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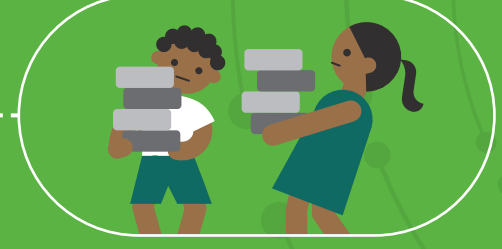
CHILD LABOUR RISK IDENTIFICATION MODEL

METHODOLOGY TO DESIGN PREVENTIVE STRATEGIES AT LOCAL LEVEL



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The report was prepared by Andres Espejo, Officer of the Social Development Division of the Economic Commission for Latin America and the Caribbean (ECLAC), under the supervision of Lais Abramo, Director of the Social Development Division, and Daniela Trucco, Social Affairs Officer.

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FOREWORD

This publication is a result of the excellent collaboration between the Economic Commission for Latin America and the Caribbean (ECLAC) and the Regional Office for Latin America and the Caribbean of the International Labour Organization (ILO). On this occasion, the issue of child labour is addressed.

In recent years, Latin America and the Caribbean has reduced child labour thanks to the sustained action and shared efforts among governments, employers' and workers' organizations, civil society and international cooperation agencies. Between 2012 and 2016, the region showed a reduction of 17% in the rate of child labour and 35% in the rate of hazardous child labour. In other words, two million children and adolescents stopped working in our countries during this period.

Despite the good news, the countries of the region should not lower their guard because there are still 10.5 million children and adolescents between the ages of 5 and 17 who work, most of them in hazardous activities that prevent them from completing their education, put their health and safety at serious risk and limit the development of skills to insert properly in the labour market. Special attention must be paid to those who are most at risk of entering the workplace early: children and adolescents vulnerable due to economic deprivation in the houdehold, poor levels of social protection, inequality and belonging to groups particularly exposed to child labour and its worst forms, such as indigenous peoples, rural populations, the Afro-descendant population, migrants, women and girls, and those who reside in areas at risk of disasters.

Although the goal of prevention and eradication of child labour has been present, with different levels of priority, in the political agenda of most countries in the region, the adoption of the 2030 Agenda for Sustainable Development, in September 2015, gave new impetus and vigor to this struggle, by including in SDG 8 on decent work and economic growth, Target 8.7, which calls to *"Take immediate and effective measures to eradicate forced labour, end modern slavery and human trafficking and secure the prohibition and elimination of the worst forms of child labour, including recruitment and use of child soldiers, and by 2025 end child labour in all its forms."*

The complexity of the phenomenon, combined with an uncertain economic scenario for Latin America and the Caribbean, calls on governments, employers' and workers', civil society organizations and international agencies, not only to redouble efforts to avoid a setback, but to define more focused, coordinated and integrated strategies to deal with the persistence of child labour, especially in its worst forms. Moving towards the achievement of Target 8.7 implies not only reducing child labour, but also achieving at least 35 other targets established in the SDGs[1], which have strong links and interdependencies on issues that are crucial to the development agenda of the region.

1 See: http://target8-7.iniciativa2025alc.org/en/

Not leaving anyone behind in achieving these Sustainable Development Goals requires looking for imaginative ways to cooperate between countries and stakeholders, putting value on knowledge, experience and accumulated capacity. Along these lines, 28 countries in the region[2], with the participation of employers' and workers' organizations, created the Regional Initiative Latin America and the Caribbean Free of Child Labour, a platform that seeks to accompany the first generation free of child labour for the year 2025.

The Regional Initiative proposes a Policy Acceleration Framework that includes strategies that reinforce the social protection and education systems focused on the prevention and eradication of child labour, coordinating the intervention with the Ministries or Secretaries of Labour. This framework is based on two areas of intervention: 1) protection to remove children and adolescents from child labour and the restoration of their rights; and 2) prevention through actions designed to identify and intervene in a timely manner to interrupt the trajectory of child labour.

The present study, which is part of the second area, seeks to provide empirical evidence that serves as a basis to establish priorities in national and subnational policies aimed at the prevention and elimination of child labour. To this end, the ILO Regional Office for Latin America and the Caribbean and ECLAC jointly developed the Child Labour Risk Identification Model, a methodology that, based on the statistical information available in the countries (surveys, censuses and/or administrative records) allows, on the one hand, to identify the territories most vulnerable to child labour and, on the other, to estimate the weight of various factors associated in order to determine which multisectoral actions are more effective in interrupting the trajectory of child labour and, in the medium term, reduce the indicator in a sustained manner.

This technical document was submitted, between August 2016 and March 2017, to a validation process with experts from the Brazilian Cooperation Agency (ABC); the Spanish Agency for International Development Cooperation (AECID); the United States Department of Labor (USDOL); the Ibero-American Federation of Ombudsmen (FIO) - GIZ Project; the Pan American Health Organization (PAHO); the Understanding Children's Work Programme (UCW); and ILO and ECLAC specialists and statisticians.

In April 2017, the pilot process of applying the Model began in a group of countries that expressed their interest in participating and that met a set of basic criteria, identified by the ILO and ECLAC, which guaranteed the viability of the process. Thus, the participation of Argentina, Brazil, Colombia, Costa Rica, Jamaica, Mexico and Peru was formalized. These countries have followed an implementation path that has been adapted to the particularity of their political and institutional context and in which tools and processes of technical assistance have been adapted, and different levels of dialogue and inter-institutional coordination have been applied.

2 The 28 countries are: Argentina, Bahamas, Barbados, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Grenada, Guatemala, Guyana, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, Saint Lucia, Suriname, Trinidad & Tobago, Uruguay and Venezuela.

The inter-agency work of ILO and ECLAC in the measurement and characterization of child and adolescent labour in Latin America and the Caribbean is expected to be a contribution, in particular, to the Ministries of Labour and Social Development, as well as the National Statistics Institutions of the countries of the region, so they undertake similar studies and periodic measurements that serve as an input to adjust and focus their preventive actions in the territories with the highest risk of child labour.

Having a tool to analyze and monitor the evolution of child and adolescent labour at the local level is a way to territorialize the 2030 Agenda, while allowing countries to advance in the achievement of national goals and meet the commitments at the international level to ensure that children enjoy their childhood, are able to exercise their rights and access the same opportunities to expand their talent and develop their skills.

José Manuel Salazar-Xirinachs
Regional Director for Latin America and the Caribbean
International Labour Organization
(ILO)

Alicia Bárcena
Executive Secretary of the Economic Commission
for Latin America and the Caribbean
(ECLAC)

INTRODUCTION

Child labour is a broad and persistent phenomenon in Latin America and the Caribbean. Its occurrence is directly linked to the violation of the fundamental rights of boys, girls and adolescents since it generates profound and lasting negative impacts throughout life (ECLAC, 2017). Over the last 20 years, in recognition of these profound negative consequences, the countries in the region have been making great efforts to eradicate this scourge. These include the ratification of international instruments -especially the ILO Minimum Age Convention, 1973 (No. 138) and the ILO Convention on the Worst Forms of Child Labour, 1999 (No. 182), the achievement of important advances in legislative matters nationwide, the development of a knowledge base on the topic and the promotion of prevention and eradication policies and programmes. This led to a significant reduction of child labour incidence[3], placing Latin America and the Caribbean in a privileged position to become the first developing region free of child labour (ILO, 2013).

According to estimates of the International Labour Organization (ILO, 2017), nearly 10.5 million boys, girls and adolescents are in child labour in Latin America and the Caribbean, corresponding to 7.3% of the regional population between 5 and 17 years. Although a downward trend can be observed when comparing this with the estimates of 2008, it is also verifiable that the progress is slow despite the improvements within the region in terms of productivity and reduction of poverty and inequality.

The complexity of the phenomenon combined with a diverse economic scenario for Latin America[4] calls for redoubling efforts to avoid a setback. In this context, 28 countries of the region, and employers and workers' organizations, came together to create the Regional Initiative Latin America and the Caribbean Free of Child Labour, that seeks to accelerate the rate of decline of child labour and to achieve its full elimination by 2025, in response to the Global Road Map, the goals of the Hemispheric Agenda on Decent Work and the Sustainable Development Goals (SDGs), that position once more the eradication of child labour as a priority goal under Target 8.7.

In order to achieve the ambitious goal to eliminate all forms of child labour by 2025, the Regional Initiative has developed a Policy Acceleration Framework[5]. This includes a series of strategies that seek to maximize the scope and effectiveness of the social protection and education systems in the prevention and eradication of child labour, under the articulation of the respective Ministries of Labour (ILO, 2017). The Policy Acceleration Framework is based on the combination of two approaches: on one hand, the protection approach for the rescue from child labour and the restoration of rights, and on the other hand, a preventive approach that includes actions aimed

3 "It is likely that this progress has also been largely driven by broader economic and demographic forces that accompanied government efforts" (ILO, 2017:3).

4 See: ECLAC. (2017). Gaps, axes and challenges in the link between social and productive areas.

5 See: http://iniciativa2025alc.org/sites/default/files/acceleration-framework.pdf

at identifying and timely intervening boys and girls in child labour trajectory to prevent their early entry into the labour market.

It is imperative to provide reliable, comprehensive and timely data as the basis to determine priorities of national and sub-national action aimed at the prevention and elimination of child labour. Therefore, the Regional Office of the ILO for the Americas, in its capacity of Technical Secretariat of the Regional Initiative Latin America and the Caribbean Free of Child Labour, requested technical assistance to the Economic Commission for Latin America and the Caribbean (ECLAC) in order to jointly elaborate an instrument that enables the timely identification of boys, girls and adolescents in the trajectory of child labour.

This instrument, called Child Labour Risk Identification Model, allows to identify territories where there is greater likelihood of child labour based on existing statistical information in the countries, and it also allows to estimate the weight of several risk indicators in the territories, in order to define the most relevant multi-sectoral actions needed to interrupt the trajectory of child labour. This provides the countries with reliable information at national and sub-national level and enables them to design focused and articulated responses, to improve the performance and effectiveness of public policies and to advance in the achievement of national goals and thus contribute to the achievement of global commitments assumed.

The document has five sections. The first one examines the current context of child labour in the region based on available information, analyses its prevalence in the countries and seeks common characteristics among them. The second section reviews several studies and conducts an analysis that identifies the factors that relate to child labour. This section is split in two parts. On one hand, it analyzes the factors related to the context and on the other hand, it provides evidence about household related factors and those related to boys and girls. The third section reviews the measurement of child labour, in particular the statistical definition and available sources of information. The fourth section proposes a methodology to identify and estimate the risk of child labour at sub-national level based on available statistical information. Finally, the fifth section presents a validation exercise of the proposed methodology, showing its strengths and weaknesses.

1

CHILD AND ADOLESCENT LABOUR IN LATIN AMERICA AND THE CARIBBEAN

Most countries in Latin America and the Caribbean have made major efforts to prevent and eliminate child labour. As a result, the incidence of child labour has sharply declined in both absolute and relative terms, placing the region in a privileged position to become the first developing region free of child labour (ILO, 2013).

According to ILO estimates (2017), the percentage of children and adolescents aged 5 to 17 in the labour market declined from 10.8% in 2008 to 7.3% in 2016, meaning that 3.7 million fewer children worked in the region. During this period, hazardous child labour[6] also experienced a significant reduction from 6.7% to 4.4%, equivalent to 3.2 million children and adolescents.

Table 1
Latin America and the Caribbean: Child labour and hazardous child labour, 5 to 17 years, 2008, 2012 and 2016

Year	Total population 5-17	Population in child labour 5-17	Percentage	Population in hazardous child labour 5-17	Percentage
2008	141.043.000	14.125.000	10.8	9.436.000	6.7
2012	142.693.000	12.505.000	8.8	9.638.000	6.8
2016	144.004.000	10.461.000	7.3	6.278.000	4.4

Source: ILO, 2013 and ILO, 2017.

In absolute numbers, more than 10.4 million children and adolescents -aged 5 to 17- were involved in child labour in the region in 2016. Although the statistics are not comparable among countries, following the definitions and official statistics reported in each of them, it can be verified that Brazil, Mexico and Peru have the largest number of child workers. In terms of percentages, the countries with the highest incidence of child labour are Haiti (34%), Bolivia (26%), Paraguay (22%) and Peru (21.8%). Costa Rica (2.1%), Panama (2.5%), Belize (3.2%) and Argentina (5.8%) have the lowest incidence.

6 Item d) of Article 3 of the ILO Convention on the prohibition of the worst forms of child labour and the immediate action for its elimination 1990 (No. 182), defines hazardous child labour as follows: d) any work that due to its nature or to the conditions where it is performed, is likely to harm the health, safety or morality of children.

Table 2

Latin America and the Caribbean (19 countries): Population and percentage of boys, girls and adolescents engaged in child labour (Different years)

Country	Year	Boys, girls and adolescents aged 5 to 17 engaged in child labour	
		Quantity	% of total age group
Argentina	2017	522.706	5.8
Belize	2013	3.528	3.2
Bolivia (Plurinational State of)	2008	800.180	26.4
Brazil	2015	2.671.893	6.5
Chile	2013	219.624	6.6
Colombia	2017	796.000	7.3
Costa Rica	2016	20.896	2.1
Dominican Republic	2010	304.062	12.2
Ecuador	2016	290.325	6.5
El Salvador	2015	140.700	8.9
Guatemala	2014	731.115	16.9
Haiti	2012	815.993	34.4
Honduras	2017	382.931	15.2
Jamaica	2016	37.965	5.8
Mexico	2015	2.217.648	7.5
Panama	2016	23.855	2.5
Paraguay	2011	416.425	22.4
Peru	2015	1.619.200	21.8
Uruguay	2010	68.100	9.9

Source: ECLAC, on the basis of special tabulations of the child labour surveys of countries in Latin America and the Caribbean.
Note 1: The official definition and measurement reported by each country are taken into account. In most countries, measured child labour is linked to the not allowed economic activity/occupation.
Note 2: For Argentina, the age segments are 5-15 years and 16-17 years.
Note 3: For Bolivia, Dominican Republic and Peru, the age segments are 5-13 years and 14-17 years.
Note 4: Guatemala considers the analysis from 7-17 years.

In spite of numbers vary among countries, the characteristic that stands out is the large share of child and adolescent workers employed in agriculture.

Although in Latin America and the Caribbean there are no updated regional studies that enable comparing the situation of boys, girls and adolescents in the region, studies at national level[7] show that the region shares common traits with regard to child labour. In spite of the varying numbers among countries, the characteristic that stands out is the large share of child and adolescent workers employed in agriculture.

Within sub-regions, the Andean region has the highest percentage of child and adolescent workers in agriculture (62%), followed by Mesoamerica (43%), and to a lesser extent, the Southern Cone of South America (38%) (ILO, 2013). At the country level, in Ecuador, for example, the results of the Child Labour Survey (2013) reveal that 71% of children and adolescents who work do so in agriculture, 21% in services and 8.1% in manufacturing. In Guatemala, the ENCOVI Survey (2014) found that 65% of child and adolescent workers are employed in agriculture. In Colombia, according to the Large-scale Integrated Household Survey (2017), agriculture concentrates 44.4% of child labour; trade, hotels and restaurants represent 30.1% (DANE, 2017). In Mexico, 30% of child and adolescent workers are employed in agriculture, 25% in services and 23% in trade (INEGI, 2015).

A second common element is the high concentration of child labour in the informal sector, especially among contributing family workers (unpaid workers). In Guatemala, for example, more than 64% of child and adolescent workers can be found in the informal sector, where more than 95% work as contributing family workers (ENEI, 2014). In El Salvador, 70% of child workers were informal and 60% of the total were contributing family workers (DIGESTYC, 2013). In Panama, two of every three employed children and adolescents work without pay in the household (INEC and UCW, 2014).

Another distinctive feature is the marked gender divide in child labour. Boys and male adolescents have higher rates of child labour than their female counterparts. Boys/male adolescents tend to work in productive activities outside the household, particularly in agriculture. In El Salvador, for example, boys/male adolescents account for 76% of child labour, particularly in agriculture, livestock herding and forestry (DIGESTYC, 2013). In Guatemala, boys/male adolescents account for nearly 67% of child labour, especially indigenous males (69%), mainly in agriculture (65%) (ENEI, 2014). By contrast, working girls/female adolescents are concentrated in unpaid domestic work and caretaker activities.

7 National studies measure child labour in different ways, for which reason they cannot be compared.

In Ecuador, for example, 7 of every 10 people aged 5 to 17 years who perform domestic work are female (INEC, 2012). In Brazil, nearly 214.000 children and adolescents are employed in domestic work and, of those, 94.2% are female, a percentage that is maintained among adults and that underscores the considerable gender gap in this occupation (ECLAC, 2016a). Frequently, this situation creates a dual disadvantage since many women who are paid domestic workers must also carry out domestic chores in their homes. This activity is often invisible given that in some countries, child labour is recognized only within the limits of the National Accounts System, leaving (unpaid) domestic and caretaking work out of official measurements.

National reports also state that child labour affects a higher percentage of indigenous and Afro-descendent populations. In Bolivia, nearly half of child workers are indigenous and many perform hazardous jobs. Similarly, in Brazil, close to 60% of children aged 5 to 13 who work are Afro-descendants.

