, government technicians, family farmers and other representatives of the local productive sector. It will have a minimum workload of 800 hours divided into five modules, with practical and theoretical classes that cover different stages and the knowledge involved in the production chain, from planting and management to marketing to final consumers. The curriculum not only covers the potential of the açaí chain, but also the promotion of economically, socially and environmentally sustainable practices. An example of such practices is the strong emphasis on planting açaí in combination with other native plants, increasing thereby their productivity and enabling the exploration of off-season products, while maintaining local biodiversity. Specific disciplines were developed that address the preservation of the Amazon and its relationship with the local production chain, to promote the responsible management of local natural resources. Students are expected to learn about the tools used in their TVET process and search autonomously for specific solutions for their contexts, using technologies which are already available in the territory. The curriculum-implementation is in its structuring phase, before reaching the TVET teaching units in 2024. Other successful examples of high-quality training in agriculture aligned with sustainable practices, conservation and resource management in other Latin American and Caribbean countries can be found in Prada and Rucci (2023). The main condition that these programs have to meet is that the supply of courses must aligned with market demands, so that students may finish their training stage in good conditions to find a job with positive prospects, while contributing to local value chains.

The third and final way in which skill development-opportunities can have positive impacts in the region is by alleviating poverty. The Amazon region is characterized by high levels of informality in its economy, with many residents involved in subsistence-agriculture or informal sectors such as livestock farming, with a lack of connectivity to external markets, which limits economic complexity (Goldstein et al., 2023). TVET programs provide skills that improve employability and income potential in promising economic sectors. This helps to reduce poverty and increase living standards, contributing to a more inclusive type

Source: Audiovisiual Sandobox Program (IDB, 2023).

of development and bringing new opportunities to the people of the region. An example of solution implemented in this sense is the *Audiovisual Sandbox* program in Colombia, which has impacted 1,500 vulnerable young people (Afro-descendants, Indigenous people, women, immigrants and the LGBTQIA+ community), helping them have access to the work market in the audiovisual industry. Participants included people aged between 18 and 30 in the department of Putumayo, in the Amazon, in addition to five other regions in the country's interior. The focus on audiovisual skills was motivated by the growth of this industry. In 2019, nearly US$ 5.7 billion were invested to produce content, leading to the creation of more than 1.6 million direct and indirect jobs in Latin America and the Caribbean. The project consisted of sharing the potential of job opportunities that exist behind the cameras by offering specific technical training in the audiovisual sector through an online platform, enabling practical training and internships in production companies, in addition to structuring a mentoring program to connect young people to entry-level employment opportunities. In total, 625 young people completed the training phase, with a significant acquisition of new skills. Among them, 100 people obtained internships in local productions and were accepted for practical training at the Congo Films School. The IDB led the *Audiovisual Sandbox* design and implementation with the support and co-financing of Netflix, and the partnership of the Colombian Ministry of Culture, which was the project's beneficiary. More details can be found in Prada & Rucci (2023).

5.4 c) Intercultural Bilingual Education

By Emma Näslund-Hadley

INTERCULTURAL BILINGUAL EDUCATION (IBE) promotes relevant education for Indigenous students from communities that have distinct languages, cultures and ways of life (Näslund-Hadley & Santos, 2022). Its goal is to create an inclusive and culturally responsive learning environment, meeting the specific needs of children and adolescents who may face challenges in regular educational settings due to cultural differences and language barriers.

Investing in IBE is a way to improve the learning level of Indigenous students. In primary education, the method has been associated with favorable results in different countries of Latin America. In the Amazon region, there is evidence of decreasing school retention in Bolivia and increasing girls' enrollment levels in Peru, thereby reducing gender inequality. Also in Bolivia, a longitudinal study found that, compared to a control group, students of IBE schools experienced an increase in self-esteem (Abram 2004). Beyond the Amazon, data from Guatemala shows that the National Intercultural Bilingual Education Program decreased retention rates from 47% to 22% after Indigenous students were transferred to IBE schools (Abram 2004).

Implementing quality IBE begins with community engagement, to ensure that the program is aligned with the cultural values and aspirations of Indigenous peoples. The next step is to create a culturally relevant, context-appropriate curriculum that incorporates Indigenous languages, knowledge and traditions. The development of teaching materials must also involve community members, educators and experts to reflect the local context. Teachers need comprehensive training that develops the skills needed to teach in an intercultural and bilingual environment, while understanding and respecting diverse cultural perspectives. Education systems must allocate resources, including funding, materials and infrastructure to support the implementation of a project like IBE. It is also necessary to ensure that schools have the necessary tools to provide quality education in Indigenous languages. Finally, it is important to establish a system to monitor and evaluate student learning, teacher effectiveness, and community engagement, using the data for continuous adjustments and improvements.

Access to IBE in Latin America is still limited. Although the exact proportion of schools operating with this model is unknown, Näslund-Hadley & Santos (2022) estimate that they represent 11% of primary schools in Ecuador and 25% in Peru. In secondary education, the offer drops to 7.4% in Ecuador and less than 15% in Peru. It is also necessary to take into account that the term IBE is usually used simply to describe schools attended by Indigenous students, without necessarily including bilingual or intercultural teaching. In this context, there are very few quality schools actually operating under the IBE model in the Amazon region.

