UNDP

Peru

SDG PUSH FRAMEWORK

Unlocking New Pathways to SDG Acceleration

2024

Acknowledgements

The SDG Push Framework **is led by the government**, as part of their journey of developing roadmaps to achieve the SDGs in the country through a structured approach to identifying the accelerators.

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Acronyms

BAU	business-as-usual
CEPLAN	National Centre for Strategic Planning
CGE	Computable General Equilibrium
GDP	Gross domestic product
INFF	Integrated National Financing Framework
LAC	Latin America and Caribbean
MS	micro-simulation
SDG	Sustainable Development Goal
SINAPLAN	National Planning System
UNDP	United Nations Development Program
VNR	Voluntary National Review

1. Executive Summary

Peru's convergence with high-income levels has accelerated in the last two decades with an annual average growth rate of around 5 percent, one of the highest in the Latin America and Caribbean (LAC) region.

This has supported a dynamic economy and has resulted in better living conditions for the population, although with large gaps amongst different population groups. While the emergence of a middle-class has been one of Peru's greatest socio-economic achievements, it has brought a whole set of new challenges, specifically associated to economic diversification, decentralization, and institutional reform. The country has been stuck in a "middle-income trap" requiring long-term structural reforms that transcend any robust macroeconomic performance.

The outbreak of the COVID-19 pandemic pushed the Peruvian economy into a severe crisis in 2020 with the economy contracting by 10.8 percent. This led to a significant increase in the monetary poverty rates (above 30%) and a worsening in inequalities. According to the World Bank (2022), the Covid-19 shock exposed the persistent structural challenges of lower productivity, higher informality, and inefficiency that the country has faced since the post-commodity boom in Peru.

The presence of other significant global crisis as the war in Ukraine and climate change, plus a severe internal institutional and political crisis adding up to the severe socio-economic consequences of the pandemic, led the country into recession in 2022, a situation that had not occurred in Peru since the economic crisis of the 1980s (Boloña, 1993). These crises have amplified Peru's development challenges around poverty eradication, large inequality, and poor access and quality of basic services. As of 2022, six in ten Peruvians were either monetary poor (27.5%) or were at risk of falling into monetary poverty (32.3%), resulting in the loss of a decade of social progress (World Bank, 2023).

The SDG Push Initiative

To help course correct the development trajectory severely affected by the COVID-19 and other multiple global crisis, the United Nations Development Program's (UNDP), piloted the SDG Push initiative to identify a plausible economic policy roadmap to accelerate economic growth and development targets. The SDG Push is a comprehensive and country-specific UNDP tool to plan for both pro-cyclical and anti-cyclical response moments – elevating fiscal, financial, digital/data and governance enablers of sustainable development. The framework

comprises five key components: scoping, acceleration dialogues, economic modelling, sustainable financing, and acceleration pathways. These components are essential in identifying development gaps, challenges, and drivers, developing potential interventions to address each challenge, and systematically assessing the costs, interlinkages and trade-offs related to the acceleration plan.

SDG Accelerator Scenario Results

The main outcome of the scoping phase in Peru was the prioritization of key SDGs, with significant synergy effects on other SDGs, that Peru should pursue to accelerate progress. In the next phase, the multi-stakeholder acceleration dialogues interrogated key SDGs further to identify potential policy actions that could significantly stimulate progress. These policy proposals were synthesized using sensing-making protocols to identify SDG Accelerators – specific policy actions – that the government could implement.

Based on the scoping exercise and outcomes of the acceleration dialogues, the policy actions for each thematic area with accelerator potential, were transformed into elements of public intervention. A combination of policy scenarios was tested during the SDG Push modelling stage. Five scenarios were examined, in addition to the baseline business-as-usual (BAU) scenario. Each one contains a different combination of public investment in education, health, infrastructure (transportation, energy, telecommunications), increased efficiency of public spending and a reduction in the costs of doing business under government projections and the SDG Push scenario.

Under BAU, the modelling projected that Peru would make little or no progress in achieving several SDGs. By 2030, only 27.24 percent of students would achieve a satisfactory level in math in the student census assessment, an increase of 10 percentage points from the baseline (2021). Productivity growth would be limited to 1.4 percent allowing a limited share of manufacturing in total GDP, a GDP growth rate of 2.9 percent, which is well below the 7 percent target. Informality would remain high if no action is taken in terms of attracting investment. In fact, by 2030, almost 74.4 percent of jobs were projected to come from the informal sector (76.8 percent at baseline), while the poverty rate would be around 18.7 percent, an important but small change from 25.9 percent in 2021.