In many countries of the region, child labour is concentrated in certain geographic areas. In Peru, the regions with the highest rates of child labour are Huancavelica (79%), Puno (69%), Huanuco (65%), Amazonas (64%) and Pasco (50%) (MINTRA, 2015). In Brazil, the states of Bahia, Minas Gerais, Para and Sao Paulo have the highest concentration of child and adolescent workers (SAGI, 2015).

A final common characteristic is that child and adolescent workers receive no pay, and those who do earn wages far below the established legal minimum. In Colombia, in 2017, 56.2% of child and adolescent workers received no pay. In Ecuador, just 30.5% declared that they received labour income. In Costa Rica, 20.9% of employed girls and female adolescents received in-kind payments for their work. In Uruguay, most received monetary income in exchange for their work, representing less than 9% of the total household income.

In Brazil, nearly 214.000 children and adolescents are employed in domestic work and, of those, 94.2% are female, a percentage that is maintained among adults and that underscores the considerable gender gap in this occupation (ECLAC, 2016a). Frequently, this situation creates a dual disadvantage since many women who are paid domestic workers must also carry out domestic chores in their homes.

Finally, in Latin America and the Caribbean, child and adolescent labour is concentrated in the age group 15-17 years, a characteristic that differs from other regions of the world. According to the last report Global Estimates on Child Labour prepared by the ILO, in the world, boys and girls of 5 to 11 years account for 48% of the total boys and girls in child labour, figure that in the Americas[8] is around 37%.

In summary, the pace of progress and the child labour indicators raise concerns about the possibility of reaching national and international goals and commitments, including the Sustainable Development Goals of the 2030 Agenda. To achieve the ambitious goal of eliminating all forms of child labour by 2025 requires action on several fronts, including reducing poverty; improving access, permanence, relevance and quality of education; generating decent work opportunities for adult members of the household (men and women of working age); promoting gender equality; and strengthening social protection policies, among others. The populations most vulnerable to child labour for geographic, gender or ethnic/racial reasons require priority attention.

8 It includes countries of Latin America, the Caribbean, the United States and Canada. For further detail on the countries considered, see: ILO (2017). Global Estimates on Child Labour: Results and trends 2012-2016.

2

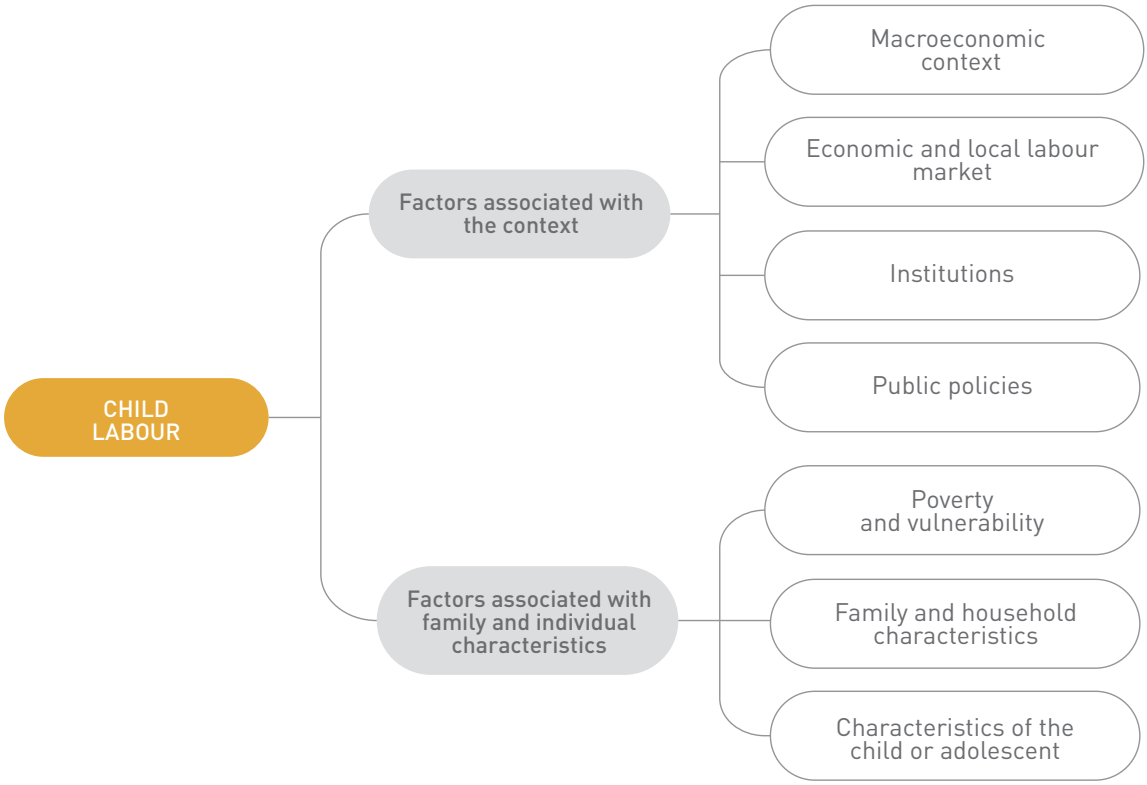
FACTORS ASSOCIATED WITH CHILD AND ADOLESCENT LABOUR

The main dimensions of the analysis presented below are the result of a literature review.

The information is presented in two parts (Graphic 1). The first lists the factors associated with the context in which children and their families live, and how it affects the incorporation of children in the labour market. Within this context, the macroeconomic situation, economic sectors, institutions and public policies are examined.

Second, family and individual factors that help explain the persistence of the phenomenon are analyzed, such as the characteristics of fathers, mothers, children and their socioeconomic condition.

Graphic 1
Factors associated with child labour



Source: Compilation prepared by the author.

2.1 Factors associated with the context

A. Macroeconomic context

Several of the economic conditions affecting families are associated with an increase or decrease in child labour. Aspects such as the Gross Domestic Product (GDP) and GDP per capita of the country; the minimum wage and its capacity to cover living expenses (critical wage); economic crises; unemployment; the prevalence and performance of certain economic sectors; the level of labour market formality; and the increase in demand for skilled labour influence families' decisions to send their children to work or to keep them in school.

Much of the literature on the subject indicates that child labour is a buffer mechanism for families in response to economic crises. Studies conducted in Cambodia and Tanzania reveal that a substantially higher proportion of children work in communities exposed to economic shocks associated with agriculture, such as drought, floods and poor harvests.

Much of the literature on the subject indicates that child labour is a buffer mechanism for families in response to economic crises. Studies conducted in Cambodia and Tanzania reveal that a substantially higher proportion of children work in communities exposed to economic shocks associated with agriculture, such as drought, floods and poor harvests (Guarcello et al., 2008; Beegle et al., 2003; in ILO, 2013). Another study that examines the impact of the economic slowdown in Venezuela during 2002-2003 revealed that the percentage of children in the labour market practically doubled as GDP fell. This percentage then diminished with the economic recovery (Blanco and Valdivia, 2006; in ILO, 2013). Similarly, a study of urban areas of Brazil found that a rise in adult unemployment significantly increased the likelihood that children would drop out of school to work (Duryea et al., 2007; in ILO, 2013).

Restricted access to credit drives increases in child labour by hindering parents' ability to make exchanges between current and future income (Acevedo et al., 2011; Brown, 2002). In a scenario

with access to credit, when income fluctuates, families can use their expectations of future income and thus moderate the restriction in consumption over time. When families have limited access to credit, they must depend on their current assets and replace the future returns that educating their children would provide with current restrictions.

Dehejia and Gatti (2002) tested this hypothesis with a sample in 172 countries. They found a significant negative correlation between child labour and credit constraints, which was higher in lower-income countries. Measured by importance of credit in national GDP, a standard deviation increase in the percentage of credit in GDP is associated with a 10% decrease in the standard deviation in child labour. Likewise, access to credit mitigates the increase in child labour in contexts of household income variations or shocks (Beegle, Dehejia and Gatti 2003; in Acevedo et al., 2011).

By contrast, economic growth, measured by the increase in GDP and GDP per capita, is associated with a decrease in child labour. An ILO study of children aged 12 to 14 in four countries of the region for the period 2001-2007 demonstrated a strong inverse relationship between the two phenomena: a coefficient of -0.83 for Colombia; -0.73 for Brazil; -0.51 for Costa Rica; and -0.47 for Honduras. The same report analyzes the elasticity of child labour in relation to economic fluctuations. The result for those countries is -0.13 when GDP per capita is used (that is, for every 1% increase in GDP per capita, the rate of activity or participation of this population group declines by 0.13 percentage points), and of -0.08 for total GDP (ILO, 2009).

The data analysis carried out by Sauma (ILO, 2015) indicates that Chile, Panama, Peru, Bolivia and Guatemala are exceptions to this trend. Chile and Panama, both countries with the lowest child labour rates in 2002, despite maintaining strong economic growth, did not manage significant reductions in 2012. According to the author, this could reflect the lesser impact of economic growth on reducing child labour given these countries' low levels of this phenomenon.

Bolivia and Peru also maintained strong economic growth but were unable to reduce their child labour rates. By contrast, Guatemala experienced sluggish growth but managed a modest reduction in child labour. These three countries had the highest child labour rates at the start of the evaluation period.

B. Economic sectors and local labour market

As discussed above, the child labour phenomenon is closely associated with economic trends in the countries, and more specifically, with the dynamics and characteristics of the local economies where the families live. The dynamics of local economies and labour market characteristics influence the supply and quality of employment and wages on the one hand, and the subjective appraisal of education according to the returns it signifies in the local labour market on the other.

Higher levels of informality in the labour market are associated with a higher incidence of child labour. Sauma's regional analysis (ILO, 2015) identified a strong, positive correlation between the two dimensions.

Additionally, child labour is more common in certain economic sectors. According to the Global Estimates of Child Labour (ILO, 2017), the agriculture sector, which comprises fishing, forestry, livestock herding and aquaculture, as well as subsistence and commercial farming, is where employed youth are most likely to find themselves in hazardous jobs. It is also where child labour is most concentrated: In the Americas, 5.5 million (52%) children and adolescents work in agriculture (ILO, 2017).

Several studies indicate that the zone where children and their families live influences their chances of joining the labour force. A study in Nicaragua (Bonilla, 2010) demonstrated that living in households in urban areas with economically active household heads reduces the likelihood of child labour by 49%, as compared with economically active household heads in rural areas. A study in Ecuador (Villazhañay and Narvaez, 2014) found that children living in urban areas increased their possibilities of studying and not working by 4.94 percentage points.

Together with economic factors, the value the local labour market places on skilled human capital influences families' decision to keep their children in school or to send them to work. Sauma's report (ILO, 2015) revealed that demand for skilled workers is associated with higher education rates of children and a reduction in child labour, given the increase in the future benefits associated with education. The growth of the technology industry in India, which demanded a highly skilled labour force, contributed to the positive assessment of education. The districts recording the highest level of enterprise and job creation in the technology service sector also experienced the highest increase in school enrolment, which is closely associated with a decrease in child labour.

Thus, as the report states, *"in countries where there are few opportunities for decent work requiring advanced skills, and where returns to education are therefore limited, parents have less reason to delay their children's entry into work and to incur the costs associated with their children's schooling"* (ILO, 2015: xix).

C. Institutions

A key part of the efforts of international agencies committed to the prevention and elimination of child labour is the development of agreements and standards on how it should be defined and prioritized for policy action in the countries. Three principal international conventions –ILO Convention No. 138[9], ILO Convention No. 182[10] and the United Nations Convention on the Rights of the Child[11]– together set the legal limits for child labour and provide the legal basis for national and international actions against it (ILO, 2015).

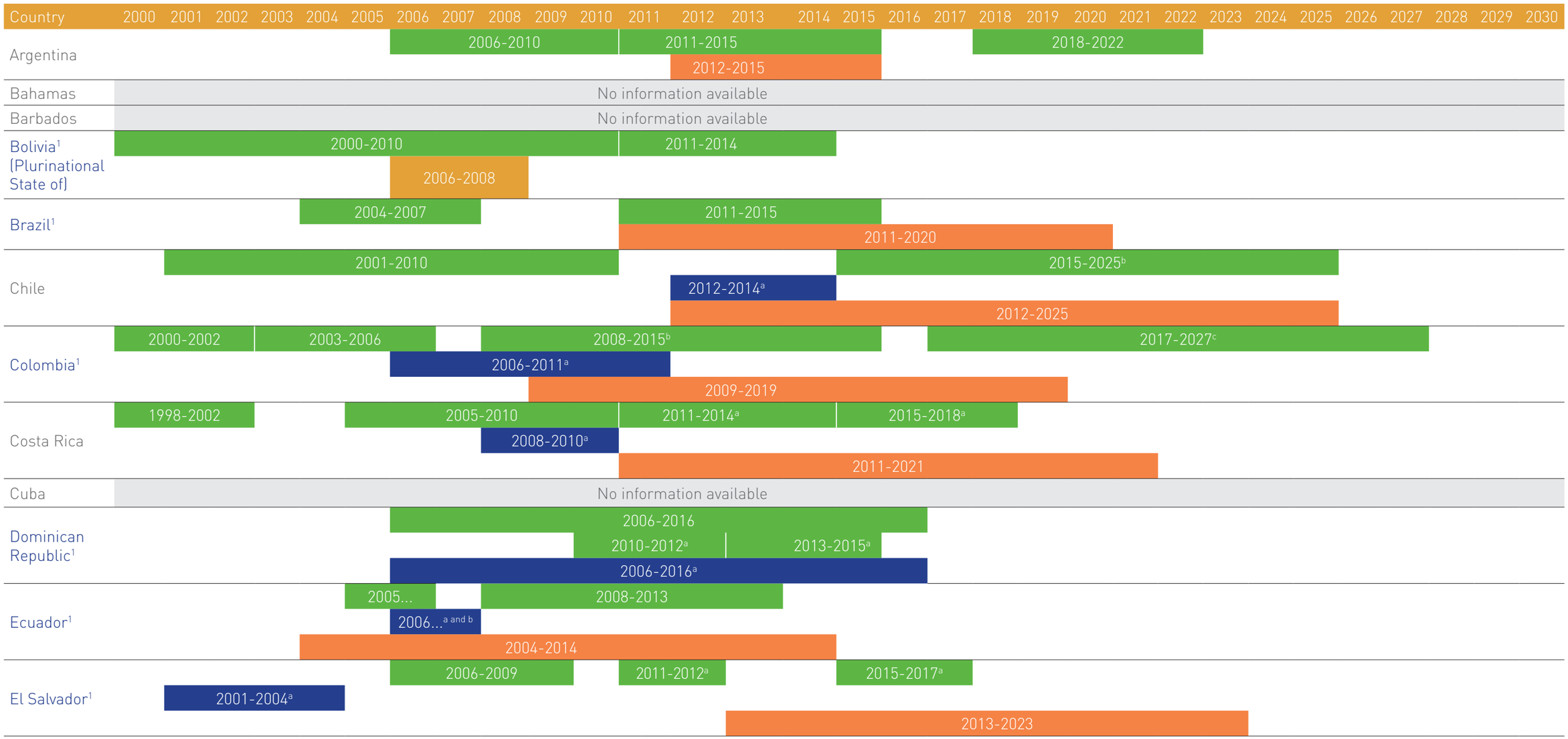
In Latin America and the Caribbean, most of the countries have ratified these regulatory frameworks. Nevertheless, given that they contain several flexibility clauses, it is left to the discretion of the countries to define areas of application, determine the oversight agency and establish the minimum working age, among other considerations.

For example, in most of the countries in the region, Ministries of Labour are the institutions responsible for controlling child labour. National committees specializing in the topic have developed plans for child labour prevention and eradication and protection of legal adolescent employment. These committees are led by Ministries of Labour in collaboration with Ministries of Social Development / Social Protection or agencies that oversee child and family policies. Several countries of the region have included the issue of child labour in guidelines, strategies or actions of national development plans and/or national plans for children and adolescents. To complement general policies on prevention and eradication of child labour, some countries have adopted instruments to tackle specific issues, such as commercial sexual exploitation of children and adolescents, trafficking of minors and child domestic work.

9 See: https://www.ilo.org/dyn/normlex/en/f?p=NORMLEXPUB:12100:0::NO::P12100_INSTRUMENT_ID:312283
10 See: https://www.ilo.org/dyn/normlex/en/f?p=NORMLEXPUB:12100:0::NO::P12100_ILO_CODE:C182
11 See: http://www.un.org/es/events/childrenday/pdf/derechos.pdf

Table 3

Policies, strategies and national plans against child labour and its worst forms in Latin America and the Caribbean (2000-2030)



[1] Countries that have included child labour in their National Development Plans.

- National Child Labour Plan/ Roadmap[a]/ Strategies[b]/ Policy Guideline[c]
- National Plan for the Rights of the Child and Adolescent
- National Plan against Sexual Exploitation[a]/ Human Trafficking[b]/ Forced Labour[c]
- Triennial Plan to Progressively Eliminate Child Labour
- Action Plan against Child Labour in Domestic Work

Source: ILO/Cheng, 2015. Last update: May 2018.