One of the main challenges in practice is the shortage of teachers. Professionals allocated to Indig-

In the Amazon region, there is evidence of decreasing school retention in Bolivia and increasing girls' enrollment levels in Peru, thereby reducing gender inequality. Also in Bolivia, a longitudinal study found that, compared to a control group, students of IBE schools experienced an increase in self-esteem (Abram 2004).

enous schools tend to have limited training, less formal education, less experience and receive lower salaries compared to non-Indigenous schools (Bertoni et al., 2020; IPA, 2020a). It is also difficult to find teachers who know Indigenous languages and native cultures. In Peru, only half of teachers in Indigenous bilingual schools claim to be fluent in the dialect in which they are expected to teach, thus increasing learning gaps (Benavides, Mena and Ponce 2010).

A successful case in Intercultural Bilingual Education was JADENKÄ, a mathematics program created in Panama to improve the learning of students from the Ngäbe-Buglé region – the largest and most populous of the three Indigenous territories in the country. According to data from the national learning test (MEDUCA, 2018), 83% of students in this region had either low or very low learning levels in mathematics, compared to 49% in the national average.

In schools where the program was implemented, many teachers were not from the region and did not know how to speak the Ngäbe language. Further, the classrooms had a mix of monolingual Spanish or Ngäbe students as well as bilingual students. JADENKÄ consisted of recording 108 audio lessons that repeat mathematical concepts in both languages (Spanish and Indigenous) for preschool students. Each audio lasts around 45 minutes and supports the teachers in conducting the activities, with stories and songs relevant to the culture of Ngäbe-Buglé. The audio lessons follow an investigative and problem-based pedagogical approach, through which students learn to solve mathematical challenges by working in groups under teacher's guidance, in addition to singing and dancing to songs that reinforce lessons such as numbers, geometric shapes and spatial relationships. The program was also created based on the concept of ethnomathematics, which considers that the discipline is inserted within a cultural and social context, with aspects that must be incorporated into the teaching journey.

Without increasing class time, program JADENKÄ improved students' skills in the knowledge of their own culture, in addition to ethnomathematics and Western mathematics. In the second year of implementation, when teachers were more familiarized with the model, the students' learning of Western mathematics showed an improvement of 0.24 standard deviation. This result equates to more than half an academic year of additional learning compared to the status quo (Näslund-Hadley et al., 2022). In 2023, JADENKÄ was recognized with one of the most relevant awards in education, the Khalifa Education Award.

Based on the JADENKÄ-model, the Peruvian Ministry of Education will launch the *MateRaymi* program in 2024, which will offer quality IBE for mathematics-teaching in Quechua language. The program was designed in collaboration with the IDB and the NGO Innovations for Poverty Action (IPA) and aims to overcome language challenges by implementing classes with audio support. Classes also incorporate Indigenous culture, mixing Western mathematics with Quechua ethnomathematics. A version of this program for use at home by parents or caregivers of students in the Amazon region of Venezuela is also in development and is expected to be tested in 2025. The audio instruction program is handily scalable and already gives evidence of improving the quality of teaching, even in classrooms that do not have a native teacher or a teacher knowledgeable about the local language and culture.

However, while the JADENKÄ model offers an immediate solution to bridge the skill gaps of teachers, educational systems must also work to ensure in the medium term that schools with bilingual intercultural education have well-educated teachers with adequate training and experience. Students learn better when they can learn in the language and culture that they understand and speak best.

PROBLEMS
1. Low completion rates
2. Low learning outcomes

SOLUTION TO THE FOLLOWING CAUSES
- Insufficient availability and quality of teachers
- Late and disrupted pathways

5.5 Learning Recovery and Permanence

a) Acceleration Programs

By Pablo Zoido Lobaton and Victoria Oubiña

ONE SOLUTION TO IMPROVE student performance in places with unsatisfactory achievement rates is via learning acceleration programs. They are characterized by a priority on fundamental skills, customized learning and constant monitoring with a focus on results, as well as by enhancing connections and socio-emotional skills. For locations that face issues of long distances or teacher shortages, such as the Amazon region, learning can be accelerated via remote tutoring, in which the tutor and student are not physically in the same space.

Since 2022, the IDB has provided technical and financial support to Ministries of Education and civil organizations in the implementation of distance classes in nine countries. The methodology used was customized to meet the needs, contexts and political priorities of each location.

Remote tutoring consists of weekly text messages and one-on-one telephone support. The typical duration is eight weeks, and the target population consists of students who do not have adequate learning levels. The objective is to strengthen fundamental skills with personalized support, adapting the content to the needs of students. Using regular phone calls, an accessible and low-cost technology, enables to reach vulnerable young people who do not have an internet connection, while developing an economical solution that can be scaled to accelerate learning.

In the Amazon, an IDB study (in progress) based on a randomized pilot was conducted in the Brazilian state of Pará. 483 students were divided into control and treatment groups, and students from treatment groups had a 0.15 standard deviation improvement over students in the control group. In this pilot, a significant share of students received calls in less than the 8-week standard period as a result of implementation challenges. Students who received the 8-week intervention improved 0.35 standard deviations.