An overview of government projections shows that the country would move forward in reducing malnutrition but register limited progress in economic growth (3.6 percent), educational outcomes, productivity growth and poverty. For example, the report found that the prevalence of malnutrition in children under 5 years would tend to zero while the percentage of students achieving a satisfactory level in math would reach 43.0 percent by 2030, an important but moderate change from the baseline (17 percent); and the poverty rate would approximate 17.7

percent. Therefore, additional efforts are needed to fully achieve the targets in terms of poverty reduction, educational outcomes, and economic growth.

SDG Push Scenario

Investments made within the SDG Push scenarios will help Peru to achieve several SDGs related to education, health, economic growth, and poverty reduction. According to this scenario, by 2030, poverty will decline to 12.6 percent, economic growth will stand at 6.4 percent per year and annual productivity growth will exceed 4 percent (on average) leading to lower unemployment and underemployment. The prevalence of malnutrition will tend towards zero, and the country will see a greater improvement in educational performance (100 percent).

Under the SDG Push framework public investments in infrastructure (transportation, energy, telecommunication) have a higher macroeconomic and social impact because of positive externalities on private output. Higher efficiency in public sectors under the SDG Push framework frees public resources that can then be used to fund additional investments. As a result, the country will experience higher economic and productivity growth, a decrease in unemployment and poverty reduction.

To achieve these outcomes, the additional annual cost would average 1 percent of GDP. Therefore, over the 2023-2030 period, Peru would need approximately S/13 billion to achieve the progress indicated under the SDG Push interventions, which raises the question on the feasibility of such outcomes in a context of political turmoil and economic downturn.

While public efforts are important for productivity enhancement, both in terms of quantity and quality of investment, as well as for increased formal employment and economic growth, there is an important need to incentivize and leverage private investment. This is particularly true for transportation, energy and telecommunications infrastructure, health and education, sectors with significant multiplier effects.

2. Introduction

In September 2022, the Government of Peru, and the United Nations Development Program (UNDP) launched the SDG Push Framework. The SDG Push aimed to deliver an economic policy roadmap to accelerate the realization of key growth and development targets after the economic and development impacts of the COVID-19 pandemic and subsequent global and internal shocks. Peru can then apply identified policy interventions to regain its economic footing and achieve its Sustainable Development Goals (SDGs).

Peru was hit hard by the COVID-19 pandemic, despite having had one of the strongest annual average GDP growth rates in the Latin America and Caribbean (LAC) region. The impact of the pandemic led to an 11 percent contraction in its economy, the largest decline in 30 years and the greatest in Latin America in 2020. As a result, the national poverty rate increased to 30.1 percent, and extreme poverty reached 5.1 percent in 2020. The significant development gains achieved in the previous decade were severely eroded. By the end of 2021, the economy had recovered, but poverty and extreme poverty remained on a par with 2012 and 2015 levels.

Since 2016, a governance crisis, with six presidents in quick succession, has further weakened the country's political environment and economic foundations. This crisis and the losses caused by the pandemic have set the stage for popular discontent: social gaps have become persistent and political institutions are considered to have become blind to the country's needs. The pandemic also intensified persistent territorial inequalities and disparities in access to productive assets and public services, disproportionately affecting minorities, women, indigenous peoples, and Afro-Peruvians.

Post pandemic, Peru's SDG targets were at risk. A comprehensive set of integrated SDG investments and interventions were needed to recalibrate development strategies for governance, social protection, green economy, and digitalization, and steer Peru back on track. The SDG Push initiative was developed by UNDP's SDG Integration team to specifically address the global development and economic challenges created during the pandemic which disrupted progress towards the SDGs world-wide. It was designed as an all-terrain tool, to help catalyze breakthroughs from real-world constraints, rather than adding mechanical benchmarks or targets. The progressive roll out in pilot countries was led by Governments together with a team of experts from global, regional, and country offices, delivering a country-specific playbook that bridged short run and long run horizons. The SDG Push framework was piloted in five countries: Namibia, South Africa, Peru, Indonesia, and Moldova, with additional research conducted in Iraq.