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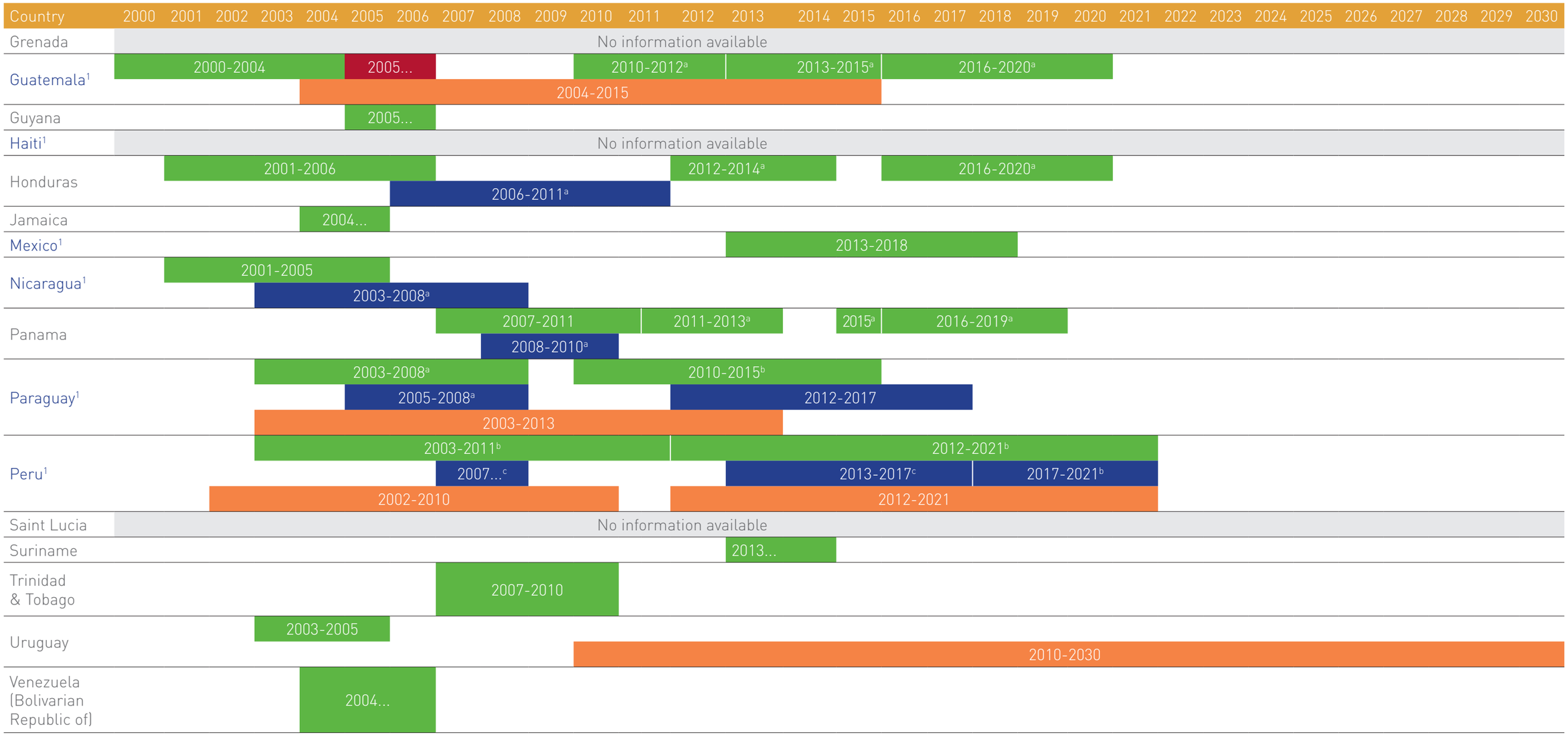

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- Action Plan against Child Labour in Domestic Work

Source: ILO/Cheng, 2015. Last update: May 2018.

In recent years, governments have attempted to link these plans with existing ones –mainly of children, poverty reduction, development and social inclusion and education– and with different government entities, such as the case of the National Strategy to Eradicate Child Labour in Colombia, which is linked to the Ministry of Social Protection, the Colombian Family Welfare Institute, the Ministry of Education and the National Planning Department; and with social protection services and instruments to reinforce targets to eliminate child labour, for example, the link between the Family Benefits Programme (*Bolsa Familia*) and the Child Labour Eradication Programme in Brazil (IPEC, 2007; DNP, undated).

Enacting legislation to establish the minimum working age is another important tool for safeguarding the rights of children and adolescents (UNICEF, 2016). ILO Convention No. 138 sets the minimum working age at 15, with the possibility of initially and temporarily establishing the age of 14 years for countries whose economies and education services are insufficiently developed. Minimum working ages vary among countries in the region, ranging from 10 in Bolivia to 16 in Argentina, Brazil, Grenada and Trinidad & Tobago. In most of the countries, the minimum age is 14 or 15, as the table below demonstrates.

Table 4
Latin America and the Caribbean (28 countries): Minimum working age, by country

Country	Minimum working age (a)
Argentina	16 years
Bahamas	14 years
Barbados	16 years
Bolivia (Plurinational State of)	10 years (b)
Brazil	16 years (c)
Chile	15 years
Colombia	15 years
Costa Rica	15 years
Cuba	15 years
Dominican Republic	14 years
Ecuador	14 years
El Salvador	14 years
Grenada	16 years

Country	Minimum working age (a)
Guatemala	14 years
Guyana	15 years
Haiti	14 years
Honduras	14 years
Jamaica	15 years
Mexico	15 years
Nicaragua	14 years
Panama	14 years
Paraguay	14 years
Peru	14 years
Saint Lucia	14 years
Suriname	16 years
Trinidad & Tobago	16 years
Uruguay	15 years
Venezuela (Bolivarian Republic of)	14 years

Source: Compilation prepared by the author based on ILO, 2016.

a) There are some countries (For example, Brazil, Costa Rica and the Dominican Republic) that allow people who are below the minimum age to work to promote vocational training.
b) According to the amendment of the Code of Children and Adolescents, Article 129, July 2014.
c) According to Brazilian legislation, the minimum working age is 16, except in the condition of apprentice, where it is 14.

Additionally, ILO Convention No. 138 recognizes a minimum age for light work that does not interfere with a child's schooling, and for hazardous work. With respect to light work, all the countries of the region have a minimum age according to ILO Convention No. 138. With respect to hazardous jobs, all countries in the region set the minimum age at 18, in accordance with ILO Convention No. 182.

Another key element for protection of children and adolescents is to establish a minimum age for completing school or a mandatory education level. Several countries have enacted laws that link the minimum working age with mandatory education[12].

12 International standards do not explicitly specify the education level or age of children and adolescents for completing school.

Throughout the region, the established age for completing mandatory education varies widely, from 14 to 18, while other countries do not clearly establish ages for completion of mandatory studies but rather refer to levels of education or years of mandatory study (UNICEF, 2016). With respect to this last indicator, the countries of the region establish years of mandatory education ranging from 6 in Nicaragua to 15 in Ecuador and Venezuela.

Table 5
Latin America and the Caribbean (26 countries): Completion of mandatory education, by country

Country	Established age for completing mandatory education	Years of mandatory study
Argentina	18 years	13 years
Bahamas	16 years	11 years
Bolivia (Plurinational State of)	18 years	14 years
Brazil	17 years	14 years
Cuba	15 years	9 years
Chile	-	12 years
Colombia	-	10 years
Costa Rica	-	10 years
Dominican Republic	-	9 years
Ecuador	17 years	15 years
El Salvador	-	9 years
Grenada	16 years	9 years
Guatemala	15 years	10 years
Guyana	14 years	9 years
Haiti	15 years	-
Honduras	-	9 years
Jamaica	-	-
Mexico	18 years	14 years
Nicaragua	-	6 years
Panama	15 years	11 years
Paraguay	-	9 years

Country	Established age for completing mandatory education	Years of mandatory study
Peru	16 years	12 years
Saint Lucia	15 years	10 years
Trinidad & Tobago	12 years	6 years
Uruguay	-	14 years
Venezuela (Bolivarian Republic of)	16 years	15 years

Source: ILO, based on UNICEF 2016; UNESCO/UIS 2016; UNESCO 2011; Education Act.

The evidence points to the impact of these strategies and their limitations. In Brazil, Ferro and Kassouf (2005) analyzed the impact of legislation (adopted in 1998) and found statistically significant declines in child labour for both sexes in urban and rural sectors resulting from that law.

By contrast, a study by Edmonds and Shrestha (2012) in 59 countries showed that a variation of less than 1% in paid child labour could be attributed to regulation. Rather, household characteristics explained the 63% variation in paid child labour. Clearly, laws and actions to regulate child labour are necessary, but they are insufficient. This finding confirms that coordinated intervention strategies are needed, particularly those that focus on family well-being.

D. Public policies

The 2013 ILO World Report on Child Labour[13] states that social protection and education policies are the two most effective policies for reducing child labour. Social protection policies decrease the likelihood that families will have to resort to child labour as a survival strategy in response to economic shocks or vulnerabilities in the lifecycle. Additionally, the existence of free, quality and pertinent education that families consider valuable influences their decision to invest in their children's education as an alternative to child labour (ILO, 2013; ILO-MINTRAB, 2016; Kumari, 2013; Sauma, 2015).

Conditional and unconditional cash transfer programmes have been established as the central feature of policies to eradicate poverty and as a key social protection tool in most of the countries in Latin America and the Caribbean. Currently, 20 countries of the region[14] have at least one such programme, with coverage of nearly 21.5% in 2013, according to ECLAC estimates (ECLAC, 2016b).

13 See: http://www.ilo.org/ipec/Informationresources/WCMS_211943/lang--en/index.htm

14 Argentina, Belize, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Haiti, Honduras, Jamaica, Mexico, Panama, Paraguay, Peru, Trinidad & Tobago, and Uruguay.

These programmes have successfully mitigated the effects of economic shocks on households, reduced the participation of children and adolescents in child labour and the numbers of hours worked and increased education levels (Hoop and Rosati, 2014). For example, in Panama, indigenous beneficiaries aged 12 to 15 experienced a reduction of almost 16% in child labour and an increase of nearly 8% in primary school enrolment in indigenous areas (UNICEF, 2015a). In Brazil, Cardoso and Souza (2004, in UCW, 2011) found that children and adolescents from households that receive conditional cash transfers are 4% more likely to attend school than those whose households do not receive these benefits. The impact of the programme is strongest for primary education and tends to decline over the education cycle.

Table 6

Public programmes selected for their impact on child labour

Programme	Impact on reducing child labour		Impact on education	Evaluation year
Familias por la Inclusión Social - Argentina	Yes	Disincentive for labour participation of adolescents. Slightly reduced participation of children/adolescents (3-13 years) in employment.	--	2006
Ampliación de Cobertura de la Educación Secundaria (PACES) - Colombia	Yes	Reduced working hours of girls by 1.5 hours weekly.	Improved school performance and test scores; increased rates of completion of secondary education.	2002 2013
Familias en Acción - Colombia	Yes	Reduced participation of 10-17-year-olds in paid employment in rural and urban zones (with the exception of the group of 14-17-year-olds in rural areas); reduced domestic work.	--	2007 2010 2012 2013
Eliminación del Trabajo Infantil (PETI) - Brazil	Yes	Reduced child labour by 5 to 25 percentage points, depending on the region; associated with the extension of the school day.	--	2002 2007 2013

Programme	Impact on reducing child labour		Impact on education	Evaluation year
Bolsa Familia - Brazil	Yes	Reduction of child labour by 2% in the population aged 5-17; reduced the hours devoted to domestic work by 4.5 hours weekly; labour market entry delayed by 10 months for boys and male adolescents.	--	2009 2013
Esquema Social de Pensiones - Brazil	Yes	The benefit received by the elderly reduced child participation in paid employment.	The benefit received by the elderly increased the school attendance of the population aged 10 to 14.	2008 2013
Bono de Desarrollo Humano - Ecuador	Yes	Reduced labour force participation.	Increased school enrolment rates.	2006 2011
Asignación Social II (PRAF-II) - Honduras	No	No evidence of impact on reducing child labour or on school enrolment/permanence rates.		2006 2013
Avances a través de la Salud y la Educación (PATH) - Jamaica	No	No evidence of impact on reducing child labour or on school enrolment/permanence rates.		2013
Desarrollo Humano Oportunidades / Prospera - Mexico	Yes	Reduced the participation of children, aged 12-14, in economic activities by 8%, during the first year and 14% in the second year. For women aged 15 to 18, the decrease was 11% in the first year.	--	2001 2007 2010

Table 6
Public programmes selected for their impact on child labour

Programme	Impact on reducing child labour		Impact on education	Evaluation year
Red de Protección Social - Nicaragua	Yes	Increased school enrolment and permanence of the population aged 7 to 13 until the sixth grade.	--	2005 2013
Proyecto TEKOPORA - Paraguay	Yes	--	Increased likelihood of permanence in the school system for children from families living in extreme poverty.	2008
Juntos - Peru	Yes	Reduced incidence of child labour. Beneficiaries were 35.5% less likely to engage in paid employment outside of the home.	Did not promote education given that most beneficiaries were in school.	2009 2011
Capacitación Laboral para Jóvenes (PROJOVEN) - Peru	No	The population receiving vocational training increased their labour market entry by 11%.		2006 2011
Plan Nacional de Atención a Crisis (PANES) - Uruguay	No	No evidence of impact on reducing child labour or on school enrolment/permanence rates.		2008 2013

Source: ILO/Cheng, 2015.

Nevertheless, none of these programmes has managed to eliminate child labour, which suggests that these interventions alone are not a complete policy response (ILO, 2013). According to Sauma (ILO, 2015), other factors, such as the percentage of household income that the transfer represents, the education level of parents, conditions of education access and quality, availability of academic support and recreational services for the population that studies and works, all influence the effectiveness of these programmes.

The studies that have assessed the effects of cash transfer programmes on reducing child labour report that they are more effective when they target the poorest population and when they are associated with some programmed service, for example, school attendance or health checkups, as long as the services are available to families. Brazil's Programme to Eradicate Child Labour, linked to the Family Benefits *(Bolsa Familia)* Cash Transfer Programme, which included a mandatory programme of after-school classes that doubled the length of children's schooldays, reduced child labour by 5 percentage points in Pernambuco District and 25 percentage points in Bahia District (Yap et al., 2002; in ILO, 2013).

Other studies indicate that the transfers are less effective when they invest in productive activities given that those investments encourage the participation of children and adolescents in family labour (ILO, 2013). The evaluation of the Crisis Assistance Programme in Nicaragua, for example, which offered a subsidy for productive investments, reported that this additional component considerably reduced programme impact on child labour (Del Carpio and Loayza, 2012; in ILO, 2013).

Other social protection policies that have an impact on reducing child labour include those that mitigate vulnerability during the lifecycle. These include insurance against illness, income security in old age, unemployment protection policies and disability policies. As discussed below, the presence of ill, elderly or disabled individuals in the household increases the likelihood of child labour, especially for girls and female adolescents, who are largely responsible for caretaking duties within the household.

Available information for Guatemala and Pakistan (ILO, 2013) indicate that the practice of providing families with health insurance reduces dependence on child labour. Likewise, studies in Zambia and Togo reveal the existence of households that respond to health problems by sending their children to work (ILO, 2013).

Studies in Nepal, Bangladesh and Gansu Province in China (ILO, 2013) have found that children in households where adults are sick, disabled or have missed work are more likely to be forced to work, within or outside the household. In multigenerational households, which are common in Latin America and the Caribbean, old-age pensions can mean economic stability for the household and therefore can reduce the likelihood that children will have to work.

Other social protection policies that have an impact on reducing child labour include those that mitigate vulnerability during the lifecycle. These include insurance against illness, income security in old age, unemployment protection policies and disability policies.

In terms of education policies, abundant evidence points to an inverse relationship between school attendance and child labour, mainly in low-income countries (Fallon and Tzannatos, 1998; in Acevedo et al., 2011). Thus, school attendance is a key factor in preventing and eliminating child labour.

In order for education policies to contribute to lower rates of child labour, education services must be close to families. Case studies in India, where the perceived value of education increased due to the rise of information technology and the demand for skilled workers in the local labour market, showed that the impact of this transformation on child labour depends on the availability of local schools (ILO, 2015). Education supply by itself does not guarantee a reduction in child labour if the value of education for improving living conditions is not recognized. According to Canagarajah and Coulombe (1997; in Acevedo et al., 2011), the limited relevance of education in countries has contributed to the entry of children and adolescents in the labour market.

The literature also underscores the high costs of education and its low quality as one of the key determinants of household decisions to send children to school or work (Jensen and Nielsen, 1997; Canagarajah and Coulombe, 1997; in Acevedo et al., 2011). Per capita spending of countries on education can provide an idea of the importance that governments attach to it. Sauma (ILO, 2015) found that countries with higher per capita expenditures in education tend to have a lower incidence of child labour and vice versa.

Improving secondary education and vocational training and increasing their pertinence and relevance in labour markets could increase parents' perception of the value of their children's education and consequently reduce the incidence of child labour, as well as improve conditions of youth employment. At any rate, education policies that guarantee the availability of quality education that responds to local demand are likely to contribute to reducing child labour.