In addition to this experience in Pará, the program was implemented in other countries outside the Amazon Region: El Salvador, Guatemala and Mexico (Tabasco and Guanajuato). Regardless of the type of impact assessment (experimental or quasi-experimental) and context (national or local), students who received tutoring improved their performance when compared to similar students who did not. The estimated impact ranges from a standard deviation of 0.155 in Guatemala, 0.234 in El Salvador and 0.408 in Tabasco. Furthermore, program participation, engagement, and eventually completion are associated with even more significant improvements.

Despite positive results, there are challenges that need to be addressed for attaining better outcomes, such as establishing contact with students, and tutor turnover. Some students do not have a telephone at home (neither mobile, nor landline); others do not

For locations that face issues of long distances or teacher shortages, such as the Amazon region, learning can be accelerated via remote tutoring, in which the tutor and student are not physically in the same space.

answer calls; and there is still resistance by families who do not know about the project, perhaps due to a lack of face-to-face awareness-raising dialogues. In the case of tutors, they usually leave the project because they prefer other commitments or because the amount paid for tutoring is low. It is important to consider these findings for future interventions.

Besides remote tutoring programs, there are other ways to accelerate learning for students with the biggest learning gaps. Another example is *Teaching at the Right Level*, a program commonly found in some African and Asian regions, which is also active in Brazil. Its goal is to develop basic and mathematical literacy skills in students from 3rd to 9th grade experiencing big learning gaps. Education professionals undergo 30 hours of in-person training and schedule a monthly online meeting to clarify doubts throughout the program's implementation, which lasts for about one academic semester. Its implementation-model depends on each municipality, but in most locations, the option has been to teach after-school classes.

In 2023, the program was implemented by Elos Educacional in eight Brazilian municipalities, four of them in the Amazon region (Moju-PA, Ulianópolis-PA, Presidente Figueiredo-AM, and Porto Velho-RO). Overall, there was a 26 p.p.-increase between the first and most recent assessments in Portuguese language, for students who were able to read at least one paragraph. In mathematics, there was a 34 p.p.-increase, considering students who performed at least subtraction operations. Specific results per Amazonian municipality were not available due to confidentiality aspects, but the trend was similar.

Despite positive results, there are challenges that need to be addressed for attaining better outcomes, such as establishing contact with students, and tutor turnover.

PROBLEMS
1. Low completion rates
2. Low learning outcomes

SOLUTION TO THE FOLLOWING CAUSES
- Insufficient availability and quality of teachers
- Late and disrupted pathways

5.5 b) Teen Pregnancy Prevention and the Promotion of Schooling for Parenting Adolescents

By Emma Näslund-Hadley

THE PANDEMIC-INDUCED SCHOOL CLOSURES disrupted the regular routine and support systems for students all across the Amazon region. Such situation meant that many adolescents were left unsupervised, creating a potential environment for increased risks, such as sexual abuse, non-consensual sex, or lack of access to contraception. To scrutinize the impact of school closures during the COVID-19 pandemic on teen pregnancy, a recent IDB study analyzed crucial statistic data from Ecuador and Peru (Näslund-Hadley, Arcia, Zanoni & Mahé, 2024). The study shows that the declining trend in teen pregnancies observed since 2017 was halted in 2020, with observable increases in pregnancy rates during 2020-2021. The findings from both countries show similar regional disparities regarding girls in rural areas, especially in the age groups of 15-16 and 17-19, and urban girls aged 17-19. The highest teen pregnancy rates were reported for these groups, reaching close to 10% of the female adolescent population. Disturbingly, the analysis shows a correlation between school closures (full or partial) and high teenage pregnancy rates in the age group of 13-14 years in Ecuador and among girls aged 13-19 in Peru. The study highlights a particularly concerning impact on the Indigenous tween group. For instance, in 2020 the number of pregnancies of Indigenous girls in the 10-12 age group in Ecuador experienced a 100% increase over 2019. Similarly, Indigenous girls in the 10-12 age group in Peru also seem more vulnerable than other age groups, having experienced a 19% increase in 2020 over 2019.

Young women who leave school due to pregnancy are more likely to face economic hardships, which, in turn, may increase the likelihood that their children will also face similar challenges in the future. Several countries in the region have recent studies that reveal the economic implications and the educational opportunity-cost linked to teenage pregnancy. For instance, in Ecuador, the differences in the level of education achieved and its effects on labor income between teenage mothers and those who postpone motherhood until adult age show that early motherhood generated an economic loss of US$59.6 million in 2017 (UNFPA, 2020).

School dropout does not necessarily begin with teenage pregnancy, but can also be the result of early marriages. In order to ensure universal access to quality education, it is fundamental to act also on this issue (Näslund-Hadley & Binstock, 2010). Comprehensive support systems, including policies and interventions, are needed to address the complex relationship between early pregnancy and gender inequality in education.

In response to this complex and interrelated set of factors, integrated interventions appear to work best in the prevention of early pregnancy and provision of support to teenage mothers, demonstrating a positive impact in terms of reduced school dropout rates among girls. By acting in multiple fronts, such as sexual education, access to health services and offering support to young mothers so that they may continue their studies, the interventions contribute to creating a more favorable environment. Adolescents who receive this integrated support are more likely to stay in school, complete their education and have better future prospects.

