Reducing Inequality in FEALAC Member Countries

Illustrations of the Methodology

STRENGTHENING THE EVIDENCE BASE TO LEAVE NO ONE BEHIND

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1 Introduction

Why it is important to understand and analyse multiple forms of inequality?

Overcoming inequality is at the center of the 2030 Agenda for Sustainable Development. This is expressed as two standalone Sustainable Development Goals — SDGs 5 and 10 — aimed at reducing different manifestations of inequality and an overarching commitment to *leave no one behind* in the path towards sustainable development. This rallying call of the 2030 Agenda reflects the recognition that some groups have not benefited from the economic and social progress that the global society has experienced in recent decades. Moreover, SDG 17 underscores the need to disaggregate and analyse indicators, in order to reveal heterogeneity in progress towards the SDGs that might otherwise be concealed behind national averages.

Certain population groups have been systematically excluded from access to basic services, high quality education and health services, as well as from decent work opportunities, social protection and decision making. This situation not only has profound impacts on their possibilities for social and economic inclusion, it also has implications for the transmission of poverty and inequality across generations and therefore undermines efforts to build just and sustainable societies.

The inequality that affects people in FEALAC member countries manifests itself in different yet inter-related ways. For example, women, those living in poverty, indigenous people, rural residents and others may experience multiple, simultaneous and compounding forms of exclusion and discrimination that prevent them from fully enjoying their rights and reaching their full potential.

A critical first step to overcome these inequalities is to identify population sub-groups that have limited access to opportunities and achieve worse outcomes in various domains, including access to education, health, nutrition and basic infrastructure.

Knowing who is being left behind can inform policy and guide the adoption of tailored response strategies. The purpose of this guide is to explain in a user-friendly and practical format how to interpret the results of Classification and Regression Tree Analysis (CART) to identify inequalities in two SDG-related indicators and how these results can be used to inform policy.

How can the CART Analysis support policy makers to identify the groups furthest left behind?

The CART methodology is based on an algorithm that partitions the population group of interest in the survey sample into different sub-groups based on household- or individual-level predictor variables or determinant factors. It creates a multi-level tree diagram with mutually exclusive sub-groups of individuals or households and stops when further information cannot be generated by a new partition. In this way, it allows the examination of how multiple factors, such as socioeconomic level, sex, place of residence and age, interact to create more acute exclusion among certain groups.[1]

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1   For additional information on the CART methodology please see ESCAP (2020). *Classification and Regression Trees (CART): A User Reference Guide for Identifying those Left Furthest Behind*. Available at: https://www.unescap.org/resources/leave-no-one-behind-decision-tree-user-reference-guide.

2   Interpreting CART to highlight gaps in Latin America and the Caribbean and Asia and the Pacific

We review two examples of classification trees to understand and interpret the data they present.

ILLUSTRATION
Stunting in Myanmar

Approximately 5.6 million children under the age of 5 died in 2016 worldwide, more than half of whom died due to hunger (UNICEF, 2018). Extreme hunger and malnutrition are strong barriers to sustainable development, infringing on the life prospects of millions of children. Stunting (low height-for-age), which is a form of undernutrition, has profound consequences for the physical and cognitive development of children. Target 2.2 of the 2030 Agenda calls on governments to end all forms of malnutrition, including achieving, by 2025, the internationally agreed targets on stunting for children under the age of 5. However, as Figure 1 illustrates, much remains to be done towards this goal.

Starting on the extreme left of the figure, we see the data for the total sample population ("Population Size: 100 per cent") and the stunting rate for that population ("Rate: 29 per cent"). From this information we know that 29 per cent of children under age 5 in the sample are stunted. The sample is subsequently split into two groups, according to the predictor or determinant factor that achieves the most "information gain".