The framework provides a comprehensive and country-specific UNDP tool to plan and implement SDG breakthroughs in a variety of development contexts, for both pro-cyclical and anti-cyclical response moments – elevating fiscal, financial, digital/data and governance enablers of sustainable development. It builds on lessons learned through the COVID-19 pandemic and the first half of the 2030 Agenda by advancing longer-term structural transformation while balancing short-term imperatives.

The SDG Push framework in Peru comprised the following key components:

- **Scoping**: Examining specific contexts and trends based on SDG gaps, policy documents and interviews with government officials, establishing a rapid landscape of trends and current priorities. Interlinkages amongst SDGs were assessed based on local literature.

- **Acceleration Dialogues**: leveraging sensemaking protocols with key stakeholders from the government, civil society, and academia to explore scoping outcomes, interrogate previous policies, and chart accelerators.

- **Modelling**: engaging new forms of participatory and economic modelling to assess the impact of potential accelerators.

- **Sustainable Finance**: estimating financing and the feasibility of potential accelerators, using SDG finance tools, including the Integration National Financing Framework (INFF).

- **Acceleration Pathways**: integrating insights developed through this approach with data visualizations and recommendations to advance policy interventions.

These components are essential in identifying development gaps, challenges, and drivers, developing potential interventions to address each challenge, and systematically assessing the costs, interlinkages and trade-offs related to the acceleration plan. They work as an integrated iterative process, where progress in each component reinforces the other elements of the SDG Push.

This report synthesizes the main findings of the SDG Push initiative in Peru for UNDP partners, country offices, development specialists, and other policy decision makers. It complements the suite of SDG Push tools, together with technical annexes related to data analysis and policy modelling. The report is structured to provide an overview of framework design and implementation, the SDG Push pilot in Peru and the key findings of each SDG Push scenario, and the financial constraints on delivering the necessary interventions.

3. SDG Push Pilot: Peru

The SDG Push initiative represents a dynamic systems approach to development transformation. Launched in response to the worsening economic and development indicators experienced by many countries during and in the recovery stages of the COVID-19 pandemic, this approach was designed to address complex challenges and facilitate progress.

Despite Peru's history of pro-poor economic growth, significant economic vulnerabilities remain, including over-reliance on natural resources and low productivity growth, leading to a noteworthy economic slowdown. Poverty remains a significant issue in Peru, with 27.5 percent of the population living below the poverty line in 2022. With the COVID-19 pandemic further exacerbating these challenges and disproportionately affecting the most vulnerable populations. It is estimated that 6 in 10 Peruvians are either poor or vulnerable (World Bank, 2022).

Peru's current challenge is to overcome low productivity, which is already translating into a lower potential economic growth pathway, often known as the middle-income trap. On its current trajectory, it is likely that Peru will make little or no progress in achieving several SDGs. Socio-economic gains remain unevenly distributed, with rural areas and minorities facing significant challenges in accessing quality public services. Informality has remained high throughout the past two decades, reaching the highest level during the pandemic. This has limited revenue collection and social protections. Stronger institutional capacities are needed to bridge the growing divide between citizens and institutions. The country faces a complex set of challenges which require a multi-faceted approach to socio-economic disparities, governance issues and climate risks.

Recent climate-related events have also demonstrated the high level of vulnerability and low coping capacity that vulnerable populations have in Peru. Thus, investing in building resilience could have the multiple benefits of helping the poor and vulnerable, positive impacts on other priority areas, such as industry, innovation, and infrastructure (SDG 9), and on productivity through education and overall economic growth (SDGs 4 and 8)**.**

In Peru, the SDGs hold strategic relevance in national planning. Under the political constitution, they are considered an international agreement and a group of commitments that Peru must comply with. As a result, SDGs targets are linked to the axes of government policies developed by the National Agreement and are considered (but not incorporated) in the strategic development plans at the different levels of government, national policies, multi-annual sectoral plans and in the different general government policies. The National

Agreement identifies six issues of national priority for the five-year period 2021-2026, namely health, education, the fight against poverty and extreme poverty, sustainable economic growth with decent employment, political reform, and reform of the judicial administrative system.