An international meta-analysis derived from 15 studies concluded that enrollment and completion rates increased among pregnant teens and parenting teens involved in integrated services programs, compared with their peers in control groups. Since these programs offer a range of services such as tutoring, academic support, career guidance, financial assistance, childcare and health services, it was not possible to isolate the effect of different interventions (Steinka-Fry, Wilson & Tanner- Smith, 2013). Regard-

ing pregnancy prevention, another meta-analysis concluded that integrated programs to promote school engagement through learning support, address challenging childhood experiences through guidance and social support, and provide professional development and experience have demonstrated a joint effect of 39% in reducing teenage pregnancy rates (Harden et al., 2009).

Several noteworthy initiatives have been implemented in Latin America to prevent early pregnancy. Ecuador is an example in the Amazon region, where the Ministries of Health, Education, Economic and Social Inclusion, and Justice, among others, are brought together through the Intersectoral Policy for the Prevention of Pregnancy in Girls and Adolescents 2018-2025, which promotes evidence-based sexual education. Between 2019 and 2020, a total of 70,000 families were impacted by the program "Educating as a Family", which acts through campaigns, workshops and educommunication messages for students, teachers and parents.

In 2021, the Government of Peru approved a set of Comprehensive Sex Education Guidelines for Basic Education, providing therewith a regulatory framework for educational institutions, teachers and the educational community at large in public and private schools. The guidelines are part of a series of policies in the context of the country's National Educational Project 2036. The Peruvian Ombudsman's Office is responsible for supervising the implementation of sex education in the country's classrooms.

In 2018, Guyana established a National Policy for the reintegration of teenage mothers into the formal school system. Its objective is to encourage teenage mothers to continue their studies until completing high school in public teaching institutions. The policy further tasks the Ministry of Education and other government agencies with providing awareness-raising programs for parents, community groups and adolescents; creating supportive environments for pregnant students and their teachers; offering guidance and psychosocial support, parenting sessions and family support groups, as well as postnatal services and childcare.

The IDB is currently working with the Peruvian Ministry of Education to test a toolkit that promotes behavioral change, targeted at young people to combat teenage pregnancy and child marriage, as well as to promote the education of Indigenous girls. The material is being prepared in Quechua language and will be developed and validated to ensure that it is culturally appropriate.

PROBLEMS
1. Low completion rates
2. Low learning outcomes

SOLUTION TO THE FOLLOWING CAUSES
- Insufficient availability and quality of teachers
- Late and disrupted pathways

5.5 c) Systems to Protect Educational Pathways

By Marcelo Perez Alfaro, Cecilia Giambruno, and Martim Aguiar

MORE THAN A RESPONSE to a particular event, school dropout is the result of a process that involves multiple factors. While factors directly linked to school – such as student performance and behavior – are fundamental, the students' community environment, family background, and behaviors outside the institution are just as important (McDermott et al., 2019; Zaff et al., 2017).

The relevance and complexity of this challenge call for redoubling efforts to attain evidence-based systemic responses, using new technologies to ensure that children and adolescents in the region have a real opportunity to pursue continuous and complete educational pathways, thus guaranteeing their right to education (Ortiz et al., 2021).

The use of Early Warning Systems (EWS) in the educational realm is relatively recent. In the Amazon region, their development has been driven by the advancing new technologies and the disruption caused by school closures due to COVID-19. These systems involve predicting in advance which students may face challenges in their educational process that put them at risk of dropping out of school, usually operating with the logic of "red flags" (UNICEF, 2018).

The IDB's Education Division promotes the approach of protection systems for educational pathways structured with two components: student at risk detection – using EWS as the main tool – and timely and targeted interventions (Ortiz et al., 2021) activated after detection.

The first initiatives to create early warning systems focused on expert knowledge-based models and indicators, which consist of generating simple risk indicators – for instance, low grades and low school attendance –, defining static thresholds for anomalies, and establishing rules for their aggregation (Bowers et al., 2013). This type of model, accompanied by adequate implementation, has proven to be effective in detecting students potentially at risk of exclusion. The selection of indicators is crucial for accurately identifying students in a potential exclusion-situation (Bruce et al., 2011). The current literature on the subject allows identifying three pivotal predictors in terms of educational exclusion: attendance, behavior and course performance (ABC model) (Bruce et al., 2011). The selection of indicators should also consider the characteristics of educational exclusion in each context, allowing for the formulation of more accurate early warning indicators (Balfanz, 2008). In Latin America and the Caribbean, for example, teenage pregnancy and overage learner-rates (age-grade distortion) also stand out as visible indicators (Adelman and Székely, 2017).