In this case, the predictor or determinant factor is household wealth level — the richest 60 per cent (top 60 per cent) versus the poorest 40 per cent (bottom 40 per cent) of the wealth distribution. The percentage indicated by "Size" tells us the proportion of the total sample population that is in each of those two groups. We see that 51 per cent of the sample is in the poorest 40 per cent of the wealth distribution while 49 per cent of the sample is in the richest 60 per cent. The percentage indicated by "Rate"

FIGURE 1

Classification tree highlighting inequalities in stunting among children under the age of 5, Myanmar, 2016
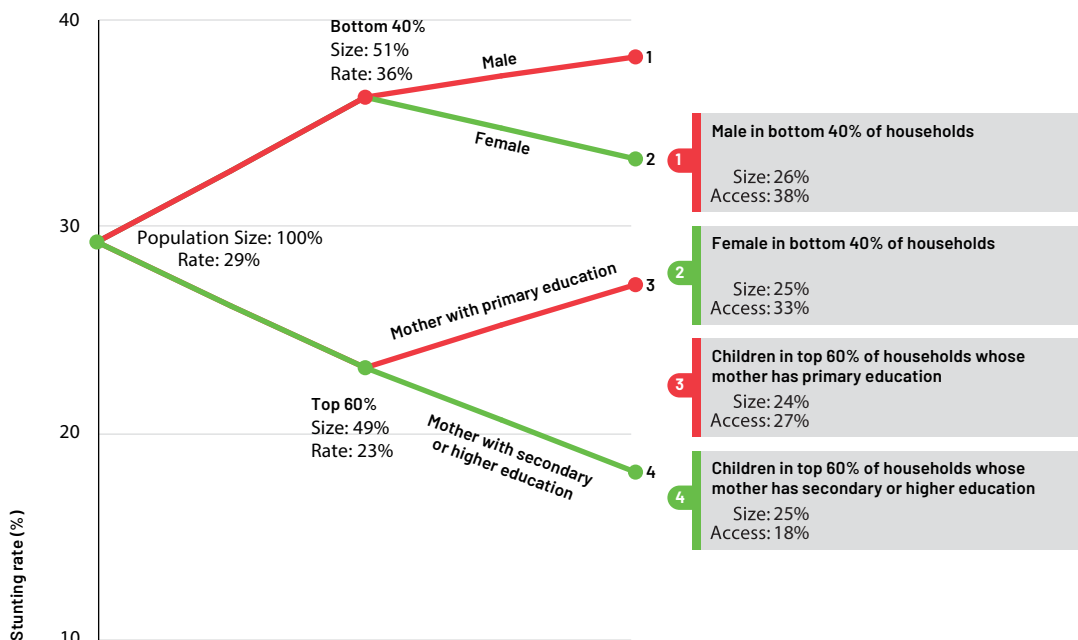
Source: ESCAP calculation using data from the 2016 DHS survey from Myanmar.

tells us the stunting rate for children in those groups. The data indicate that 36 per cent of children in households belonging to the poorest 40 per cent are stunted, while children belonging to households in the richest 60 per cent have a stunting rate of 23 per cent. Hence, we can conclude that stunting is more common among children from poorer households.

For children in the poorest 40 per cent of the wealth distribution, the next predictor or determinant factor that yields most "information gain" is the child's sex, male or female. Here again, the percentage indicated by "Size" refers to the proportion of the total population that is in the poorest 40 per cent of the wealth distribution and that is male — 26 per cent of the total population is in this category. Under this figure, by "Rate", we see the percentage of those in this category who are stunted, in this case 38 per cent. In contrast, the proportion of the total population that is in the poorest 40 per cent of the wealth distribution and that is female is 25 per cent, and among this group, the stunting rate is 33 per cent. From these data we can conclude that boys in poorer households are more affected by stunting than girls in poorer households.

We see from the results that for children in the richest 60 per cent of the wealth distribution the next predictor or determinant factor is not the child's sex, but the mother's level of education. Children in the richest 60 per cent whose mothers have completed primary education account for 24 per cent of the total sample ("Size: 24 per cent") and 27 per cent of children in this group are stunted ("Rate: 27 per cent"). From these data it is also possible to observe that for children in the richest 60 per cent of the wealth distribution whose mothers completed secondary education or higher, a group that constitutes 25 per cent of the sample ("Size: 25 per cent"), the stunting rate is 18 per cent ("Rate: 18 per cent").