Finally, national and local agencies have a wide range of public social protection and education instruments to operationalize their targets for eliminating child labour: *"the challenge is to coherently link these programmes with policies to reduce child labour, which include improving mechanisms to identify the population; inter- and intra-institutional coordination and management; investment in infrastructure and conditions of access to the education system; as well as the implementation of innovative education strategies that improve school performance, the pertinence of contents and the use of free time for recreation and personal development"* (ILO-MINTRAB, 2016, p.20).

2.2 Factors associated with family and individual characteristics

A. Poverty and vulnerability

Academic and political discourse on child labour has focused on the variables of income and poverty to explain the phenomenon. Currently, many research studies concur on the influence of household poverty in the decision to have children join the labour force. Some research demonstrates that other factors may modify or even reverse this relationship. One key study is that of Basu and Van (1998), who developed "The luxury axiom" hypothesis. This premise states that all households have a critical income that determines whether the household will send their children to work (Acevedo et al., 2011).

In light of this premise, a large body of research seeks to identify the relationship among income, poverty and child labour. The country studies conducted by Understanding Children's Work (UCW, 2009; in ILO, 2013) reveal that, all conditions being equal, poor children are more likely to work than their wealthier peers. In Sub-Saharan Africa, Admassie (2002) found that the high rate of child labour in the region could be explained by the high poverty rate, among other factors. Amin, Quayes and Rives (2004; in Acevedo, 2011) studied the determinants of child labour in Bangladesh and support the notion that household poverty makes it more likely that a child will work. Kumari's statistical analysis in Cuttak, India (2013) demonstrated that an increase in household income significantly diminished hours of child labour.

Del Rio and Cumsille's study in Chile (2008) found that economic concerns still largely explain child labour among the most vulnerable groups. Likewise, the studies of households of the Colombian Caribbean indicated that while children and adolescents aged 10 to 14 years contribute 10% of total household income, on average, this figure is approximately 25% in the poorest households, which reveals the key role that child labour plays in reproducing poor households (Amar et al., 2012).

Another group of studies points out that poverty alone does not explain the persistence of the phenomenon and, under some circumstances, that reducing poverty may even increase child labour. After observing the correlation between poverty reduction in countries of the region and the prevalence of child labour, Sauma (ILO, 2015) concluded that poverty reduction does not result in the same decrease in the child labour rate. For example, despite experiencing sharp declines in poverty between 2000 and 2012, Bolivia and Peru had an increase in child labour. Along the same lines, the decrease in child labour and the increase in school attendance in Brazil were much more intense in the poorest segment of the population than in the wealthiest, where small changes for all periods measured were observed (UCW, 2011). Therefore, several factors affect the impact of poverty on child labour, which underscores the need for actions that complement poverty reduction policies.

Some authors (Bhalotra and Heady, 2001; Basu, Das and Butta, 2007; Bar, Basu, 2009; in Acevedo et al., 2011) have called attention to what they call "The wealth paradox". Specifically, for the agriculture sector, the more land a family has, the more child labour increases. Lopez-Avila (2009) further explored the issue, distinguishing between work outside and within the household. In Colombia, the work outside the household satisfies the hypothesis of "The luxury axiom" (less wealth, more child labour); however, work in a family business proves the wealth paradox: more wealth, more child and adolescent labour.

On the other hand, the analysis of the cycle of child labour from one generation to another (Ray, 2000; Emerson and Souza, 2003; Acevedo et al., 2011) indicates that, although income has a significant effect, income on its own cannot explain the degree of persistence of the phenomenon. It is also important to highlight the existence of short-term factors that can significantly increase this possibility at certain moments in time. The concept of vulnerability provides valuable tools for this analysis and for the early identification of possible events that have a destabilizing effect on households and their decisions on child labour.

In simple terms, vulnerability reveals the fragile response capacity of individuals, households and communities that experience risk and shock events. These events can precipitate decisions with a significant impact on the well-being of households, and within them, on children and adolescents. In particular, the effects of the economic crisis, climate change, natural disasters and phenomena such as migration can significantly influence the child labour decisions of households.

As the ILO (2013) reports, there is ample evidence to suggest that child labour constitutes a possible response of households affected by adverse events, such as droughts, floods or crop losses. In Guatemala, for example, Hurricane Stan increased the probability of child labour by more than 7% in affected areas (Bustelo, 2011). Studies in Brazil and Venezuela show how a decline in employment leads to higher school drop-out rates and increased child labour in response to economic shocks (Duryea et al., 2007; Blanco and Valdivia, 2006; in ILO, 2013).

Abundant evidence exists in the region regarding the impact of economic crises and policies of adjustment and fiscal cutbacks on the well-being of households, including the increase in child labour (Cornia et al., 1987). The documented effects following the 2008 global economic crisis included the reduction and increased precariousness of employment sources and opportunities. The decline in household income resulting from job losses, increased volatility and the growing difficulty in covering costs of children's education was confirmed by rising school drop-out rates and increased rates of child labour in Bangladesh, Cambodia, El Salvador, India, Kenya, Nicaragua, Nigeria, Thailand and Zambia (Ortiz and Cummins, 2012).

The vulnerability to which households are exposed will depend not only on the transient events that may occur, but mainly on their capacity to respond to these events. This response will depend on the availability of assets that can be mobilized, such as access to credit or property, as well as the institutional responses available to address risk through relevant public policies, in this case, of prevention of child labour or current institutions for its prevention and eradication.

B. Family and household characteristics

Household composition, the characteristics of household members and their living conditions are relevant factors for explaining how families make child labour decisions.

A widely-studied factor is the parents' education level. The literature indicates that less educated parents tend to be more likely to want their children to enter the labour market rather than the school system. In the event of an economic shock, parents who view education positively will tend to postpone the decision to send their children to work. Moreover, the parents' education level is closely associated with their children's interest in school.

A study conducted in Nicaragua (Bonilla, 2010) found that children of household heads who had a secondary or higher education were 51% less likely to work than children of less educated parents. In Colombia, the education level of the household head is statistically significant and exhibits the expected patterns: the higher the education level, the lower the likelihood that a child will work (Amar et al., 2012). A study by Salazar (1990; in Amar et al., 2012) in the rock quarries of northeastern Bogota demonstrated that about half of the parents of child workers never attended school and that those who did had not completed their studies and had entered the labour market early. In Brazil, the education level of the household head has a positive, significant effect on child labour: the children of families whose household head has a primary school education are less likely to work and more likely to attend school than children of illiterate parents. The same relationship was observed for parents with a secondary education as compared with those who had completed primary school only (UCW, 2011).

One key study is that of Basu and Van (1998), who developed "The luxury axiom" hypothesis. This premise states that all households have a critical income that determines whether the household will send their children to work.

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Some studies have explored the differentiated influence of higher levels of education of the mother or father, with varying results. Some studies found that higher education levels of the mother have a greater impact on children's school attendance. Ribero (2001; in Amar et al., 2012) reported that for each additional year that Colombian mothers attended school, the likelihood that their children would attend school at the appropriate age rose by 5%.

Additionally, parents' occupational status is closely related to household income levels and, consequently, with the probability of child labour. Overall, employed fathers and/or mothers decrease the likelihood of child labour to the extent that the families have more income. A study in Argentina highlighted the positive effect that having a household member employed in a job with social protection had on children's permanence in school and their economic inactivity (Bonilla, 2010). A study in Nicaragua (Hoop et al., 2015) revealed that the participation of poor rural women in a productive programme increased their children's school attendance, even though that was not a condition of the programme.

This association does not occur with paid child domestic labour, where evidence indicates an increase when parents are employed. A study in Brazil (DeGraff and Levison, 2009; in Amar et al., 2012) found positive, significant correlations between a working mother and a working child. The researchers argue that this may result from the mother's work being associated with family domestic or business tasks, where it is easier to involve the children, particularly girls. In the case of working fathers, cultural factors may come into play since these men often believe that children should work to contribute to the family business, to have their own money or to help cover household expenses, among other reasons (Amar et al., 2012).

Household composition affects the likelihood of child labour. Several studies in the region report that children of one-parent households are more likely to enter the labour market than are those of two-parent households (Amar et al., 2012; Bonilla, 2010). For example, in Colombia, the absence of a father figure is associated with child labour.

Household size also influences the allocation of children's time. In the model developed by Kabir (2013), as household size grows, the number of hours children and adolescents work increases. A study in Brazil by Levison (1991; in UCW, 2011) found that child labour increases as the number of children in the household rises, particularly the number of pre-school aged children. The researcher argues that in vulnerable situations, parents of large families can diversify the investment of their children's time by assigning some to work in the home, others to work in the labour market and others to attend school.

These decisions also depend on the order of the child in the family. Cigno and Rosati (2001; in Brown, 2002) reported that families are more likely to invest in the human capital of younger children once the oldest child is working and the household budget is larger. Emerson and Souza (2008; in UCW, 2011) demonstrated that the oldest children (male and female) are less likely to attend school than their younger siblings.

Moreover, the immigrant status of a household can result in children's entry into the labour market as an adaptation and survival strategy. This should be considered in Latin America, which has high levels of displaced individuals resulting from armed conflicts, and a high percentage of migration due to poverty. As Pinzon et al. pointed out (2006, 2003; in Acevedo, 2011), nearly 25% of child street vendors in capital cities of Latin America claim they were displaced by violence or poverty; on the streets of Bogota, this percentage rises to 50%.

Finally, household residence (urban or rural) also has an impact on the likelihood of child labour and the type of work that children and adolescents perform. Children living in rural areas in the region are more likely to work. Most children (especially boys) who work in agriculture (60% of all child workers) live in rural areas and many of them are engaged in the worst forms of work. Many receive no pay for their work since they are mainly helping their parents or relatives (ILO/FAO, 2013). Children who live in urban areas are mostly employed in trade and manufacturing.

C. Characteristics of the child or adolescent

Most studies mention the following individual characteristics of the child: age, school attendance, education level, sex and ethnicity/race.

With respect to child age, several studies have demonstrated that the older the child, the more likely he or she will work (Kumari, 2013; Bonilla, 2010; Villazhañay, 2014; Del Rio and Cumsille, 2008; Urueña et al., 2009; Muñoz, 2014; Cortez and Gil, 2000; UCW, 2011).

School attendance is a protective factor against child labour in two ways. First, more years of education mean less probability of labour market participation. Additionally, school attendance reduces the likelihood of employment given that the activities compete for the children's available time (Kumari, 2013; Bonilla, 2010; Villazhañay, 2014; Del Rio and Cumsille, 2008; Urueña et al., 2009; Muñoz, 2014; Canagarajah and Coulombe, 1997; Khanam, 2007; in Acevedo, 2011). From the ILO's perspective, education, particularly primary education, is the main factor for reducing or eliminating child labour (ILO, 2016).

Sex also influences child labour. Child labour has a clear gender bias, which is expressed in different opportunities for individuals throughout childhood and adolescence, and which affect their possibilities for subsequent development.

In accordance with gender stereotypes that determine distinct roles for men and women, boys and male adolescents in the countries of the region are more likely to be employed outside the home and girls and female adolescents bear the burden of unpaid domestic work, whether in their own home or others (Montaño and Milosavjlevic, 2009). In Nicaragua, for example, men are three times more likely to participate in the labour market than women (Bonilla, 2010). In Brazil, men have a greater probability of entering the labour market than women and their participation sharply increases between the ages of 16 and 17, to around 42%, versus 25% for women (UCW, 2011). In Chile in 2003, of the total employed children/adolescents, just 33% were female. Nevertheless, more than 90% of children under age 17 who performed domestic work were girls (Del Rio and Cumsille, 2008).

These data confirm ILO findings (2013) on major gaps in the analysis of child labour with respect to domestic work since most of the research examines only employment in the labour market, ignoring both child domestic work (for third parties) and domestic work in children's own homes, which disproportionately affects women. Girls and female adolescents are also particularly vulnerable to the worst forms of child labour, such as commercial sexual exploitation and hidden forms of child labour, including domestic work in other people's homes (ILO, 2015).

Household composition affects the likelihood of child labour. Several studies in the region report that children of one-parent households are more likely to enter the labour market than are those of two-parent households (Amar et al., 2012; Bonilla, 2010). For example, in Colombia, the absence of a father figure is associated with child labour.

Ethnicity and race also have an impact on child labour. Indigenous and Afro-descendant populations throughout the region are especially excluded and vulnerable. This lack of equality influences the entry of children and adolescents in the labour force, and in the type of tasks they perform or their working conditions. In Peru, 20% of gold workers in Madre de Dios are indigenous children aged 11 to 17 years. In northern Mexico, approximately 32% of all indigenous workers are children. In Brazil, Afro-descendant children are more likely to work (4%) and less likely to attend school (4%) as compared to those children who are not Afro-descendant (UCW, 2011).

Finally, families' decisions to send their children and adolescents to work are closely associated with prevailing social and cultural norms regarding child labour (ILO, 2013). The role of culture should not be underestimated in the analysis of factors affecting this phenomenon and that can facilitate or impede its eradication. Social norms, then, are rules or expectations of behaviour within a specific social or cultural group (UNICEF, 2015a). These should be considered when analyzing the potential constraints to guaranteeing the rights of children and adolescents.

For example, researchers have analyzed the role of social norms as a potential barrier to achieving gender equality in access to education. They also may influence the early gender division of productive and reproductive labour. Social and cultural norms can be associated with differing views of the value of education and its future returns versus the early incorporation of children and adolescents in the labour market (ILO, 2013). Studies have also emphasized the value assigned to work as an educational space during childhood in some communities. For example, studies have revealed the increased incidence of child labour among children and adolescents of indigenous and traditional communities in countries of Latin America and Asia (Edmonds, 2003; Patrinos and Shafiq, 2008; Tuttle, 2006).

These are critical considerations when designing specific, culturally-appropriate strategies to prevent and eradicate child labour through education and sensitization programmes. These programmes should clearly define the conditions under which the activities of children and adolescents are considered child labour and its current and future consequences.

3

MEASUREMENT OF CHILD LABOUR AND ITS INFORMATION SOURCES

Latin America and the Caribbean is one of the regions in the world that shows greater advancement in national measurements of child and adolescent labour. Up to date, at least 27 countries[15] in the region have developed and implemented specific surveys and/or modules attached to household surveys on this topic, enabling the visibility and positioning of the issue in the public agenda of the countries. This achievement is due to a great extent to the work carried out by the countries together with international cooperation. One example has been ILO's work, that has promoted the development of statistics in practically all countries in the region, through the International Programme on the Eradication of Child Labour (IPEC) and specifically, through the Programme on Statistical Information and Follow-up in terms of Child Labour (SIMPOC).

In this section we examine the various elements present when measuring child labour, among which stand out issues related to the statistical definition and available sources of information for such a measurement.

3.1 Statistical definition of child labour

Up to date there is no standardized statistical definition in the region on child labour (ILO, 2013). International legal norms grant national policy makers some flexibility to establish standards and specify limits in order to determine the forms of labour and employment of boys, girls and adolescents that should be considered child labour and definitely prevented and eradicated (ILO, 2009). Notwithstanding, the common and general constitutive elements follow the recommendations of the Statistical Information Programme and Follow-up in Terms of Child Labour (SIMPOC) of the ILO.

Following the criteria recommended by the ILO (2008)[16], not all boys, girls and adolescents that perform productive activities are immersed in child labour. "Child labour" that needs to be eradicated corresponds to the following categories:

15 Argentina, Barbados, Belize, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guatemala, Guyana, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, Trinidad & Tobago, Saint Lucia, Suriname, Uruguay, Venezuela.

16 For further detail on these recommendations, see the Resolution on Statistics of Child Labour, adopted at the 18th. International Conference of Labour (Geneva, 2008).

- Work carried out by a boy or girl who has not reached the minimum age for admission to employment determined in the national legislation.
- "Hazardous labour" that puts the physical, mental or moral wellbeing of the boy or girl at risk, either due to its nature or to the conditions where it is performed.
- "The worst forms of child labour not assigned as hazardous labour", that include slavery, human trafficking, debt bondage, recruitment and use of boys and girls in armed conflicts, commercial sexual exploitation and illicit activities.

Labour carried out by people under 18 years that meets the national minimum age for admission to employment and that does not correspond to hazardous labour or a worst form, is not considered as "child labour" and therefore, its eradication is not sought.

Taking into account the aforementioned, in general, the framework of statistical reference that is used to measure child labour in the countries, is structured around two main elements: (i) the age of the boy, girl or adolescent, and (ii) the type of productive activities carried out by the boy, girl or adolescent.

In terms of age and in agreement with the ILO conventions, all individuals in the age group of 5 to 17 years will be considered, where age is measured in terms of the number of years completed. The minimum age is defined according to the legislation of each country. In the region, the minimum age for admission to employment varies from 10 years in Bolivia up to 16 years in Argentina, Brazil, Grenada and Trinidad & Tobago. In addition, in some countries within the region, national legislation also allows employment in light work[17] and/or vocational works, under the age previously mentioned, provided that they are not susceptible to harm the development of the boy, girl or adolescent or affect their attendance to school[18].

On the other hand, productive activities cover any activity developed by boys, girls and adolescents within the general frontier of the production established by the System of National Accounts[19] (SNA) for at least one hour during the period of reference, irrespective of whether they receive or not monetary or in-kind remuneration.