With the development of more recent technologies, expert knowledge-based early warning systems have begun to be replaced by predictive models based on Artificial Intelligence (AI), which use algorithms to anticipate students' risk of dropping out by analyzing large volumes of information (Ortiz et al., 2021b). At the end of 2020, the Peruvian Ministry of Education introduced the web platform *Alerta Escuela*, in which school principals and tutors can assess each student's risk of dropping out by a predictive model based on machine learning-techniques and receive guidance on adequate forms of intervention (Minedu, 2020). An implementation evaluation of the initiative sheds light on lessons learned from experience and best practices. Initially, the implementation's evaluation shows that many school principals do not yet understand the model or the variables used to obtain it. More complex models, such as those using machine learning, are even more difficult for users to grasp. Additional training is required to enhance users' proficiency amid increased complexity and the model's predictive capacity (Alegría et.al., 2023). The benefits and costs of use varied across schools based primarily on the

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students' population and connectivity. In schools with few students, the system may be perceived as burdensome, rather than supportive. In areas with limited connectivity, alternative methods like SMS or WhatsApp may be more effective for delivering information (Alegría et.al., 2023). Finally, the *Alerta Escuela* platform primarily used administrative data from Minedu and government agencies, with an additional module to collect supplementary information. The inclusion of this module affected users' perceptions, with principals focusing on costs rather than benefits.

It must be pointed that information availability is the basis for expert knowledge-based alert systems and a crucial requirement in machine learning-based models. Having a solid Educational Management and Information System (EMIS), which includes an integrated and nominal registry of students with associated personal and academic data on behavior, as well as on attendance and socioeconomic levels, is a necessary condition for the development of AI-based alert systems. Data quantity, quality and method of collection influence the ability of early warning systems to predict risk, generate trust in users and motivate their use, and be effective to identify students in risk of dropping out. Some early warning systems complement information by collecting new data based on principals or teachers, as in the case of *Alerta Escuela*. However, it is essential to carefully balance this to avoid overburdening school teams with administrative records.

In addition to identifying students, it is crucial to deploy timely and targeted interventions. To attain this aim, several strategies and resources can be combined, including strategies for educational centers originating from the central level of ministries or secretariats, and micro-strategies or interventions defined locally in the educational centers. When designing a protection system for educational pathways, it is convenient to begin by mapping the existing programs and projects, bearing in mind the populations and groups that they serve and the problems they set out to address. This approach allows optimizing the coexistence of multiple initiatives and avoiding the proliferation of parallel or overlapping programs that operate disjointedly, while identifying policy gaps where it will be necessary to implement new policies and strategies (Almeyda et al., 2023).

The basic principle in the development of protection system-models for educational pathways is that they should not be concentrated and controlled by a central level but, instead, should have the ability to operate at the local level through coordination and cooperation between different instances and institutions (Eurydice, 2014). Flexibility is a key element for adjusting and adapting strategies, with emphasis on the need for relevant decision-making at intermediate levels. In this way, the general frameworks of programs are defined, while decision-making capacities are delegated in real-time, according to different needs required by each school context, thus strengthening the work of educational centers as fundamental actors in the process (Muñoz Stuardo, 2020).

A project launched in the Brazilian state of Sergipe established a protective system for educational trajectories, centered around a component that aims to identify students at risk of dropping out. This component categorizes students into three groups, based on their total of class absences, and identifies customized interventions for each group. The system operated across three management levels: (i) the Department of Education's central team; (ii) the

State Regional Technical Teams; and (iii) management teams within individual schools. Each management level had clearly defined roles and responsibilities and received pertinent training. School teams were charged with implementing actions for students at risk and documenting these interventions on the platform. Directorates conducted bi-weekly follow-up procedures with schools to provide support, while accessing comprehensive school-level information. An impact assessment of the pilot program based on a randomized control trial identified significant statistical effects in terms of reducing the percentage of students at risk of dropping out as a result of absenteeism rates: (i) a 2.5 p.p.-decrease among students facing low dropout risk, corresponding to a relative decrease of 19% in this category; (ii) a 1.4 p.p.-decrease among students facing medium dropout risk, corresponding to a relative decrease of 31% in the category; and (iii) a 0.4 p.p.-decrease among students facing high dropout risk, corresponding to a relative decrease of 39% in the category.

One of the principal lessons learned is the importance of ensuring schools the resources and basic conditions to address the complex challenge of educational exclusion. In this sense, the relevance of the guidance-work from early stages and the presence of permanent psychosocial support teams is highlighted (Eurydice, 2014). Experience shows that any protection system for educational pathways must encompass a consistent and medium-term strategy in the field of human resources, counting on specialized teams working in each school (and, thus, alleviating the work of teachers and principals). It must also permanently train teams in the institutional and pedagogical approach to inclusion (Muñoz Stuardo, 2020). Finally, the properly pedagogical dimension of educational inclusion must be a clear priority, since the best way to ensure an effective and complete educational pathway is through quality education that is sensitive to the problems and needs of students (Muñoz Stuardo, 2020).

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6 A NOTE REGARDING IMPLEMENTATION

BEYOND THE CHALLENGES PRESENTED in this study, an additional layer of complexity regards governance and management capacity. Ideally, educational management involves assessing demands and creating strategies and guidelines to steer action, as well as control and accountability mechanisms, so that the results of the service delivered to the population may be measured and new needs may be identified. In practice, nonetheless, this process has not yet unfolded with the desired harmony in many parts of the Amazon region, especially between different governance levels representing the national, local and school levels. National governments have difficulties in identifying specific needs of remote and/or rural areas, while local governments have difficulties in fulfilling their responsibilities due to the lack of technical or financial resources. The obstacles in the assessment of needs are also related to a data-challenge, as many countries still have weak Educational Management and Information Systems (EMIS) – a reality that also posed a challenge for the structuring of this document.