Thus, the results from the Classification Tree Analysis of stunting in Myanmar support the following conclusions:

• Although the overall stunting prevalence of children in the country is 29 per cent, this figure hides important differences between population sub-groups.

• Factors such as household wealth, the child's sex and the mother's level of education are important in shaping the risk of stunting and increase the stunting rate in Myanmar.

• While the stunting rate for children in the richest 60 per cent of the wealth distribution whose mothers completed secondary education or higher is 18 per cent, the stunting rate for male children in the poorest 40 per cent more than doubles this figure and reaches 38 per cent.

Another way to visualize the results of the Classification and Regression Tree Analysis are presented in Figure 2. This graph shows a comparison of stunting rates across countries in the Asia and Pacific region, as well as the magnitude of the gaps that exist within countries between the groups that have the highest and lowest rates of stunting. From this type of graph it is possible to conclude that, among countries with low levels of stunting, some have narrow gaps between population subgroups (for example, Kazakhstan), while in others, stunting gaps remain large (for example, Mongolia and Armenia). Finally, there are countries where average stunting rates remain high and marked disparities persist (for example, India and Pakistan).

FIGURE 2

Stunting rates among children under the age of 5 in 22 countries in Asia and the Pacific, latest year available

Highest stunting rate — Average stunting rate — Lowest stunting rate
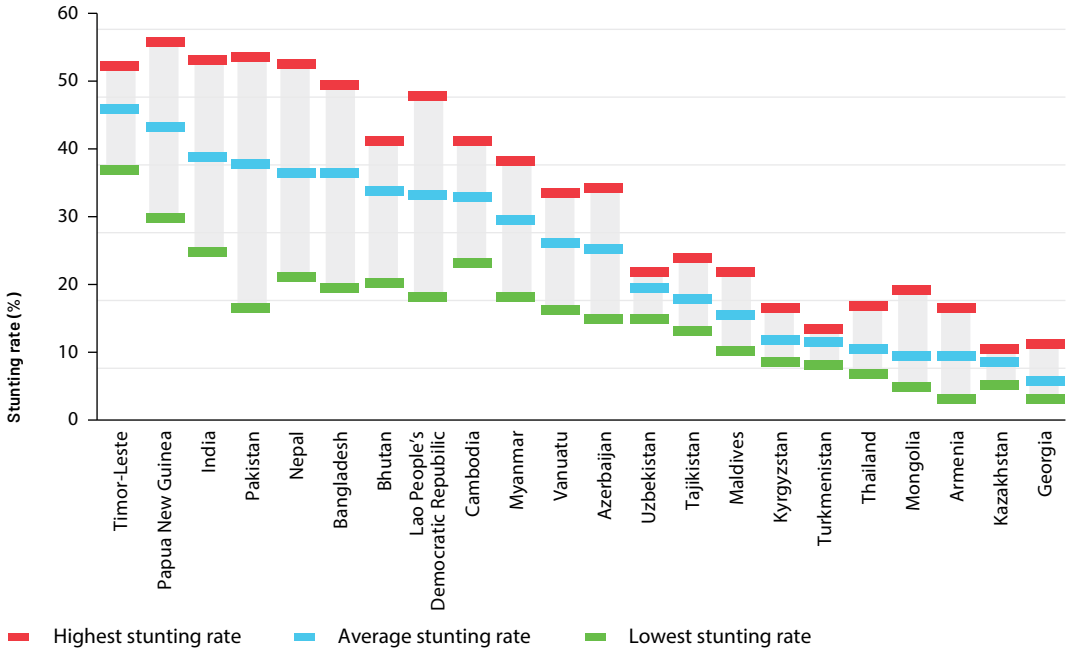
Source: ESCAP calculations based on latest MICS and DHS surveys for countries in the Asia and Pacific region.