17 Allowed light work is defined as any non-hazardous work carried out by boys and girls (12 to 14 years) during less than 14 hours a week of reference. The threshold of hours and the age segment have been used in previous global estimates of the ILO.

18 Usually, light work can be differentiated from non-light work on the basis of the thresholds of time of work that are applied to all working boys and girls, irrespectively of whether they attend school or not (ILO, 2009).

19 "Economic activity" is defined on the basis of the production limit of the SNA, which excludes the domestic services carried out inside the household. Likewise, activities that are part of their school education are excluded.

The following table presents a graphic view of this broad definition:

Table 7
Classification of broad child labour according to the National Accounts System (NAS)

Age group	General production boundary					
	SNA production				Non-SNA production	
			Worst forms of child labour			
	(1a) Light work[3]	(1b) Regular work[4]	(2a) Hazardous work	(2b) Worst forms of child labour other than hazardous work	(3a) Hazardous unpaid household services[1]	(3b) Other non-SNA production
Children below the minimum age specified for light work (for example, 5–11 years)[2]	Employment below the minimum age for light work	Employment below the general minimum working age	Employment in industries and occupations designated as hazardous, or work for long hours and/or at night in industries and occupations not designated as hazardous	Children trafficked for work; forced and bonded child labour; commercial sexual exploitation of children; use of children for illicit activities and armed conflict	Unpaid household services for long hours; involving unsafe equipment or heavy loads; in dangerous locations; etc.	
Children within the age range specified for light work (for example, 12–14 years)[2]						
Children at or above the general minimum working age (for example, 15–17 years)[2]						

Source: 18th International Conference of Labour Statisticians, 2008.

[1] (3a) is applicable where the general production boundary is used as the measurement framework for child labour.
[2] Age-group limits may differ across countries depending upon the national circumstances.
[3] Where applicable at the national level.
[4] Children in employment other than those covered under columns (1a), (2a) and (2b).

Note 1: The shaded area shows child labour to be abolished, in the broad definition. A narrower definition will be considered following the legislation of each country.
Note 2: Many countries in Latin America and the Caribbean, for example Brazil, do not recognize the category of "light work". Therefore, measurement will be subject to the legislation of each country.

3.2 Information sources

In addition to the surveys and/or modules mentioned at the beginning of this section, there are other information tools that in some cases allow measuring child labour incidence or that provide relevant information on the related factors such as population census and housing and administrative records.

A. Surveys and/or modules that allow measuring child labour

i. ***Specific surveys on child labour,*** these are efforts of the countries, in some ocasions supported technically and financially by international organizations, without regularity in time, and with specific questionnaires to measure the extent, characteristics and causes of child labour. In addition, they collect information about labour conditions, occupations, employment category among other characteristics inherent to this condition. Questionnaires also collect information on demographic and social aspects of the household, as well as the factors that lead the boys, girls and adolescents to work (SIMPOC, 2008).

ii. Other countries measure child labour through ***modules and/or questions included in national household surveys.*** The purpose of these surveys is to *"provide reliable socioeconomic and demographic information between inter-census periods and meet the demand of information with regard to the design and evaluation of economic and social policies"* (ECLAC, s.f.). This type of surveys are among the three main sources of statistical information on social issues of the countries, as they provide a more economic alternative than the population and housing censuses while they collect timely and more detailed data than the systems of administrative records (United Nations, 2009).

Questionnaires seek to collect information on demographic and social aspects of the household, as well as the factors that lead the boys, girls and adolescents to work.

Box 1

Surveys on Multiple Indicators by Conglomerates (MICS)

In addition to the household surveys elaborated by the governments, there is a series of instruments funded or guided by several cooperation agencies that allow measuring child labour. One of these instruments is the Multiple Indicators Cluster Survey (MICS). This is a programme of household surveys prepared by UNICEF in order to learn about the situation of children and women in the areas of health, nutrition, education, social protection, child labour, among others.

The MICS follow an international format that has been implemented in more than 40 countries, with questionnaires designed in a modular format. In general, they have three questionnaires, one on household and family (with questions on child labour), the other on women between 15 and 49 years and the third one on children under the age of 5 years that is answered by the mother or any other caregiver.

Regarding the questions on child labour, these are designed to get information on the prevalence and do not assess the risks faced by working boys, girls and adolescents, for instance, whether their occupation is of hazardous nature.

Source: UNICEF, 2015b.

The main advantage of using the household surveys to measure child labour is that the home itself is the most appropriate unit to identify children and their families. This type of instruments allows *"except as regards to special categories of child labour, like work of children living in the street and those who are under the worst forms of child labour not identified as hazardous labour"* (ILO, 2009), to estimate their incidence and collect a great variety of demographic and socioeconomic statistics from the children and their parents.

Table 8
Latin America and the Caribbean (27 countries): Surveys and/or modules to measure child labour

Country	Name of Survey/Module	Year
Argentina	EANNA	2017
Barbados	Multiple Indicators Cluster Survey (MICS/UNICEF)	2012
Belize	National Survey on Activities of Boys and Girls	2013
Bolivia (Plurinational State of)	Survey on Child Labour (ETI)	2008
Brazil	PNAD	2016
Chile	EANNA	2012
Colombia	GEIH	2017
Costa Rica	ENAHO	2016
Cuba	Multiple Indicators Cluster Survey (MICS/UNICEF)	2014
Dominican Republic	ENHPM/MICS	2010/2014
Ecuador	ENEMDU	2016
El Salvador	EHPM	2015
Guatemala	ENCOVI	2014
Guyana	Multiple Indicators Cluster Survey (MICS/UNICEF)	2014
Haiti	Demographic Health Survey (DHS)	2012
Honduras	Permanent Household Survey for Multiple Purposes (EPHPM)	2017
Jamaica	Survey on Activities of Boys, Girls and Youth	2016

Country	Name of Survey/Module	Year
Mexico	ENOE	2016
Nicaragua	Demographic Health Survey (DHS)	2001
Panama	Survey on Child Labour (ETI)	2016
Paraguay	EANA (Rural)	2015
Peru	Survey on Child Labour (ETI)	2015
Saint Lucia	Multiple Indicators Cluster Survey (MICS/UNICEF)	2012
Suriname	Multiple Indicators Cluster Survey (MICS/UNICEF)	2010
Trinidad & Tobago	Multiple Indicators Cluster Survey (MICS/UNICEF)	2011
Uruguay	National Survey on Child Labour (ENTI)	2009-2010
Venezuela (Bolivarian Republic of)	Multiple Indicators Cluster Survey (MICS/UNICEF)	2000

Source: Compilation prepared by the author based on reports from the countries.

However, there are at least three important limitations of the indicators in the household surveys. The first one is that this type of surveys does not provide information about some of the worst forms of child labour, for which it is necessary to apply alternative methodologies (boys and girls victims of commercial sexual exploitation, slavery, street children, among others) (ILO, 2013). In fact, these child labour forms tend to be hidden and in many countries of the region the incidence of these forms accounts for a very low percentage of the total of child labour, so they would be hardly detected through the household sampling.

The second limitation is related to the level of representativeness. In general, household surveys allow the disaggregation of information and measure the incidence of child labour only at the highest administrative level (region, province, department, etc.), and thus making the information at local level invisible.

The third limitation is related to the fact that most household surveys are not developed to measure child labour, both in the related variables and in the sample size, so the results could have sampling bias and non-quantifiable statistical errors, generating the underestimation of child labour in the countries.

B. Population and housing censuses

Population and housing censuses have a significant role in Latin America and the Caribbean, as they are the foundation of the National Statistical System and are the only instruments that provide reliable data for lower levels of geographical disaggregation and for small populations (CELADE, 2013). Censuses are conducted by the National Institutes of Statistics in the countries with a periodicity of approximately 10 years, with the main purpose to provide information about housing, households and population of a country. In Latin America and the Caribbean, the most recent application took place around 2010; however, it varies among the various countries in the region as detailed in the following table:

Table 9
Latin America and the Caribbean (28 countries): Population and housing censuses

Country	Census
Argentina	2010
Bahamas	2010
Barbados	2010
Bolivia (Plurinational State of)	2012
Brazil	2010
Chile	2017
Colombia	2005 (2018)
Costa Rica	2011
Cuba	2012
Dominican Republic	2010
Ecuador	2010
El Salvador	2007
Guatemala	2002 (2018)
Grenada	2011
Guyana	2012
Haiti	2014
Honduras	2013
Jamaica	2011
Mexico	2010
Nicaragua	2005
Panama	2010

Country	Census
Paraguay	2012
Peru	2017
Saint Lucia	2010
Suriname	2010
Trinidad & Tobago	2010
Uruguay	2011
Venezuela (Bolivarian Republic of)	2011

Source: Compilation prepared by the author based on country reports.

Note: The estimated date for the next population census is shown in parenthesis.

Although these instruments are not developed to measure child labour and do not provide information on hazardous labour, they allow -in many countries- to quantify and characterize the number of boys, girls and adolescents in paid and non-paid jobs, enabling the identification of estimates with higher levels of geographical disaggregation than surveys (for example, at municipality level).

Table 10

Latin America (18 countries):Questions related to employment in the census questionnaires

Country	Year	Minimum age for questions on employment	Occupational category	Branch of economic activity	Hours spent	Income
Argentina	2010	14 years	Yes	Yes	No	No
Bolivia (Plurinational State of)	2012	7 years	Yes	Yes	No	No
Brazil	2010	10 years	Yes	Yes	Yes	Yes
Chile	2002	15 years	No	Yes	No	No
Colombia	2005	5 years	Yes	Yes	Yes	No
Costa Rica	2011	12 years	Yes	Yes	No	No
Dominican Republic	2010	10 years	Yes	Yes	No	No
Ecuador	2010	5 years	Yes	Yes	Yes	No
El Salvador	2007	10 years	Yes	Yes	Yes	No
Guatemala	2002	7 years	Yes	Yes	No	No
Honduras	2013	5 years	Yes	Yes	No	No

Table 10

Latin America (18 countries):Questions related to employment in the census questionnaires

Country	Year	Minimum age for questions on employment	Occupational category	Branch of economic activity	Hours spent	Income
Mexico	2010	12 years	Yes	Yes	Yes	Yes
Nicaragua	2005	10 years	Yes	Yes	Yes	No
Panama	2010	10 years	Yes	Yes	No	Yes
Paraguay	2012	10 years	Yes	Yes	No	No
Peru	2007	6 years	Yes	Yes	No	No
Uruguay	2011	12 years	Yes	Yes	No	No
Venezuela (Bolivarian Republic of)	2011	10 years	Yes	Yes	No	Yes

Source: Compilation prepared by the author based on census ballots of each country.

Regarding the minimum ages established for the formulation of questions related to employment, they vary from 5 to 15 years. The information collected in this section is related to labour, occupational category (employee, boss, free-lance, family, etc.), the economic branch (agriculture, trade, services, etc.), hours spent in the main occupation and income received.

C. Administrative records

Another valuable source of information to measure or contextualize child labour in the territory are administrative records. This is data collected by *"public or private institutions on an action, fact or event due to their own management control"* (DANE, 2010). In general, this data is collected on a continuous basis to visualize the management of government programmes or to support a process within the institution; therefore, they are not statistical records but can be transformed into statistical records (INE, 2015).

Among the advantages of using administrative records is the fact that they are a low cost data source, once implemented, compared to censuses and surveys; they provide statistics with extensive possibilities of disaggregation; they do not have sampling errors and avoid the duplication of efforts among government entities (INEC, 2012; INE, 2015; DANE, 2010). The use of administrative records with statistical purposes complements surveys and many times replaces them.

However, as their purpose is mainly administrative, to use them it is necessary to evaluate its concept and methodological basis, classifications, coverage, quality of responses, data processing and availability frequency (Echegoyen, 2003).

4

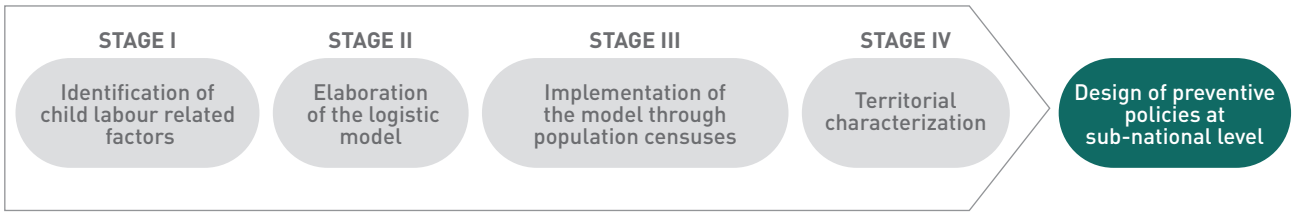
CHILD LABOUR RISK IDENTIFICATION MODEL

As previously mentioned, the Latin America and the Caribbean region has a large amount of information sources that allow to measure the extent of child labour at national level, as well as its related factors. Usually, this information does not allow a further disaggregation to the first administrative division (region, province, department), so the information at a lower disaggregation level (municipality, population center, district, etc.) remains invisible. This limits the proper implementation of public policies aimed at the prevention and eradication of child labour by not taking into account the particularities of the territory.

This section provides a measurement instrument that, by using existing statistical information in the countries, can make estimates at a lower level of sub-national disaggregation. The Child Labour Risk Identification Model is a methodology developed by ILO jointly with the ECLAC, that will enable to identify territories where there are higher probabilities of child labour, as well as to estimate the weight of several risk indicators in the territories, in order to define the most relevant multisectoral actions to interrupt the trajectory of child labour.

The four generic or ideal work stages implied in the model are presented hereafter, and it is important to consider that two sources of information are required: one that will enable to estimate child labour at national level and that will allow to build the logistic model (for example, survey to measure child labour) and the other source with disaggregation level and sufficient information to replicate the model at sub-national level (example, population census)[20].

Graphic 2
Implementation stages of the Child Labour Risk Identification Model



Source: Prepared by ILO-ECLAC.

20 Naturally, the last source should not measure child labour directly.

4.1 Stage I: Identification of child labour related factors

The first stage begins by identifying the most relevant child labour risk and protection related factors that will be included in the statistical models that will be developed in later stages. The identification of the related factors is done on the basis of the theoretical review of previous studies, ideally of the same countries or territories where the estimate will be made.

The literature highlights several child labour related factors. In summary, they can be grouped in two levels: factors related to the context and factors related to family and individual characteristics.

As mentioned in the second section, the literature highlights several child labour related factors. In summary, they can be grouped in two levels: factors related to the context and factors related to family and individual characteristics (Graphic 1).

The first ones are related to the geographical environment, and economic and institutional factors. Examples of these factors are the area of residence (urban/rural), the prevailing economic sector in the area, the availability of policies, programmes or services on child labour prevention and reduction, among others. The second type of factors are family and individual, and can be subdivided in accordance with characteristics such as sex, age, ethnic and racial origin, school attendance, migratory status, birth order, etc.; family types and structures, socioeconomic characteristics of parents and/or adults and other children in the household/family, number of people in the household, access to social protection mechanisms, etc.; and living conditions, such as poverty, vulnerability, housing and access to service, ownership of goods, access to credit, among others.

It is worth mentioning that all the variables selected as related factors must be capable of being measured with available information sources. Likewise, all these factors will have to be relevant, and in turn, account for the phenomenon. However, it is very likely that there will be many variables that by themselves account for a low proportion of the phenomenon (or that correlate without necessarily being explanatory factors). In this case, when there is a set of variables that individually account for a low percentage of the variance, the proposal is to group them (either following statistical methods or using natural clusters previously mentioned) to make the future explanation and recommendation relevant to suggest multisectoral actions.

Once the theoretically relevant variables are identified, it is necessary to review whether these factors can be measured through information sources selected for the country (surveys and censuses). After selecting the databases to be used in the analysis, it will be necessary to standardize concepts, definitions, classifications and variables that will be included in the models. Thus, both for the construction of the child labour variable and the other independent variables, the methodology adjusted to the reality of each country will be followed, especially with regard to legal ages to work, as well as the prohibited activities.

4.2 Stage II: Elaboration of the logistic model

Taking the survey (that allows to measure child labour), the statistical models to identify the risk indicators (and protection) at national and sub-national level will be specified. In most of the studies analyzed[21], the statistical model of logistic regression[22] is used, where the probability of child labour is estimated as a dichotomous dependent variable (works or does not work), based on a set of independent variables that should predict whether a boy, girl or adolescent works or not[23].

21 To review the studies consulted, see Annex No. 1.

22 Another statistical technique that allows elaborating similar models -with dichotomic dependent variables- is the discriminant analysis, even though, due to the possibility to include more types of independent variables, it is recommended to use the logistic regression.

23 As in any regression model, it is important to review the fit of the model, in order to detect possible issues due to poor specification of variables or low explanatory capacity.