An indicative sign of reduced management capacity can be noted, for instance, in Brazil. Considering all the states in the Amazon region, 19% of schools do not yet have a school council – a figure that drops to 5% in the rest of the country. Among the educational centers that do have a school council, only 57% of councils meet two or more times a year, in contrast to the considerably higher rate of 84% in the rest of the country. Since school councils bring together representatives of teachers and parents, and play an important role in approving decisions, their absence may indicate less engagement and attention to the needs of the community.

The debate on governance and institutional strengthening in the Amazon region must include several aspects. It is not enough just to create formal rules and guidelines to be followed. In addition to these rules and guidelines, it is necessary to engage in open dialogues and consider the additional challenges for the region. It is also important to adapt policies to sound governance parameters, counting on the presence of technically qualified people to implement and monitor actions.

In the context of traditional peoples, understanding their needs and being flexible are key elements for avoiding conflicts and enabling policy implementation. It is common in the region that Indigenous peoples have more autonomy over their educational policy, which includes having their own curricula, as well as classes and

study materials available in their language. In some countries, they can also have the prerogative to hire teachers of their own people, which may produce significant difficulties, mainly due to lack of educators, and create yet another barrier to learning.

Another example are schools which are not formally linked to education departments, such as boarding schools in Brazil. In the absence of State presence, the civil society creates an education center to meet the needs of local populations. It usually results in children having to spend longer periods away from home to study and return home each week or month, due to distances and lack of transportation. In this case, a good relationship between civil societies and education departments can improve the educational offer, with more qualified professionals in the future.

The situations described through the examples above are not easy to change. They require more open dialogues and extra caution in designing and implementing policies. One example of good practice comes from Colombia, where the Ministry of Education defines policies at the national level that guide departments and municipalities in managing the provision of public education services locally. To address identified governance gaps, the IDB has funded a program to improve educational trajectories from preschool to secondary education in rural regions. This implied either working with or supporting schools and secretariats of education, in coordination with the national government. This ongoing project is currently active in the six Colombian departments considered as parts of the Amazon region: Amazonas, Caquetá, Guainía, Guaviare, Putumayo and Vaupés.

Finally, one lesson learned from this document is how much policy makers across Amazonian countries, especially those focused on the Amazon region within their countries, can mutually benefit from their exchanges to address common challenges, identify optimal solutions and implement them. Cooperation and advice among them may become even more productive, in certain respects, than with other policy makers within their own countries but outside the Amazon. In sum, when designing and implementing educational policies, it is important to hold open dialogues and adapt policies based on local capacity and context, as well as to balance the autonomy and rights of traditional peoples. Furthermore, cooperation with other policy makers within the Amazon Region can be very productive. By becoming more mindful of these dimensions, initiatives also become much more likely to succeed in terms of tackling the challenges presented in this document, and improving education outcomes in the Amazon region.

Policymakers in the Amazon can greatly benefit from mutual exchanges to address common challenges, adapt policies to local contexts and capacities, and balance the autonomy and rights of traditional peoples.

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ANNEXES

ANNEX 1. Description of Amazon Region in this Document: Adapting the *Amazonia Forever* Framework for Educational Assessment

THE WORK AREA for this report was defined building upon the **Amazonia Forever** program established by the Inter-American Development Bank (IDB), with specific adaptations tailored to the scope of this educational analysis. The objective was to comprehensively outline the educational conditions across the Amazon, evaluating various indicators and contrasting these with national averages to gain insight into both the status and the availability of data for each indicator. This effort was guided by considerations such as available educational data, levels of disaggregation, and criteria pertaining to biome and language, to accurately reflect the Amazon's diverse contexts. Engaging with specialists from each country, their expertise was leveraged to ensure a precise depiction of educational indicators.

The **Amazonia Forever** program delineates its work area through extensive consultations with countries and regional organizations like the Amazon Cooperation Treaty Organization (ACTO) and the Amazon Network for Geo-referenced Socio-environmental Information (RAISG). This encompasses the eight Amazonian countries that are IDB borrowers, representing a region as extensive as 40% of the IDB's work area in Latin America and the Caribbean.

Although the **Amazonia Forever** program encompasses the entire national territories of Guyana and Suriname, this report needed a more detailed intra-country analysis to uncover educational disparities. Therefore, it was necessary to differentiate between Amazon and non-Amazon regions within these countries. This involved comparing hinterland to coastal areas in Guyana, and urban to rural settings in Suriname, to deepen the understanding of their intra educational disparities.

In Peru, there are five departments that are entirely within the Amazon, but this report includes only four of them: Loreto, Ucayali, Madre de Dios, and Amazonas. San Martín was not included in the Amazon Region due to linguistic criteria; Quechua, the predominant language in the region, does not align with the considered Indigenous languages to the Amazon.