ILLUSTRATION
Secondary education completion in Honduras

Sustainable Development Goal 4 calls on Member States to ensure inclusive and equitable quality education and to promote lifelong learning opportunities for all. Education is not only a fundamental human right, but it is also a potent lever to reduce poverty and inequality: more and better education can lead to better job prospects, higher incomes and interrupt patterns of poverty and vulnerability. Moreover, in an increasingly complex and globalized society, greater skills are needed to achieve social and economic inclusion. Despite the importance of inclusive, equitable and high-quality education, some groups are being left behind, as can be seen in Figure 3.

Starting on the extreme left of the figure, we see the data for the total sample population ("Population size: 100 per cent") and that 26 per cent of persons 20 to 35 years of age in the sample completed secondary education

("Rate: 26 per cent"). The sample is subsequently split into two groups, according to the predictor or determinant factor that achieves the most "information gain".

In this case, the predictor or determinant factor is household wealth level — richest 60 per cent (top 60 per cent) versus poorest 40 per cent (bottom 40 per cent) of the wealth distribution. The percentage indicated by "Size" tells us the proportion of the total sample in that is in each of those two categories. We see that 35 per cent of the sample is in the poorest 40 per cent of the wealth distribution while 65 per cent of the sample is in the richest 60 per cent. The percentage indicated by "Rate" tells us the rate of secondary school completion among persons 20 to 35 years of age in those two groups. The data indicate that 4.8 per cent of persons 20 to 35 years of age in households belonging to the poorest 40 per cent completed secondary education, while 38 per cent of those 20 to 35 years of age in households in the richest 60 per cent completed secondary education. Hence, we can conclude

FIGURE 3

Classification tree highlighting inequalities in completion of secondary education among persons 20 to 35 years of age, Honduras, 2011–2012
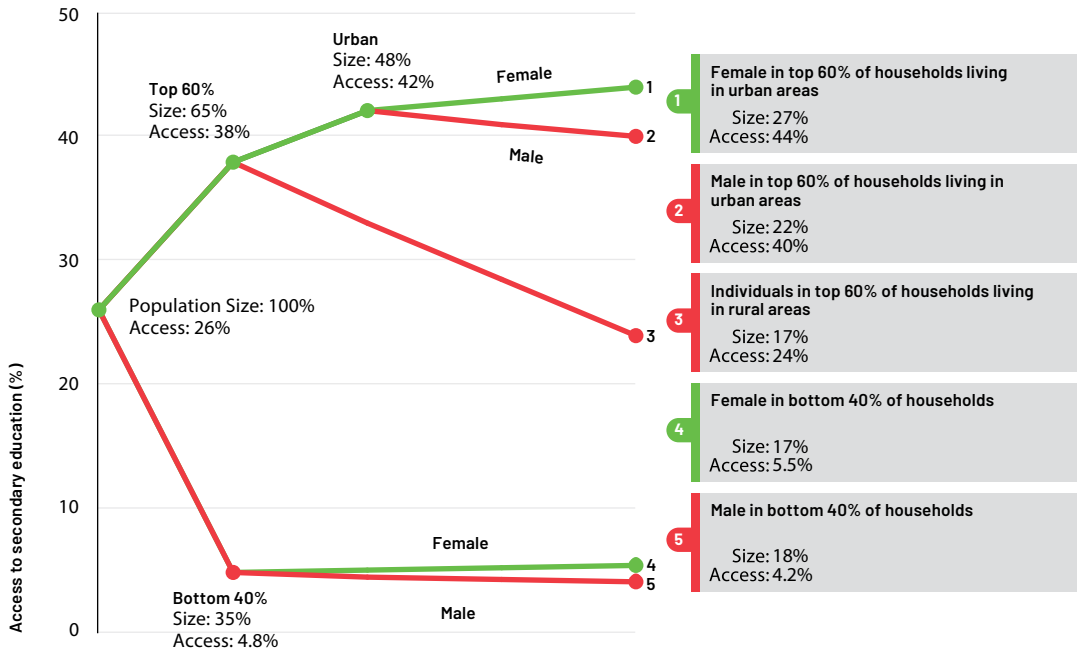
Source: ECLAC calculation using data from the 2011-2012 DHS survey for Honduras.

that those in the richest 60 per cent of the wealth distribution have almost eight times the secondary education completion rates as those in the poorest 40 per cent.