The General Government Policy 2021-2026 contains axes, priority guidelines and lines of intervention aimed at the development and updating of national policies, plans and government interventions and are in accordance with state policies, the strategic national development plan, the Peru Vision 2050, and the SDGs:

- Generation of welfare and social protection with food security.
- Economic revival and productive activities with agrarian and rural development.
- Promotion of science, technology, and innovation.
- Strengthening of the educational system and learning recovery.
- Decentralization, institutional and civil service strengthening.
- Strengthening the democratic system, public security and the fight against corruption, drug trafficking and terrorism.
- Efficient management of risks and threats to the rights of people and their environment.
- Governance and digital transformation with equity.
- Conduct of a national, autonomous, democratic, social, and decentralized diplomacy.
- Intercultural State for the promotion of cultural diversity.

The SDG Push initiative in Peru provided an opportunity to test and learn about the implementation of integrated support in a challenging political context. The complex political context was known at the beginning of the process. However, other challenges related to the institutional framework and the governance structure for monitoring SDG implementation were revealed during the scoping phase.

3.1 Scoping Phase

As part of the scoping phase, a detailed review of the national development planning institutional framework was conducted. This review shed light on specific stakeholders to engage during the SDG Push implementation and on the complexity of the planning process in place. Peru's National Planning System (SINAPLAN) brings together a range of mechanisms and actors that play different roles in the country's development planning and policy implementation. These mechanisms are designed to promote coordination, collaboration and alignment among government entities, regional authorities, and local institutions. However, despite the established articulation structure within SINAPLAN, notable

challenges hinder its effective implementation (for more detail see Appendix I: Scoping Phase).

A main outcome of the scoping phase was the prioritization of key SDGs that Peru should pursue, with significant synergy effects on other SDGs. Beyond providing a clear view of the development priorities and status of the SDGs in Peru, the scoping phase also helped to identify some initial challenges to be addressed during the rest of the implementation. First, the continuous political turmoil has led to a focus on short-term development issues, prioritizing the current situation and omitting the medium and long-term development strategy. Secondly, a lack of specific governance structure responsible for the SDGs was identified. Third, there is a need to address large territorial socio-economic heterogeneities. In Peru different entities have assumed responsibility for the implementation of the 2030 Agenda for Sustainable Development:

- CEPLAN, the National Centre for Strategic Planning, is responsible for the preparation of the Voluntary National Review (VNR).
- the National Institute of Statistics and Informatics manages the system for monitoring and follow-up of the indicators of the SDGs; and
- the Ministry of Foreign Affairs coordinates the support from the United Nations system.

However, no entity has been designated as the SDG coordinator, instead responsibility has been assigned to an existing entity, or special commissions have been established.

3.2 Acceleration Dialogues

The SDG Push Acceleration Dialogues in Peru were held between 28 September 2022 – 30 November. Participants were encouraged to collectively understand the strengths (what is working), gaps (what needs attention), trends (emerging risks and opportunities) and interlinkages (interconnection of issues, solutions, and SDG indicators), and to then identify intervention points and optimal acceleration pathways.

The Sense-Making and Accelerating Protocol methodology deployed during the development dialogues, was specifically adapted to the Peruvian context and needs. It comprised a series of exercises to discuss and prioritize development areas and specific policies based on what emerged from the scoping phase. The dialogues were structured as a two-stage process and were structured to derive learning and actionable insights from previously implemented policies and strategies, or other contexts. These insights were used to determine the combinations of accelerator scenarios taken forward by the government and its partners in the modelling phase.

In the initial phase of the dialogues, over 45 participants from civil society, academia, government, and the UN system gathered to deliberate development priorities, the SDGs, and necessary reforms. During the Dialogues, participants identified eight development priorities, which were then mapped to SDGs 1, 2, 3, 4, 9, 11 and 16:

1. Poverty
2. Security
3. Rural and agricultural development
4. Public administration efficiency
5. Risk and disaster management
6. Infrastructure and housing
7. Access to health services
8. Access to quality education

In between dialogue stages a survey was conducted with all participants to narrow down the interventions initially identified and feed the second part of the dialogues. This second stage had two objectives: 1) validate in small groups the interventions with the potential of becoming development accelerators and 2) identify new interventions with the participants. The dialogues focused the discussion on five areas as prioritized with the survey: (i) poverty reduction, (ii) health services, (iii) Education, (iv) Sustainable and inclusive economic growth with decent jobs and (v) Government transparency and efficiency. After gathering policy insights on these areas, the team worked on mapping the specific details of each intervention (target population, location, among others). This information helped to move smoothly into the modelling phase. Building on the session, a concise overview of the SDGs and the 2030 Agenda was presented, serving as a preparatory step that assisted participants understanding to identify Peru's crucial intersections and complex interrelationships (see Appendix II, Box 1).