Box 2
Logistic Regression

The purpose of the logistic regression is to predict the estimated probability that the dependent variable "Y" presents one of the two possible values (1=yes or 0=no) in terms of the different values that the set of independent values (Xi) adopt.

$$Y_i = \begin{cases} 1 \text{ if } I_i > 0 \text{ what happens when } X_i\beta + \varepsilon_i > 0 \\ 0 \text{ if } I_i < 0 \text{ what happens when } X_i\beta + \varepsilon_i < 0 \end{cases}$$

Expressing the model in terms of probabilities, we have:

$$P_i = E(y = 1/X_i) = \frac{1}{1 + e^{-(\alpha + \beta X_i)}}$$

Where Pi is the probability of occurrence of an event, then (1 - Pi) is the probability of non-occurrence.

$$1 - P_i = \frac{1}{1 + e^{Z_i}}$$

Therefore,

$$\frac{P_i}{1 - P_i} = \frac{1 + e^{Z_i}}{1 + e^{-Z_i}} = e^{Z_i}$$

Then, "$P_i/1\text{-}P_i$" is simply the ratio of probabilities (also called odds or odds ratio). It represents the estimated probability or ratio of occurrence of an event "P (Y=1)" divided by the complementary property "P (Y=0)", that is, the number of times that something may happen over something that may not happen. This measure admits values from "0" when "P (Y=1) =0" to "∞" when "P (Y=1) =1". Thus, the model is proposed:

$$Odds_ratio = \frac{\frac{p_x}{1 - p_x}}{\frac{p_{x*}}{1 - p_{x*}}} = \frac{e^{-(\alpha + \beta_x)}}{e^{-(\alpha + \beta_{x*})}} = e^{\beta(x - x*)}$$

Taking Naperian logarithms from the odds ratio, the equation of the Logit model is linearized, respecting the objective that the estimated values are within range (0-1), obtaining the expression:

$$L_i = ln\left(\frac{P_i}{1 - P_i}\right) = Z_i = \alpha + \beta X_i$$

Therefore, the logistic regression assumes that the logit can be expressed as a linear combination of the independent variables. Thus, the probability (p) may be expressed as:

$$logit\ (p) = ln\left(\frac{P_i}{1 - P_i}\right) = \alpha + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \ldots + \beta_k x_k$$

or:

$$p = \frac{1}{1 + e^{-(\alpha + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \ldots + \beta_k x_k)}}$$

Where p is the probability of occurrence of the event of interest (child labour), α and β_1, β_2,...β_k are the regression parameters, and $x_1, x_2, x_3, \ldots x_k$ the explanatory variables.

Depending on the representativeness of the source of information used, several binary models can be developed at sub-national level (regions, provinces, departments, etc.). It is worth recalling that surveys on child labour and housing usually have the first level of disaggregation possible at this level. Certainly, as in any econometric exercise, it is important to review the degree or goodness of fit of the model of logistic regression, as the final results will depend on the specification, that is, the variables included in the model depending on the specification[24].

To finish this stage, it is necessary to save the values of coefficients at sub-national level coming from the developed models, in order to insert or paste them to the source of information used in the subsequent stage (usually the census). This stage therefore implies that the models developed in the surveys only include variables that can be replicated in the source used in the third stage.

24 For more information on the logistic regression model fit, see: Hosmer & Lemeshow (2000). Applied Logistic Regression, 2nd. Ed. New York. United States.

4.3 Stage III: Implementation of the model through population censuses

The purpose of this third stage is to estimate the probabilities of child and adolescent labour with lower levels of geographical disaggregation than the survey used in stage II (for example, at municipality level). In this sense, the information source used is precisely the source that allows reaching greater coverage and disaggregation, such as micro data in the population censuses, educational censuses, etc.

Once the information source is selected, the first step will be to standardize the variables of the census with the variables of the survey used in Stage II. The objective is that both instruments have similar variables, in terms of name and in category codes. The second step will be to insert/paste the values of the coefficients (resulting from the estimate of the logistic regression) as new variables in the census. The number of new variables will be given by the number of variables used in the regression plus the constant. The third step will be to calculate the probability of every boy, girl and adolescent to be in child labour, based on the pasted coefficients as the variables of the census. The following formula is used to carrry out this procedure:

$$p = \frac{1}{1 + e^{-(\alpha + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \ldots + \beta_k x_k)}}$$

Where P is the estimated probability of child labour; α and β_1, β_2,... β_k are the regression parameters or the estimated coefficients with the survey, and X_1, X_2,... X_k are the variables of the census.

The result of the formula will be a new variable that will show the probability of each boy, girl and adolescent to be in child labour. This individual probability will be used to calculate the average probabilities of child labour at local level, and to identify the territories where the problem could be concentrating. This estimate will not indicate the value of child labour incidence, but determine the territories where there is a higher probability and identify the factors that are most influencing in this probability.

Finally, a calibration or correction of the estimate will be made in order to be able to come closer to the real rates of child labour. To carry out this last step, the official rate of child labour that most closely approximates the analyzed territory (national or regional) will be selected based on the survey used in Stage II. With this information, the individuals will be ordered from the lowest to the highest estimated probability of child labour and then those within the official rate detected (for instance, 10% of child labour) will be selected. With this, "x percent" of individuals with higher probability to be in child labour will be selected.

4.4 Stage IV: Territorial characterization

Once the probabilities of child labour at local level have been estimated, the characterization stage follows. The first step will be to review the weight of the different factors incorporated into the representative models, using the coefficients measured as odds ratio, namely the number of times that something may happen over something that may not happen (Box 1). This will not only allow to identify what variable or factor is more important to explain child labour, but to see how such a factor is expressed in the different territories. The minimum possible value is 0, value 1 implies that the two categories compared are equal and the maximum theoretically possible is infinite. In this sense, values higher than 1 mean that the presence of the factors is associated to the higher occurrence of the event (in this case, child labour), therefore, it is considered as a risk factor. On the contrary, if the result of the odds ratio is lower than 1, the presence of the factor is associated to a lower occurrence of the event, and therefore it is considered as a protection factor. For better interpretation of the odds ratio, this can be transformed into probabilities through the following formula:

$$Probability = \left(\frac{OR}{OR + 1} \right) x\ 100$$

In other words, if the odds ratio (OR) of a factor (for instance, repeated school absenteeism) is of 0.33, this would mean that the occurrence of the event (child labour in this case) is 0.33 times more likely in the presence of said factor. This translated into probabilities (using the formula) can be interpreted as a 25% of probability of child labour in view of repeated school absenteeism.

The second step, after analyzing the weight of the different factors related to the probability of child labour, is the review of that probability at territorial level. It is recommended to group the municipalities of each state or region in groups of child and adolescent labour risk, in order to facilitate the analysis of the information. The selection of municipalities by state or region is implicit in the objective of not distorting the estimates with the extreme values of the other entities. Below is an alternative to create three groups (high, medium and low) using for each one of them the same distance of the risk range size.

Table 11
Elaboration of child labour risk groups

Range size	(Maximum value – Minimum value) / 3
Group No. 1	Prob. C.L. <= (Minimum value + Range size)
Group No. 2	(Prob. C.L. > (Minimum value + Range size)) & Prob. C.L.<= (Minimum value + Range size x 2)
Group No. 3	(Prob. C.L.> (Minimum value + Range size x 2)) & Prob. C.L.<= (Minimum value + Range size x 3)

Finally, it is suggested to use and cross different sources of information to characterize the territories. This possibility is one of the greatest virtues of this methodology which allows for the development of territorial and multisectoral policies. In this respect, one can use the variables of the census or the survey used to characterize the individuals and territories, and/or also use information from the administrative records or other data with the desired sub national level. An example could be to use information at municipal level on school dropout, school absenteeism, supply of schools, social programmes, among others.

5

EXAMPLE OF IMPLEMENTATION AND VALIDATION OF THE METHODOLOGY

One of the most important and crucial steps when developing an estimation methodology, is to be able to compare the results of such a prediction with the values observed, and with this, validate the methodology. To do so, it is necessary to apply a method that compares the results of the surveys that measure child labour with the results of the population census.

Taking this objective into account, an exercise of implementation and validation of the Child Labour Risk Identification Model was carried out in Brazil, using both, the PNAD 2011 Survey and the Census on Population and Housing 2010. The election of this country is based on the fact that this population census is one of the few instruments in Latin America and the Caribbean that allows measuring child and adolescent labour (from 10 to 17 years) in a direct manner, thus enabling the comparison and validation of the indirect estimate proposed of the risk model.

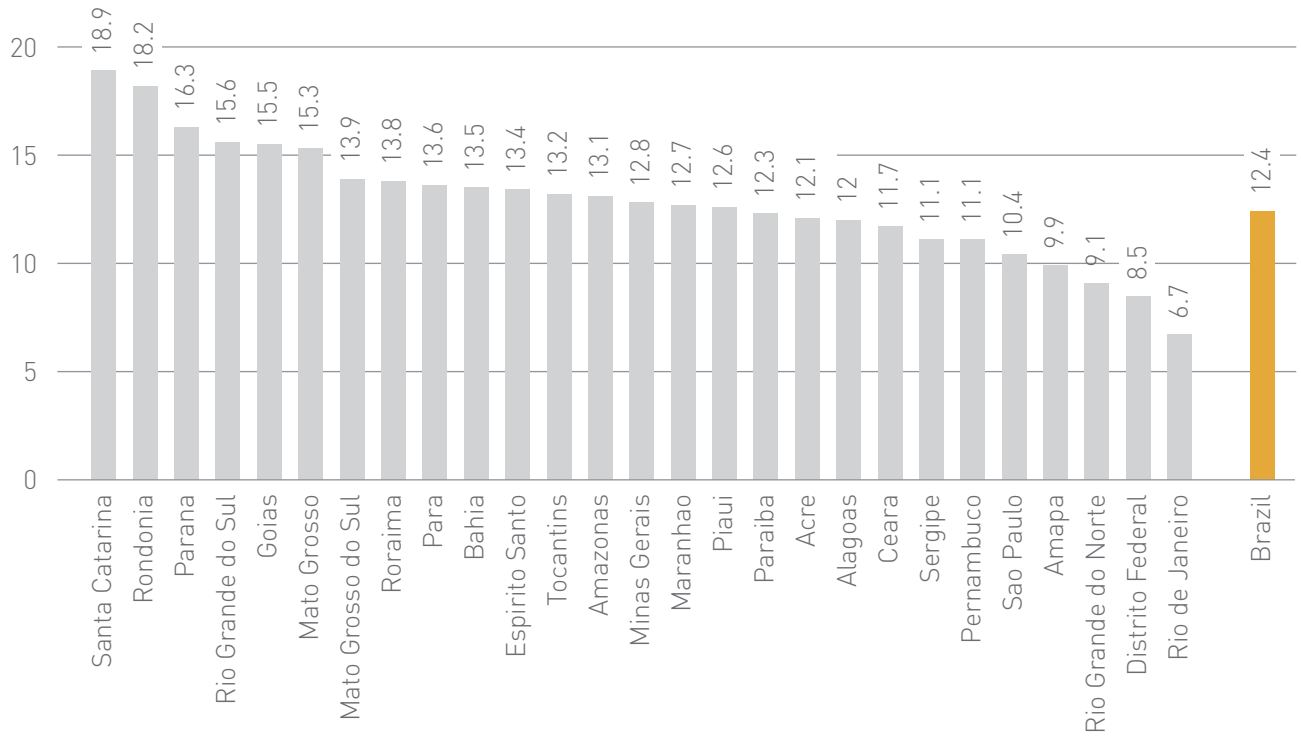
As previously mentioned, the purpose of building these models is not to estimate the child labour rate, but to determine the territories where there is higher probability of occurrence of the phenomenon and the factors that most influence such probability. Therefore, in the validations, a critical factor will not be to match the rates of estimation with the direct measurement, but to get closer to such magnitudes and be able to organize the territories in the same way that the direct measurement.

According to the official results of the 2010 Census[25], Brazil recorded 3.4 million boys, girls and adolescents in child and adolescent labour, which corresponds to 12.4% of the population between 10 to 17 years. When reviewing the distribution of this rate in the 27 states of the country, it is observed that it varies between 6.7% in Rio de Janeiro, up to 18.9% in Santa Catarina, even when in absolute numbers the distribution is reorganized, with the state of Roraima showing a lower number of child workers (11.000) in contrast to the state of Sao Paulo, that has around 500.000 boys and girls in child labour.

25 For more information, see: http://www.ibge.gov.br/estadosat/

Graphic 3

Brazil: Child and adolescent labour (10 to 17 years), by state, 2010 (in percentages)



Source: IBGE, CENSUS 2010.

The first step of the estimate was to review what variables mentioned in the existing literature could be measured through the population census, as well as the PNAD Survey. With the identified variables, the estimate of a logistic regression model at national level was made in the survey, to then run the same model in each one of the states of Brazil (Stage II). Certainly, the model elaborated in this validation is given by the variables in both instruments (survey and census); therefore, it can be modifiable in future measurements, if the necessary variables were available.

In this case, the dependent variable is child and adolescent labour (1 if he/she works and 0 if he/she does not work) and the independent variables can be grouped into three groups: group 1, individual characteristics (sex, age, geographical area of residence, migratory status -national or international-, race -preto, pardo, other- and the attendance to an educational center); group 2, characteristics associated to the household (type of household of residence, number of members and household income); and group 3, characteristics related to the head and spouse of the household (education level, occupational status, type of occupation and presence of labour contract).

Model for Brazil

Child labour = Sex + Age + Area + Ethnicity/race + Migration + Educational support + Number of persons in household + Type of family + Parents education + Parents occupation + Type of employment of head of household + Labour contract of head of household + Household income

The next step is to review the degree or goodness of fit of the model of the logistic regression. This is related to the different statistical measures that summarize the discrepancy between the observed values and the predicted values in the model under study. Therefore, it is expected that the estimate will show some classification errors, such as working children (Y=1) that are incorrectly classified as non-working children (Y=0), and non-working children that are incorrectly classified as working children.

The next table shows the results of the fit obtained by the model. The first statistical data is the hit rate, that is the ratio between the correct predictions and total predictions. This shows a value of 85%, considered satisfactory or acceptable by the literature (the difference to reach 100% is called error rate). The second data provides information on the sensitivity of the model, measuring the ratio between the individuals classified as working children (Y=1) and the total cases observed that are classified as working children. That is to say that the percentage of cases classified as working children, when they actually were so. In our case, the statistics show a value of 83.8% considered as good. Specificity is presented hereafter, that is, the ratio between the individuals classified as non-working children and the total of cases observed that are classified as non-working children, that gives a value of 85.1%, also considered as good. Finally, the statistical analysis of McFadden's R2 is provided which gives a value of 0.22, considered as accepted[26].

26 *The McFadden statistical*, or pseudo R^2, is an analogous coefficient of determination (R^2) of the linear regression; however, its values are considerably lower.

Table 12
Brazil 2011: Goodness of fit of the logistic regression model

Index	Value
Hit rate	85.1%
Error rate	14.9%
Sensitivity	83.8%
Specificity	85.1%
McFadden's R2	0.22

Source: ECLAC, on the basis of special processing of the PNAD 2011 Survey.

Once the goodness of fit is reviewed, each one of the variables included in the model is reviewed. The following table shows the coefficients of the estimate, as well as the odds ratio for each variable at national level. The first thing that can be verified is that all the variables included in the model are significant at 99%. In addition, the variable with the highest positive impact on the probability of child labour is sex, where boys and male adolescents have higher probabilities to be in this situation than their female counterparts. To live in rural areas and the fact that the household head works in agriculture, are factors that also strongly increase the probability for a boy, girl or adolescent to be working. On the other hand, variables that protect against child labour are attendance to school, a work contract for the household head and a higher educational level of the parents.

Table 13
Brazil 2011: Coefficients and odds ratio of the logistic regression

Variables	Coef.	Odds ratio
Sex (1=Male)	.769***	2.2
Age	.472***	1.6
Area of residence (1=Urban)	-.672***	0.5
Race/ethnicity (1=Preto & Pardo)	.19***	1.2
Attendance to educational center (1=Attends)	-.785***	0.5
Migratory status (1=Migrant)	.185***	1.2
Type of household 1 (1=Nuclear)	.029***	1.0

Variables	Coef.	Odds ratio
Type of household 2 (1=Composed)	-.107***	0.9
Number of persons in household	.0317***	1.0
Household income (In logaritm)	.121***	1.1
Educational level of spouse	-.03***	1.0
Educational level of household head	-.034***	1.0
Occupation of spouse (1=Busy)	.692***	2.0
Occupation of household head (1=Busy)	.181***	1.2
Type of occupation (1=Agriculture)	.594***	1.8
Contract tenure (1=Yes)	-.219***	0.8
Constant	-8.95***	0.0

Source: ECLAC, on the basis of special processing of the PNAD 2011 Survey.
Note: *p<0.05; **p<0.01; ***p<0.001.

Once the model is defined at national level, it is necessary to run it for each one of the representative entities of the survey that in the case of Brazil was for the 27 states in the country. The table hereafter, shows the coefficients differentiated by variable and geographical disaggregation, where we can see, for example, that attending to school is a protective factor in all the states for a boy, girl or adolescent not to be in child labour. However, it also can be noticed that the weight of this factor is different in each one of the states[27]. A similar case is seen in the variable place of residence, where living in a rural area increases the probabilities of child labour, but as expected, in predominantly urban states the weight of this factor is less relevant.

This work for the review of indicators can be carried out for the list shown below.

27 This difference may be due to multiple factors, such as the care coverage of each state, the extent of child labour or other factors that make this variable more or less relevant in each one of the states.