For those in poorer households, the next predictor or determinant factor that yields most "information gain" is the person's sex, male or female. Here again, the percentage indicated by "Size" refers to the proportion of the total population that is in the poorest 40 per cent of the wealth distribution and that is male — 18 per cent of the total population is in this category. Under this figure, by "Rate", we see the percentage of those in this category who have completed secondary school, in this case 4.2 per cent. In contrast, the proportion of the total population that is in the poorest 40 per cent and that is female is 17 per cent, and among this group, the secondary education completion rate is 5.5 per cent. From these data we can conclude that males from poorer households are less likely to complete secondary education than females in poorer households, although the difference is small.

We see from the results that for persons 20 to 35 years of age in the richest 60 per cent of the wealth distribution the next predictor or determinant factor is not the person's sex, but the place of residence — rural or urban. From these data it is possible to observe that for those in the richest 60 per cent who reside in rural areas, a group that constitutes 17 per cent of the sample ("Size: 17 per cent"), the secondary education completion rate is 24 per cent ("Rate: 24 per cent"). Those in the richest 60 per cent who live in urban areas account for 48 per cent of the total sample ("Size: 48 per cent") and 42 per cent of those 20 to 35 years of age in this group concluded secondary education ("Rate: 42 per cent"). Another predictor or determinant factor shapes secondary education conclusion rates for those in the richest 60 per cent in urban areas — the sex of the person. Forty-four per cent of females in the richest 60 per cent of the wealth distribution in urban areas, who comprise 27 per cent of the sample ("Size: 27 per cent") concluded secondary education ("Rate: 44"). In contrast, 40 per cent of males in the richest 60 per cent in urban areas,

FIGURE 4

Secondary education completion rates among persons 20 to 35 years of age in 16 Latin America and the Caribbean countries, lastest year available

Legend: Lowest completion rate · Average completion rate · Highest completion rate
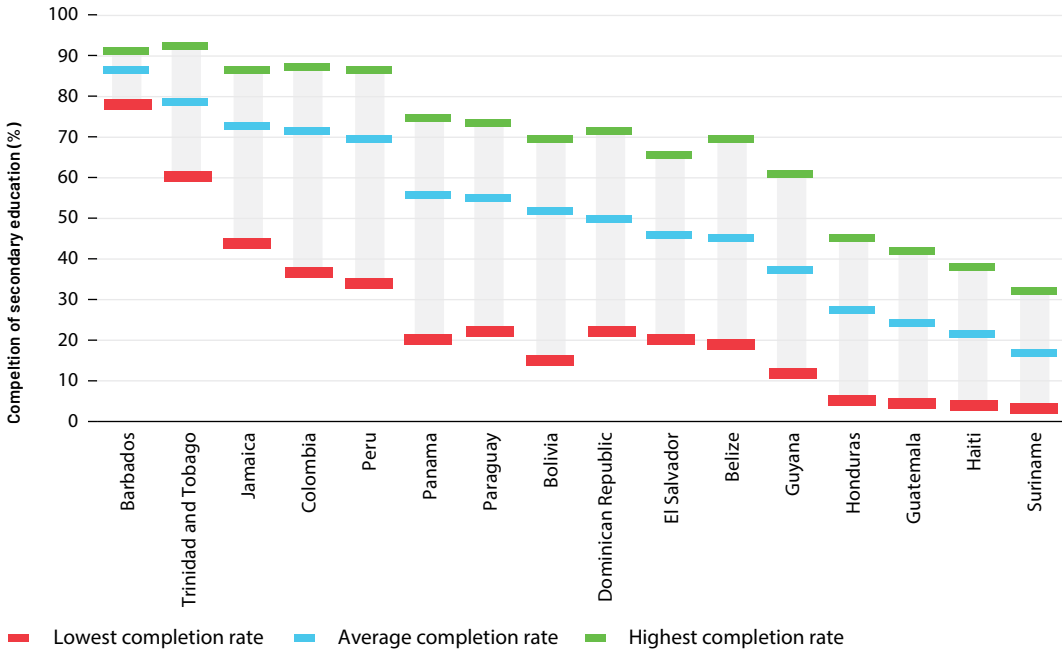
Source: ECLAC calculations based on latest MICS and DHS surveys for countries in the Latin America and the Caribbean region.