3.3   Modelling

Building from the acceleration dialogues and identified accelerator scenarios, the third phase of the pilot was the costing and analytical modelling exercise. A participatory modelling approach was applied to develop customized analytical tools for evidence-based policymaking. Policy interventions prioritized from the dialogues were transformed into elements of public intervention to facilitate economic modelling. The potential pathways emerging from this stage thoroughly assessed by local partners and the country office.

At the heart of the economic modelling approach is a carefully designed tool for the Peruvian economy, which combines a sequential dynamic Computable General Equilibrium (CGE) model and a micro-simulation (MS) model, both top-down and bottom-up. The modelling

framework's primary innovation is a coherent and systematic combination of the macro-micro and micro-macro effects of policy combinations that simultaneously address economic growth, unemployment, and inequality, in line with reaching the SDG targets (see Appendix V).

This model served as a foundation for advocating for policy interventions and assisting policymakers in forecasting the potential effects on specific sectors of the economy. The aim was to quantify the impact of policy "what if" scenarios on the SDG indicators, and thus to assess the efforts the country needs to mobilize to achieve specific targets. Its primary advantage lay in its flexibility, as it delved into the structure and nuances of behavior exhibited by different agents in the economy, capturing the intricate economic relationships and connections that might be overlooked by other models. This complexity equipped the model to handle a broad spectrum of scenarios.

The model established a baseline scenario and projected its outcomes up to 2030. Additionally, it used six distinct scenarios adapted from acceleration dialogues and based on evidence presented in the scoping phase. The following main drivers of the SDG targets were recommended:

- investment in infrastructure, education, and health, as a key policy for poverty alleviation;
- increasing the efficiency of public investment on health and education; and
- reducing the costs of doing business, as a key policy to promote sustainable and inclusive growth with decent jobs.

These drivers contribute to the abovementioned end goals and have strong synergies with other key goals such as eliminating hunger and malnutrition, reducing inequalities, providing quality education, and achieving more inclusive economic growth and decent work, among others. Each one contains a different combination of public spending on education, health, infrastructure, increased efficiency of public spending and a reduction in the costs of doing business under government projections and the SDG Push accelerator scenario.

Five scenarios were examined, in addition to the baseline scenario. Below we review each of the five scenarios based on the Government projections and the SDG Push modelling projections:

1. Infrastructure scenario (S1).
2. S1 + reduction of cost of doing business (S2).
3. S2 + increase in efficiency in public sector (S3).
4. S3 + increase in investment in public expenditure on education (S4).

5. S4 + increase in investment in public expenditure on health (S5).

Baseline Scenario: business-as-usual (BAU)

Under the BAU scenario, it was projected that Peru would make little or no progress toward achieving several key SDGs. Public expenditure was projected to grow at 2.1 percent per year, while population and GDP respectively to grow at 1.4 percent and 2.9 percent.

By 2030, only 27.24 percent of students were projected to achieve a satisfactory level in math in the student census assessment, an increase of 10 percentage points from the baseline (2021). Productivity growth was limited to 1.4 percent allowing a limited share of manufacturing in total GDP, a GDP growth rate of 2.9 percent, which is well below the 7 percent target. In this scenario, informality would remain high unless action is taken to attract investment. By 2030, it was projected that nearly 74.4 percent of jobs would come from the informal sector (compared to 76.8 percent at baseline), while the poverty rate was expected to decrease to approximately 18.7 percent, an important yet incremental improvement from 25.9 percent in 2021.

Government projections

Under this strategy, the overall public expenditure grew at 6.7% over the period 2023-2026, as projected by the Ministry of Economy and Finance.[1] The objective was to evaluate the impact on SDGs if the public expenditure growth of 6.7% was entirely allocated to the areas identified during the dialogue as drivers of SDGs until 2030.

i. **Infrastructure scenarios:** Public investments were expected to annually increase by 6.4%, 2.4% and 2.2% respectively in transportation, communications, and energy.

ii. **Education:** Public investments in education were expected to increase by 4.9% annually while the public investments in other sectors are kept at the BAU's levels.

iii. **Health:** Public investments in health were expected to increase by 4.9% annually while the public investments in other sectors are kept at the BAU's levels.

iv. **Efficiency:** In this scenario, efficiency in public expenditure on education and health was increased. The increase in efficiency was implemented to allow a reduction in costs of government expenditure[2], that is equivalent to 1.4% of GDP.