Table 14

Odds ratio of the logistic regression model, by state

	Acre	Alagoas	Amazonas	Amapa	Bahia	Ceara	Distrito Federal	Espirito Santo	Goias	Maranhao	Minas Gerais	Mato Grosso do Sul	Mato Grosso	Para
Sex (1=Male)	2.3***	2.8***	2.7***	2.7***	2.5***	2.6***	1.7***	1.7***	2***	4.8***	2***	3***	2.7***	2.5***
Age	1.6***	1.4***	1.4***	1.7***	1.4***	1.5***	2.3***	1.8***	1.8***	1.4***	1.7***	2.2***	1.8***	1.4***
Area of residence (1=Urban)	.2***	.46***	.31***	1	.58***	.65***	2***	.63***	.8***	.6***	.59***	.55***	.51***	.55***
Race/ethnicity (1=Preto & Pardo)	2.1***	1.2***	1.6***	1.1	1.1***	1.5***	1.2***	1.4***	1**	1.2***	1.4***	2***	1.7***	1.4***
School attendance (1=Attend)	.37***	.43***	.34***	.4***	.46***	.49***	.41***	.46***	.84***	.57***	.46***	.33***	.95***	.36***
Migratory status (1=Migrant)	1.4***	1.1***	1	0.96	.89***	.89***	2***	.76***	1.2***	1.4***	.97***	1.1***	1.2***	1.1***
Type of household 1 (1=Nuclear)	1	1.2***	0.99	2.8***	.84***	1.1***	.7***	.71***	1.1***	1.3***	.75***	1	.85***	1.2***
Type of household 2 (1=Compound)	2.2***	2.9***	.67***	2.4***	1.1***	.41***	.23***	.31***	2.1***	2.2***	1.5***	(omitted)	.38***	.66***
Number of persons in household	.97***	.96***	1.1***	1.1***	1	1.1***	1.2***	.91***	.99***	1.1***	.99***	1***	.94***	1.1***
Household income (ln logaritm)	.78***	1.1***	1.2***	1.2***	1***	1.1***	1.3***	1.1***	1.2***	.94***	1***	1.3***	1.5***	1.2***
Educational level of spouse	.93***	.93***	.97***	.89***	.98***	.96***	.94***	.94***	.94***	.95***	.99***	.94***	.97***	.94***
Educational level of head of household	.96***	.96***	1***	.96***	.98***	1***	.92***	1**	.99***	.96***	.96***	.94***	.95***	1*
Occupation of spouse (1=Busy)	5.1***	3.4***	2.1***	1	2.3***	2.2***	1.1***	1.7***	2.1***	1.7***	1.8***	2.4***	1.2***	2.1***
Occupation of head of household (1=Busy)	1.6***	1.6***	1.8***	0.98	.85***	.84***	2.4***	1.5***	.97**	.72***	1.5***	1.9***	1.3***	1.3***
Type of occupation (1=Agriculture)	1.4***	.93***	2.8***	1.1	1.8***	3.3***	.23***	1.6***	1.2***	1.7***	1.4***	.8***	.68***	1.5***
Contract tenure (1=Yes)	1.2***	.61***	.52***	0.93	.79***	.6***	1.3***	1.1***	.86***	.69***	.91***	.74***	1.3***	.62***
Constant	.0021***	.00082***	.00039***	7.8e-06***	.0014***	.00032***	2.0e-08***	4.4e-05***	9.2e-06***	.0012***	.00014***	4.1e-07***	7.7e-06***	.00045***

Source: ECLAC, on the basis of special processing of the PNAD 2011 Survey.
Note: *p<0.05; **p<0.01; ***p<0.001.

Table 14

Odds ratio of the logistic regression model, by state

	Paraiba	Pernambuco	Piaui	Parana	Rio de Janeiro	Rio Grande do Norte	Rondonia	Roraima	Rio Grande do Sul	Santa Catarina	Sergipe	Sao Paulo	Toncantins	Brazil
Sex (1=Male)	3.7***	2.7***	4.3***	2***	1.7***	2.1***	3.1***	5.1***	2***	1.3***	3.7***	1.5***	2.1***	2.2***
Age	1.5***	1.5***	1.5***	1.7***	1.9***	1.6***	1.7***	1.5***	1.7***	2***	1.5***	2***	1.6***	1.6***
Area of residence (1=Urban)	.29***	.44***	.27***	.67***	.65***	.87***	.69***	.085***	.37***	.78***	.49***	.7***	.48***	.51***
Race/ethnicity (1=Preto & Pardo)	0.97	.85***	2.2***	1.4***	1***	2.4***	.27***	1.3***	1.2***	.76***	4.1***	1.5***	1.8***	1.2***
School attendance (1=Attend)	.23***	.34***	.48***	.3***	.26***	.47***	.64***	.35***	.33***	.59***	.34***	.64***	.53***	.46***
Migratory status (1=Migrant)	.94***	1.3***	1.4***	1.1***	1.4***	1.6***	2***	.67***	1.2***	1.3***	.74***	1.4***	.91***	1.2***
Type of household 1 (1=Nuclear)	.9***	1.1***	2.2***	1.1***	1.3***	1.5***	1.1***	.56***	.86***	1.1***	1.3***	.94***	0.98	1***
Type of household 2 (1=Compound)	1.6***	.79***	4.6***	.86***	2***	.79***	3***	.64***	.94*	1.2***	3.2***	.42***	.25***	.9***
Number of persons in household	.98***	.98***	1***	.94***	1.2***	1.1***	.94***	.86***	.94***	1***	1.1***	1***	.97***	1***
Household income (ln logaritm)	.92***	1.2***	1.1***	1.3***	1.3***	1.5***	1.1***	1.4***	1.1***	1.5***	1.1***	1.2***	1.1***	1.1***
Educational level of spouse	.97***	.97***	1***	.95***	.95***	.92***	1**	.94***	1***	.99***	.96***	.99***	.93***	.97***
Educational level of head of household	.98***	.92***	.91***	.97***	.93***	.9***	.92***	1	.93***	1	.97***	.95***	.98***	.97***
Occupation of spouse (1=Busy)	1.7***	3.8***	1.2***	2.1***	1.4***	3.1***	2.1***	1.8***	1.8***	1.7***	1.8***	1.4***	3.2***	2***
Occupation of head of household (1=Busy)	1.4***	1.8***	1.2***	1***	1.3***	1.4***	1.7***	1.3***	2.3***	.91***	1.8***	1.2***	.7***	1.2***
Type of occupation (1=Agriculture)	1.2***	1	2.5***	2***	1.4***	1.4***	1.6***	1.6***	1.6***	.93***	1.9***	1.9***	1.9***	1.8***
Contract tenure (1=Yes)	.53***	.49***	.25***	.99*	.97***	.28***	1.1***	1.2***	.79***	.85***	0.99	1	.53***	.8***
Constant	.0042***	.00017***	.00043***	4.1e-05***	2.4e-06***	1.2e-05***	4.7e-05***	.0023***	9.7e-05***	3.7e-07***	.00016***	3.2e-06***	.00057***	.00013***

Source: ECLAC, on the basis of special processing of the PNAD 2011 Survey.
Nota: *p<0.05; **p<0.01; ***p<0.001.

In the third estimation stage the work will be done with the population census. First, the variables have to be standardized so the names, categories and their values match those in the PNAD Survey. Subsequently, the coefficients previously analyzed are pasted and the probability of child labour is calculated with the following formula:

$$p = \frac{1}{1 + e^{-(\alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \ldots + \beta_k X_k)}}$$

Where P is the estimated probability of child labour; α and $\beta_1, \beta_2, \ldots \beta_k$ are the regression parameters or the coefficients estimated with the survey, and $X_1, X_2, \ldots X_k$ are the census variables.

Once the probability of each individual is estimated, they are grouped and average probabilities are calculated by state. It is worth noting, as mentioned in the methodology section, that in this step a calibration is applied, so that the aggregated probabilities approximate the official rates at the state level. The table hereafter compares the direct measurement and the estimate proposed by ILO-ECLAC, verifying similar rates between both calculations and showing differences lower than 2.5 points.

Table 15

Direct measurement and estimate of the ILO-ECLAC on child labour, by states

States	Direct measurement CENSUS (%)	Estimate ILO–ECLAC (%)	Difference (in percentage points)
Acre	12.1	10.9	1.2
Amazonas	13.1	11.4	1.7
Para	13.6	12.5	1.1
Rondonia	18.2	17.2	1.1
Roraima	13.8	11.4	2.4
Amapa	9.9	9.2	0.7
Ceara	11.7	11.2	0.5
Maranhao	12.7	11.8	0.8
Piaui	12.6	12.1	0.5
Tocantins	13.2	12.5	0.7
Alagoas	12.0	11.4	0.6
Paraiba	12.3	11.8	0.5

States	Direct measurement CENSUS (%)	Estimate ILO–ECLAC (%)	Difference (in percentage points)
Pernambuco	11.1	10.5	0.6
Rio Grande do Norte	9.1	8.7	0.4
Bahia	13.5	12.8	0.6
Sergipe	11.1	10.7	0.4
Espirito Santo	13.4	12.9	0.5
Minas Gerais	12.8	12.4	0.4
Rio de Janeiro	6.7	6.3	0.4
Sao Paulo	10.4	9.9	0.5
Parana	16.3	15.8	0.5
Rio Grande do Sul	15.6	15.1	0.5
Santa Catarina	18.9	18.4	0.5
Distrito Federal	8.5	8.1	0.3
Goias	15.5	14.9	0.6
Mato Grosso do Sul	13.9	13.1	0.9
Mato Grosso	15.3	14.3	1.0

Source: ECLAC, on the basis of special processing of the PNAD 2011 Survey and the Census 2010 in Brazil.

Then, the averages of probabilities at municipal level are calculated[28]. As the work is based on an estimate, it is expected that as the geographical disaggregation increases, at municipality level, the difference between the estimate and the official figures will increase. The table hereafter shows the distribution of the municipalities in terms of the differences between the official measurement and the estimate ILO-ECLAC. On average, in 58% of the municipalities of the country the difference between the estimate and the official measurement is less than 4%. In addition, around 10% of these municipalities had differences above 10 points.

28 For validation in Brazil, work is carried out with 5.541 municipalities out of the 5.564 in the country, as 23 municipalities showed inconsistency to make the estimate.

Table 16

Distribution of the municipalities in terms of differences between the official measurement and the estimate ILO-ECLAC

States	Differences between the official measurement and the estimate ILO-ECLAC (In percentages)					
	Less than 2 points	Between 2 and 4 points	Between 4 and 6 points	Between 6 and 8 points	Between 8 and 10 points	More than 10 points
Acre	59.1	27.3	0.0	4.6	4.6	4.6
Alagoas	37.3	25.5	13.7	9.8	3.9	9.8
Amazonas	24.6	19.3	17.5	24.6	8.8	5.3
Amapa	50.0	18.8	12.5	6.3	0.0	12.5
Bahia	36.5	28.3	17.8	9.6	5.3	2.6
Ceara	31.0	28.3	17.9	13.6	6.0	3.3
Espirito Santo	35.9	25.6	12.8	12.8	2.6	10.3
Goias	24.8	30.9	18.3	9.4	6.5	10.2
Maranhao	28.6	25.4	21.2	12.4	5.5	6.9
Minas Gerais	33.9	25.3	17.2	12.3	5.5	5.7
Mato Grosso do Sul	37.2	39.7	10.3	7.7	2.6	2.6
Mato Grosso	26.2	24.8	15.6	12.8	9.2	11.4
Para	45.2	26.2	15.1	7.1	4.0	2.4
Paraiba	27.8	21.5	17.5	7.6	9.0	16.6
Pernambuco	33.5	26.5	19.5	10.3	3.8	6.5
Piaui	25.0	19.6	23.7	9.8	8.5	13.4
Parana	30.6	20.8	17.3	9.8	9.0	12.5
Rio de Janeiro	58.7	27.2	8.7	3.3	2.2	0.0
Rio Grande do Norte	48.2	25.9	12.1	6.6	2.4	4.8
Rondonia	28.9	30.8	13.5	13.5	1.9	11.5

States	Differences between the official measurement and the estimate ILO-ECLAC (In percentages)					
	Less than 2 points	Between 2 and 4 points	Between 4 and 6 points	Between 6 and 8 points	Between 8 and 10 points	More than 10 points
Roraima	6.7	13.3	6.7	13.3	20.0	40.0
Rio Grande do Sul	20.6	20.2	12.9	11.9	10.3	24.2
Santa Catarina	15.0	16.0	14.0	7.9	6.1	41.0
Sergipe	36.0	26.7	21.3	5.3	4.0	6.7
Sao Paulo	43.7	27.4	17.1	5.6	2.8	3.4
Tocantins	26.6	17.3	23.7	13.0	8.6	10.8
Total municipalities of Brazil	33.5	24.6	15.3	10.0	5.9	10.7

Source: ECLAC, on the basis of special processing of the PNAD 2011 Survey and the Census 2010 in Brazil.

Another way to compare the methodologies is to collate how many municipalities were classified in the same way in both methodologies. As mentioned at the beginning of this section, what matters is not to match the rates of the estimate with the direct measurement, but to get closer to such magnitudes and order and classify the territories in a similar way in both measurements.

In order to facilitate the analysis, three groups of child labour risk were created[29] (low, medium and high); to then compare the groups of both methodologies. The municipalities that are in the same risk group in both methodologies are considered as correctly classified. On the other hand, the municipalities that differ in their groups of pertainance are considered as incorrectly classified, differentiating those that differ in a neighboring group and those that are in an opposite group. The table hereafter shows that approximately 65% of the municipalities of Brazil (3.525 municipalities) were correctly classified, that is, they were cataloged in the same group in both methodologies. For those that were incorrectly classified, it is worth noting that only 4.5% were placed in opposite groups in both methodologies, which accounts for a good predictive power of the model.

29 For the development of risk groups, see the methodological detail in the previous section.

Table 17

Comparison of the municipalities classification in terms of the differences between the official measurement and the estimate ILO-ECLAC

States	Correctly classified		Incorrectly classified				Total
			In neighboring groups		In opposite groups		
	No. of municipalities	%	No. of municipalities	%	No. of municipalities	%	No.
Acre	18	81.8	2	9.1	2	9.1	22
Alagoas	80	78.4	20	19.6	2	2.0	102
Amazonas	34	54.8	23	37.1	5	8.1	62
Amapa	12	75.0	3	18.8	1	6.3	16
Bahia	292	70.0	120	28.8	5	1.2	417
Ceara	116	63.0	64	34.8	4	2.2	184
Espirito Santo	56	71.8	18	23.1	4	5.1	78
Goias	147	59.8	79	32.1	20	8.1	246
Maranhao	129	59.5	71	32.7	17	7.8	217
Minas Gerais	487	57.1	310	36.3	56	6.6	853
Mato Grosso do Sul	54	69.2	20	25.6	4	5.1	78
Mato Grosso	79	56.0	56	39.7	6	4.3	141
Para	103	72.0	39	27.3	1	0.7	143
Paraiba	137	61.4	76	34.1	10	4.5	223
Pernambuco	136	73.5	47	25.4	2	1.1	185
Piaui	112	50.2	91	40.8	20	9.0	223
Parana	244	61.2	146	36.6	9	2.3	399
Rio de Janeiro	79	85.9	12	13.0	1	1.1	92
Rio Grande do Norte	117	70.1	41	24.6	9	5.4	167

States	Correctly classified		Incorrectly classified				Total
			In neighboring groups		In opposite groups		
	No. of municipalities	%	No. of municipalities	%	No. of municipalities	%	No.
Rondonia	39	75.0	13	25.0	0	0.0	52
Roraima	5	33.3	8	53.3	2	13.3	15
Rio Grande do Sul	333	67.1	156	31.5	7	1.4	496
Santa Catarina	166	56.7	118	40.3	9	3.1	293
Sergipe	48	64.0	26	34.7	1	1.3	75
Sao Paulo	435	67.4	191	29.6	19	3.0	645
Tocantins	67	48.2	66	47.5	6	4.3	139
Total	**3.525**	**64.7**	**1.816**	**30.8**	**222**	**4.5**	**5.563**

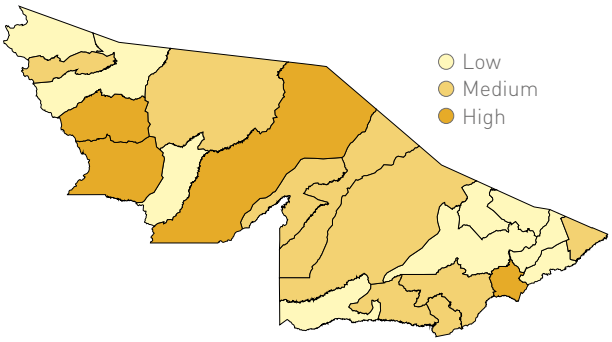
Source: ECLAC, on the basis of special processing of the PNAD 2011 Survey and the Census 2010 in Brazil.

To illustrate these differences, hereafter three maps of comparison between both technologies, show states with a correct classification (on 80% of well-classified municipalities); of intermediate classification (around 65% of the well-classified municipalities); and of low classification level (near 35%).