22 per cent of the total population, completed secondary education ("Rate: 40 per cent").

Thus, the results from the Classification Tree Analysis of secondary education in Honduras support the following conclusions:

- Although overall 26 per cent of people 20 to 35 years of age in Honduras completed secondary education, this figure hides important differences between population sub-groups.

- Factors such as household wealth, place of residence, and sex are important in shaping secondary education completion in Honduras.

- The secondary education completion rate for females in the richest 60 per cent of the wealth distribution who reside in urban areas is 44 per cent, which is 10 times greater than the corresponding figure for males in the poorest 40 per cent of households, 4.2 per cent.

Another way to visualize the results of the Classification Tree Analysis are presented in Figure 4. This graph shows a comparison of secondary education completion rates across countries in the Latin America and Caribbean region, as well as the magnitude of the gaps that exist within countries between the groups that are furthest behind and with highest rates of completion. From this type of graph, it is possible to conclude that some countries have high average levels of secondary education completion while maintaining narrow gaps between population subgroups (for example, Barbados), while others have high averages, but completion gaps remain large (for example, Jamaica and Colombia). Finally, there are countries where average completion rates remain low and sizeable disparities persist (for example, Suriname and Haiti).

3 How can these results be used to inform policy to leave no one behind?

By supporting policy makers in identifying the groups that are being furthest left behind, CART can help guide targeted interventions to promote greater access to opportunities and improve outcomes for those groups. For example, in the case of child stunting in Myanmar, complementary to income support initiatives for poor households in general, child nutrition and parental guidance on WASH (water, sanitation and hygiene) and nutrition practices, initiatives to provide additional support to women who are pregnant with male babies or have young male children at home could be developed.

At the same time, these results reveal the factors that underlie the inequalities that are observed, which can also be addressed through policy interventions in synergistic ways. In the example of secondary education completion in Honduras, in addition to income support for poor households, additional monetary bonuses could be provided for secondary school completion to reduce the likelihood that young people from these households leave their studies to enter the labour market. Additional support can be provided to defray the costs of education, through the provision of school materials, uniforms and transportation costs. The results from the CART Analysis also point to the need to invest in new education infrastructure and support initiatives to promote school continuance among youth, especially in rural areas and linking education to employment opportunities once secondary school has been completed for these youth.

In addition, the CART results are of direct use both to UN Country Teams, who are undertaking Common Country Assessments or other joint programming exercises. By determining the composition and intersecting characteristics of furthest behind groups, the UN at the country level can faster and more accurately prioritize projects and programmes, based on evidence.

The cross-national analysis can be used to identify countries that have had success in advancing a particular outcome — whether achieving low levels of stunting or higher rates of secondary school completion - while ensuring that this progress has been experienced by the entire population and not exacerbated existing inequalities. Lessons learned and good practices can be drawn from these countries to design and implement pro-equality programmes and policies.

For a complete list of the furthest behind groups by indicator, please see:

https://www.socialprotection-toolbox.org/inequality

or go directly to:

https://www.socialprotection-toolbox.org/inequality/furthest-behind