In Bolivia, the analysis was specifically directed towards Pando and Beni, departments that lie entirely within the Amazon basin. This geographical positioning not only eases the access to relevant data but also ensures that the analysis is consistent with the Amazon biome—where 100% of their territory is classified as Amazonian. In contrast, regions like Cochabamba, La Paz, and Santa Cruz were not included as Amazon Region. The decision was based on the logistical challenges in obtaining precise Amazonian territory data, which would require municipal-level information, and the recognition that their biomes do not fully fall within the Amazonian classification.

These methodological decisions, prompted by the distinct requirements of the educational inquiry within the Amazon, were instrumental in providing a detailed and accurate portrayal of the educational landscape across this ecologically and culturally differentiated region, accommodating the varied data availability issues present in each of the eight encompassed countries.

ANNEX 1, TABLE 1. Description of Amazon Region in this document

Country	Amazon Region
Bolivia	• 25% of territory • 6% of population • 2 departments (from a total of 9): Beni y Pando. Focus was limited to Pando and Beni as Bolivia's Amazon region due to their location entirely within the Amazon basin and the straightforward availability of data. Other regions, like Cochabamba, La Paz, and Santa Cruz, require complex disaggregation by municipalities for pinpointing Amazonian data, which isn't feasible with the currently available public sources.
Brazil	• 59% of territory (IBGE) • 14% of total population. A notable demographic feature of the Brazilian Amazon region is its predominantly Afro-descendant population, which stands at 78%, in contrast to the national average of 52%. Additionally, over 280,000 people, constituting about 1% of the population in the area, self-identify as Indigenous (PNADC, 2021) • 9 states (from a total of 27): Amazonas, Acre, Roraima, Rondônia, Pará, Amapá, Tocantins, Mato Grosso, and Maranhão
Colombia	• 42% of territory • <2% of population. While only 5% of the region's inhabitants identify as Indigenous, compared to 4.5% nationally, this percentage exceeds 50% in the Amazonian departments of Guainía and Vaupés • 6 departments (from a total of 32): Amazonas, Caquetá, Guainía, Guaviare, Putumayo, and Vaupés
Ecuador	• 43% of territory • 5% of population (INEC). Around 58% of the Ecuadorian Amazon population self-identifiy as Indigenous, compared to just 3.9% in the country's non-Amazonian regions (ENEMDU, 2022) • Population aged 6-17: 0.3 million • 6 provinces (from a total of 24): Sucumbíos, Napo, Orellana, Pastaza, Morona Santiago, and Zamora-Chinchipe
Guyana	• Entire territory is considered part of the Amazon region • Where possible, there are comparisons between hinterland (interior) and coastal (non-hinterland) areas as proxies for Amazon and non-Amazon areas. The Hinterlands (1, 7, 8 and 9) are home to most of Guyana's Indigenous peoples, which account for about 10% of the country's population. The Amerindian population comprises 9 groups: Akawaios/Kapon, Arawaks/Lokonos, Arekunas/Kamarakoto, Karinya/Caribs, Makushis/Macuxi, Patamonas, Wai Wais, Wapishanas and Warraus
Peru	• 60% of territory • 10% of population. Nearly 11% of the population in the Amazonian territory identifies as Indigenous, compared to about 20% of the population in the entire country • 4 departments (from a total of 25): Loreto, Ucayali, Madre de Dios and Amazonas. Given a linguistic classification, not just geographical, San Martín is not considered as part of the Amazon
Suriname	• Entire territory is considered part of the Amazon region • Where possible, there are comparisons between urban and rural areas as proxies for Amazon and non-Amazon areas
Venezuela	• 51% of territory • 7% of population • 2 states (from a total of 23): Amazonas and Bolívar

ANNEX 2. Adequate Learning Levels by Country

EACH COUNTRY has its own specific tests and defines its own standards for what is considered adequate learning in the evaluated disciplines such as mathematics and reading. Given the diverse educational standards and assessments utilized across the different countries that composed the Amazon Region, this compilation highlights the variances in defining and measuring educational outcomes.

The analysis draws on a range of national assessments from countries within the Amazon Region and utilizes UNICEF's Multiple Indicator Cluster Surveys (MICS) data for Suriname. Notably, Bolivia and Venezuela are not included in this analysis due to the lack of relevant national learning assessment data. This disparity in available data and assessment methodologies implies that making direct comparisons across these countries may be challenging and limited due to the differing benchmarks and testing methodologies used across these countries.