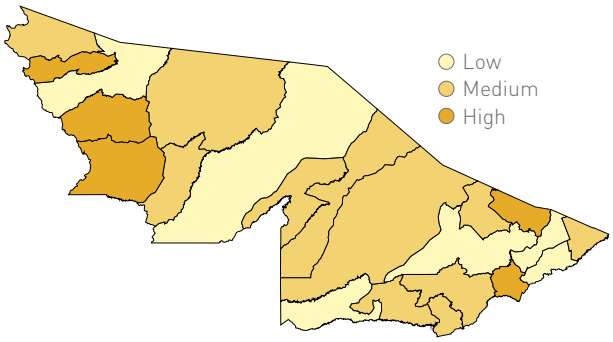
The first map shows the state of Acre (Map 1), with 81% of its municipalities correctly classified and only two municipalities with classification errors. Secondly, the state of Rio Grande do Sul (Map 2), with 67% of its municipalities correctly classified and seven municipalities (out of a total of 496) incorrectly classified in opposite groups. Then, the state of Roraima (Map 3), where only 33% (five municipalities) are classified in the same group in both categories; 53% are classified in neighboring groups and 13% in opposite groups. It is worth noting that this difference could already be perceived in previous tables (Table 14), where it is shown that it was the state with the biggest difference between both methodologies.

Map 1
State of Acre: Comparison direct measurement and estimate ILO-ECLAC

Direct measurement



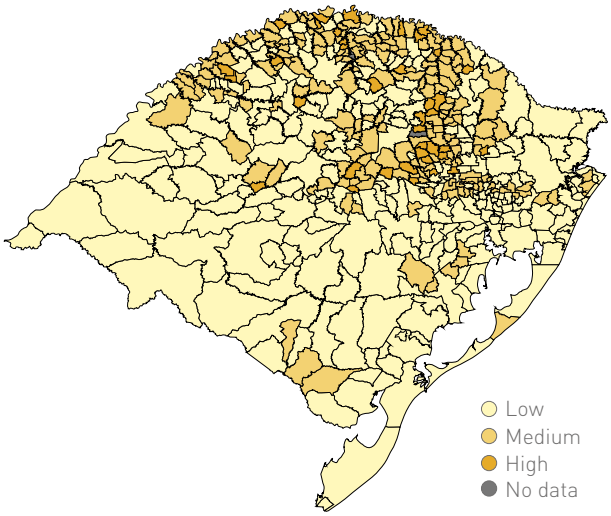
Estimate ILO-ECLAC



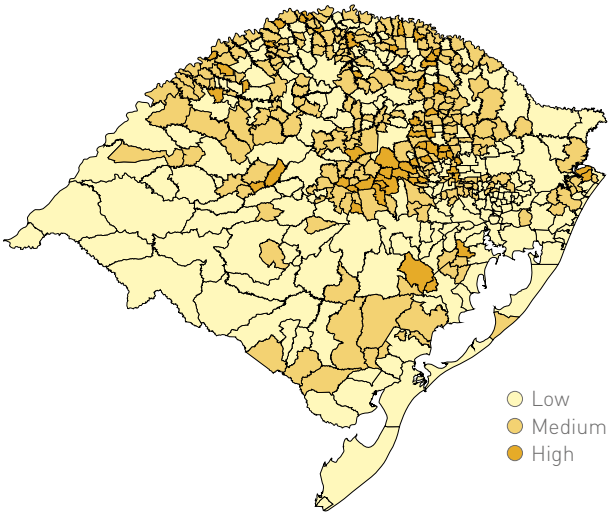
Source: ECLAC, on the basis of special processing of the PNAD 2011 Survey and the Census 2010 in Brazil.

Map 2
State of Rio Grande do Sul: Comparison direct measurement and estimate ILO-ECLAC

Direct measurement



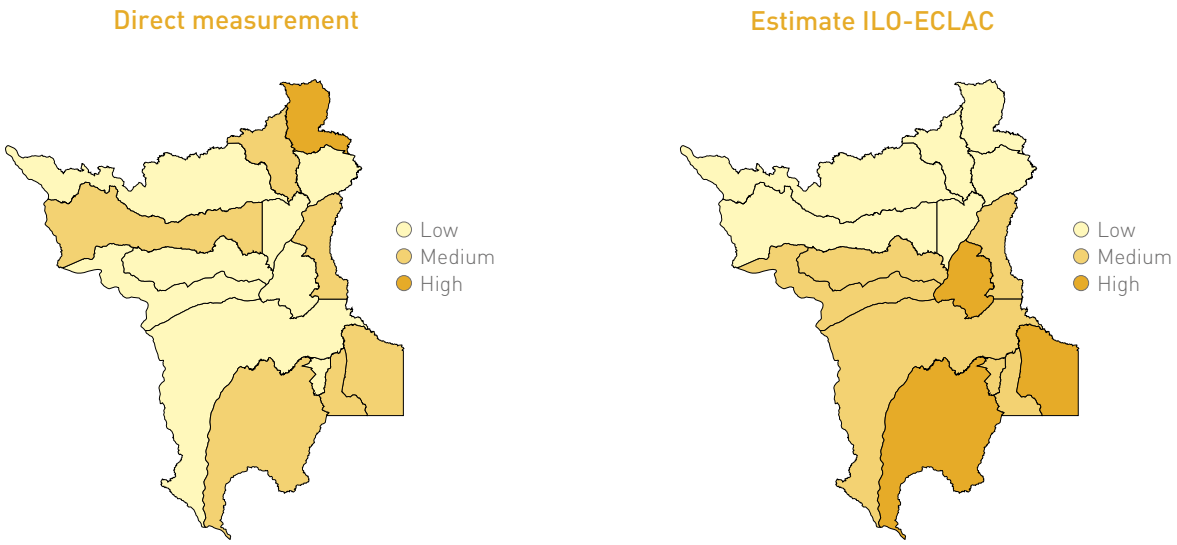
Estimate ILO-ECLAC



Source: ECLAC, on the basis of special processing of the PNAD 2011 Survey and the Census 2010 in Brazil.

Map 3

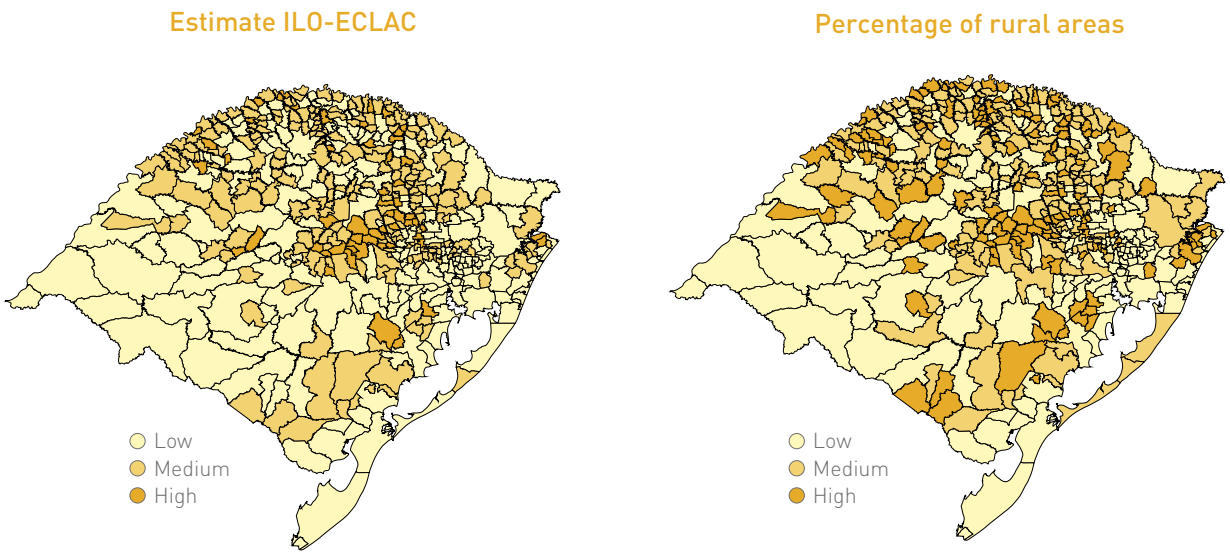
State of Roraima: Comparison direct measurement and estimate ILO-ECLAC



Source: ECLAC, on the basis of special processing of the PNAD 2011 Survey and the Census 2010 in Brazil.

The last stage of validation is to characterize the territories, using the information of the census or external information from the administrative records of the country. Based on the first option and taking as an example the state of Rio Grande do Sul, a correlation is found between the municipalities with a high rate of child labour and with a high percentage of population living in rural areas. Indeed, although this state is one of the states with the higher gross domestic product, it is also characterized by an economy mainly based on agriculture, and, especially, family agriculture; two factors strongly correlated to child labour in this state.

Map 4
State Rio Grande do Sul:
Comparison between the estimate ILO-ECLAC and the percentage of rural population



Source: ECLAC, on the basis of special processing of the PNAD 2011 Survey and the Census 2010 of Brazil.

In summary, through this application and validation of the methodology it is proven that the instrument developed by ILO-ECLAC has a great potential to deepen the territorial analysis of child labour, aimed at focusing and strengthening public actions for the prevention of this phenomenon. Moreover, the strong agreement between the methodology estimates and the direct measurements of the census generate confidence in the external validity of the methodology.

6
CONCLUSIONS

The countries of Latin America and the Caribbean have carried out important and concrete efforts to become the first developing region free of child labour. Despite the significant reduction of the incidence in recent years, the rate of progress and the indicators achieved, generate concern with regard to the possibility of complying with the national and international commitments, among which the 2030 Agenda for Sustainable Development stands out, which seeks to eliminate all forms of child labour by 2025 (Target 8.7).

To achieve this ambitious objective, actions in several areas are required, including the reduction of poverty, improving access, relevance and quality of education, the generation of decent work opportunities for the adult members of the family (men, women and youth of working age), strengthening social protection policies, as well as new strategies to timely identify and intervene boys and girls in the trajectory of child labour and to prevent their early entry into the labour market.

Within these actions, the Regional Office of the ILO for Latin America and the Caribbean, in conjunction with the Economic Commission for Latin America and the Caribbean (ECLAC), developed an instrument that will enable countries to classify territories according to the level of probability of child labour, and to identify the main factors linked to this risk, using available statistical information (surveys, censuses and administrative records). This will enable the countries to have both at national and sub national level reliable information to design focused and articulated multisectoral preventive responses that interrupt the trajectory of child labour.

The methodology described in this document was implemented and validated using statistical information available of Brazil. The election of this country is justified in the fact that its population census is one of the few instruments in the region that allows measuring in a direct way child and adolescent labour (from 10 to 17 years) at sub-national level, which allowed to compare and validate the indirect estimation proposed in this report. The results showed that in Brazil, the estimation methodology allowed to classify 65% of the municipalities in a correct manner (around 3.500), that is to say, they were classified in the same risk level (high, medium, low) both in the direct measurement (through the census) and in the indirect estimation (ILO-ECLAC methodology). Regarding the municipalities incorrectly classified, it is worth mentioning that only 4.5% were placed in opposite groups in both methodologies, which shows the good predictive power to the proposed model.

The Child Labour Risk Identification Model, that the ILO and ECLAC make available to countries and social partners, allows using the available statistical data in a new way, making the sub-national territories visible, which lacked information for decision making. This is an aspect of central relevance to countries, as they will have estimations at a lower level of geographical disaggregation, without applying new and costly measurement instruments for these purposes.

In addition, by identifying the factors related to child labour risk, the model allows to define the multisectoral actions that are more relevant in the territories to interrupt the trajectory of child labour, and to plan a preventive action with impact. The proposal delivered is sensitive to the territories and enables the relevance of the intervention strategies.

In terms of measurement, the model provides a standardized methodology that allows adapting to the availability of data, to the particular situation faced by the region and to the specific situation of each country and its territories. Likewise, the relative simplicity of the model enables the technical teams in the countries to take ownership and to integrate the model in the regular statistical processing for decision making, thus handling timely information with a cost-efficient application.

Despite the important advance represented by having an instrument like this for measuring child labour risk at territorial level, there are some limitations of the methodology that should be taken into account. First, the countries need to have updated information on surveys, censuses and administrative records to develop the models. Secondly, it is necessary to know the representativeness of the survey, as the sub national estimates will be more reliable as the more territories are involved. Finally, and related to the above, it is important to consider possible errors in the estimations produced, both on sampling errors and on the fit of the regression model. Therefore, the estimates on child labour risk in the territories should be taken as a reference that will contribute to public policy, but never as official figures in sub national territories.

Notwithstanding these limitations, the Child Labour Risk Identification Model is a relevant, timely and cost-efficient measurement strategy that can be of valuable use for countries on the way to the sustainable eradication of child and adolescent labour, prioritizing the design and implementation of preventive strategies that will prevent the early entry of boys, girls and adolescents to the labour market.

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ANNEXES

Annex 1: Studies on child labour related factors

The review of the literature shows different statistical methods to approach the study of child labour related factors[30]. In general, most of the studies calculate the probability for a boy or girl to be or not to be in child labour, based on a set of independent variables. These variables of significant influence are considered determinant or child labour related factors.

The main studies analyzed (Table 16), show two similar statistical models, as the two of them are models of probabilities. These are the Logistic Regression Model (binomial or multinomial) and the Probit Models (binomial and in two stages). In very simple terms, the difference between both models lies in how the dependent variables are distributed statistically. The first one has a Logit accumulative distribution instead of a normal distribution like the Probit Models.

Main studies and type of model used

Author	Title	Place	Type of model
Bernal and Cardenas (2006)	Child labour in Colombia	Colombia	Logistic Reg. Binomial
Bonilla, W. (2010)	Child and adolescent labour determinants in Nicaragua	Nicaragua	Logistic Reg. Binomial
Canagarajah and Coulombe (1997)	Child labour and schooling in Ghana	Ghana	Probit Binomial

30 Also called "Child Labour Determinants".

Author	Title	Place	Type of model
Cortez, R. and Gil, A. (2000)	Determinant factors of child labour in Peru	Peru	Probit Model in two stages
Del Rio, M.F. and Cumsille, P. (2008)	Economic need or cultural preferences? Parental justification of child labour in Chile	Chile	Logistic Reg.
Gunnarsson, Orazem and Sanchez (2004)	Child labour and school achievement in Latin America	Latin America	Probit Model
Heady (2000)	What is the effect of child labour on learning achievement? Evidence from Ghana	Ghana	Probit Binomial
ILO / UNICEF / World Bank (2013 and 2014)	Understanding children's and youth work	El Salvador and Dominican Republic	Biprobit
INE, Uruguay (2010)	Extent and characteristics of child labour in Uruguay	Uruguay	Logistic Reg. Binomial
INEC, Ecuador (2015)	Child labour in Ecuador. Towards a comprehensive understanding of the problem	Ecuador	Logistic Reg. Multinomial
Muñoz, V. (2014)	Determinants of the supply of child labour in households in Cali: Evidence from discreet choice models 2012	Colombia	Logistic Reg.
Patrinos and Psacharopoulos (1995)	Educational performance and child labour in Paraguay	Paraguay	Multivariate Analysis
Patrinos and Psacharopoulos (1997)	Family size, schooling and child labour in Peru – An empirical analysis	Peru	Logistic Reg.
Pedraza and Ribero (2006)	Child and youth labour in Colombia and some of its key consequences	Colombia	Multinomial Logit, Binomial Probit, Binomial Ordered

Author	Title	Place	Type of model
Psacharopoulos (1997)	Child labour versus educational attainment: Some evidence from Latin America	Bolivia and Venezuela	Logistic Reg.
Ravallion and Wondo (2000)	Does child labour displace schooling? Evidence on behavioural responses to an enrolment subsidy	Bangladesh	Probit Binomial
Ray (2000a)	Poverty, household size and child welfare in India	India	Logistic Reg.
Ray (2000b)	Analysis of child labour in Peru and Pakistan: A comparative study	Peru and Pakistan	Two stages method SLS
Ray and Lancaster (2004)	The impact of children's work on schooling: Multicountry evidence based on SIMPOC data	Cambodia and Namibia	Multinomial Logit, MCO Instrumental Variables
Urueña et al. (2009)	Child labour determinants and schooling. The case Valle del Cauca in Colombia	Colombia	Probit Binomial
Villazhañay, J. and Narvaez, G. (2014)	Child labour characteristics and determinants and their influence in school dropout in Ecuador, 2012	Ecuador	Probit Binomial

Source: Compilation prepared by the author. May 2018.

In most of the studies reviewed, the models used work the dependent variable as dichotomous (Binomial Logit and Binomial Probit), where they estimate the probability of labour (works or does not work), based on a set of independent variables. On the other hand, in the studies that use multinomial models, the dependent variable takes more than two values. For example, a dependent variable with three categories of response: i) Boy/Girl only works; ii) Works and studies; iii) Only studies.

For more information visit:

Regional Initiative Latin America and the Caribbean free of child labour
www.iniciativa2025alc.org/en
iniciativaregional@ilo.org

ILO
www.ilo.org/ipec/lang--en/index.htm
sirti_oit@ilo.org

ECLAC – Social Development Division
www.cepal.org/en/work-areas/social-development

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