- **Brazil:**[31] The System of Basic Education Assessment (SAEB) in Brazil employs a 10-level scale for assessing student learning, with the Ministry of Education setting level 7 as the benchmark for Adequate Learning in mathematics and Portuguese language. Levels below 3 are deemed Insufficient, while levels 3 to 6 are categorized as Basic. For the purposes of this document, the SAEB 5th Year-results inform the analysis on primary education.
- **Colombia:**[32] The SABER tests organize student performance into four distinct levels: Insufficient, Minimum, Satisfactory, and Advanced. These categories help quantify the ability of students to tackle questions of varying difficulty levels and master specific knowledge and skills. Adequate learning is defined as achieving either a Satisfactory or Advanced level, underscoring a solid command over the evaluated competencies. The SABER 5 results inform the primary education analysis.
- **Ecuador:**[33] *Ser Estudiante* (SEST), developed by INEVAL, assesses various subjects at the final grade of different education levels, including High School. Achievement is classified into four levels: Insufficient, Elementary, Satisfactory, and Excellent, with Satisfactory as the minimum competency. The analysis focuses on fourth-grade results.
- **Guyana:** Adequate learning in primary education is shown by how many students pass the National Grade Six Assessment (NGSA) in each subject, showing they meet national educational standards.
- **Peru:**[34] The *Evaluación Censal de Estudiantes* (ECE) evaluates fourth-grade students in primary, ensuring compliance with national standards. Student performance is divided into four levels: Beginning Level, In Process, Prior to Beginning, and Satisfactory Level, with the latter indicating readiness for further education.
- **Suriname:**[35] Adequate learning in primary education in Suriname is measured using UNICEF's MICS, assessing foundational reading and numeracy skills for children aged 7 to 14 years, based on the curriculum for Grades 2 and 3. The measure of adequate learning is the percentage of children who demonstrate foundational skills in mathematics and reading.

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34. http://umc.minedu.gob.pe/wp-content/uploads/2016/03/Informe-para-Instituci%C3%B3n-Educativa-sec_ECE-2015.pdf
35. Suriname-MICS-EAGLE-education-factsheet

APPENDIX

Country	Basic Education provision	Educational Structure
Bolivia	Departmental Directorates of Education administer education at the district level. They are overseen and coordinated by the Ministry of Education	**Primary education:** 6 to 12 years old **Secondary education:** 13 to 18 years old
Brazil	Basic education in Brazil is overseen by the Ministry of Education, which establishes foundational guidelines. However, the actual management and implementation of education policies are mainly conducted by state and municipal education secretariats. Each of these secretariats is led by a Secretary of Education, who is responsible for adapting federal guidelines to local needs, managing the public-school network, and overseeing teacher training and curriculum application.	**Primary education:** 6 to 10 years old **Secondary education:** 11 to 17 years old The educational system in Brazil consists of a Basic Education level, which includes early childhood development with daycare (for children from 0 to 3 years old) and preschool (4 and 5); fundamental schools, which is divided into initial (6 to 10) and final years (11 to 14); and high school (15-17). Students must have completed their Fundamental Education-cycle before they can enroll in high school (Ensino Médio). In this document, the initial years of Fundamental Teaching is considered primary education; and the last years of fundamental schools and high schools are considered secondary education.
Colombia	Education is under the jurisdiction of the Ministry of National Education. Each department has its own Secretariat of Education, which administers the educational policies, regulations, and resources	**Primary education:** 6 to 10 years old **Secondary education:** 11 to 16 years old The Colombian educational system comprises several stages: initial education, preschool education, basic education, and middle education. Basic education includes primary education for students from 6 to 10 years old, consisting of five grades, followed by lower secondary education for students from 11 to 14 years old, spanning over four grades. Middle education, serving students from 15 to 16 years old, encompasses two grades and culminates with the attainment of the high school diploma. In this document, lower secondary and middle education are considered as secondary education
Ecuador	Centrally managed by the Ministry of Education, which is responsible for the country's educational policy, regulation, and the development of national education standards.	**Primary education:** 5 to 14 years old **Secondary education:** 15 to 17 years old In Ecuador, General Basic Education (EGB) encompasses grades one through ten, providing education to students from 5 to 14 years old. Following EGB, the *Bachillerato General Unificado* (BGU) represents the last three years of education, from first to third year, and is designed for students aged 15 to 17 years old. Upon completion, students graduate with the title of 'Bachiller'. In this document, EGB is considered primary education and BGU is considered secondary education

Country	Basic Education provision	Educational Structure
Guyana	Guyana's central government oversees education, whereas the country's regional governments play a role in allocating resources and monitoring schools.	**Primary education:** 5 to 11 years old
		Secondary education: 12 to 15 years old
		In Guyana, primary education starts at 5 years and 6 months of age and spans over a period of six years. It is compulsory for all students. On its turn, the duration of secondary education is variable, with programs ranging from 3 to 5 years, depending on the institution. Three-year programs are generally geared towards Technical and Vocational Education and Training (TVET), while five-year programs culminate in students taking the Caribbean Secondary Education Certificate (CSEC) issued by the Caribbean Examinations Council (CXC). Compulsory education extends up to the age of 15, covering at least 3 years of secondary education
Peru	School management is decentralized in Peru. Schools are managed by local educational management divisions under regional education directorates subordinated to the decentralized regional governments	**Primary education:** 6 to 11 years old
		Secondary education: 12 to 16 years old
Suriname	Basic education is centrally managed by the Ministry of Education, Science, and Culture (MOESC). The MOESC has a Permanent Secretary (PS) for General Education and a PS for Administration, which oversee different aspects of the education-system. The Office of Interior Education is tasked with managing education in Suriname's hinterland regions	**Primary education:** 6 to 12 years old
		Secondary education: 12 to 18 years old
		Secondary education is divided into lower secondary (12 to 15 years old) and upper secondary (16 to 18 years old)
Venezuela	The Ministry of Education is responsible for formulating educational policies and curriculum standards, and for managing public schools throughout the country.	**Primary education:** 6 to 11 years old
		Secondary education: 12 to 17 years old


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