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[1] Ministry of Economy and Finance, 2022
[2] While keeping the volume of consumption fixed.

This reduction in costs is considered to reflect the conclusion of Public Expenditure Review for Peru[3], which found that 1.4 percent of GDP in fiscal savings would be collected from efficiency reforms across areas including health and education.

v. **Reduction of cost of doing business:** In this scenario, the tax rates on economic activities were expected to decline by 50% by 2030.

3.4   SDG Push Scenarios

As part of this strategy, the aim was to reach or come close to the targets set out in the SDG results framework by 2030. For example, the poverty rate should be halved by 2030, economic growth should be at least 7%, and the primary school completion rate should be 100%. Like government projections, the focus was on areas identified as drivers of SDGs.

i. **Infrastructure:** Growth in public investment in the transport, energy and telecommunications sectors was 15 percentage points higher than in the government scenario.

ii. **Education:** Growth in public investment in education was 7.7 percentage points higher than the government's projection.

iii. **Health:** Public investment in health was maintained at the level of the government projection. This was because the objective of reducing malnutrition would be achieved in the government projection scenario.

iv. **SDG stimulus:** In this scenario, we assumed that the government would receive transfers from the rest of the world to fund the investment plan. We arbitrarily choose 40% as the contribution of the rest of the world.

v. **Reduction of cost of doing business:** Scenarios related to efficiency and reduction of costs of doing business were the same as in Government projection scenarios.

3.4 Costing the SDG Push interventions

Significant additional funding is required to implement proposed SDG accelerators, in each of the priority areas, for the period 2023 to 2030. On average the annual additional cost, under each project would be (millions of soles, 2021 price):

- Government projection: 2,191

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[3] https://openknowledge.worldbank.org/entities/publication/edce5845-7962-5f10-9782-aeb83cf77168

- SDG Push 13,038
- GAP: 10,847
- % BAU GDP: 1%

The additional public expenditure corresponds to the difference between the value of public expenditure under the scenarios compared to the value of public expenditure under the BAU scenario. The additional expenditure needed to implement the SDG push is around 1% of GDP (on average).

The Peruvian government has strong fiscal rules that different governments have adequately met over the past 22 years (with the exception of 2023). An important economic slowdown, together with a significant reduction in private investment have put the country in a complicated scenario where public investment does not have enough room to significantly improve.

SDG Push has revealed that to significantly accelerate SDG achievement towards 2030, there is a need to significantly improve public investment, which raises the question on the feasibility of such outcomes in a context of political turmoil and economic downturn.

While public efforts are important for to enhance productivity, both in terms of quantity and quality of investment, as well as for increase formal employment and economic growth, there is an important need to incentivize and leverage private investment. This is particularly true for transportation, energy and telecommunications infrastructure, health and education, sectors with significant multiplier effects.

To improve public investment, and based on the costs estimated, several financing options could be used to explore options (plans) for mobilizing the financial resources needed to partially cover the costs of the SDG accelerators. Based on Peru's experience, these options could include mobilizing national public resources (long overdue tax and revenue reforms), partnering with the national private sector or mobilizing external funds (public or private).

4. Conclusion and Policy Implications

Overall, the SDG Push initiative in Peru has proven valuable for repositioning the 2030 Agenda and the SDGs in national public policy discussions as well as providing useful insights to policymakers based on a systemic approach to development.

In terms of specific policy implications, the Results Based Framework (Appendix VI) shows that if Peru maintains past trends in public spending (BAU), it will make little or no progress in achieving several SDGs. In a BAU scenario the prevalence of malnutrition in children under five years would tend to zero while the percentage of students achieving a satisfactory level

in math would reach 43.0 percent by 2030, an important but moderate change from the baseline (17 percent); and the poverty rate would be approximate 17.7 percent. Therefore, additional efforts are needed to fully achieve the targets in terms of poverty reduction, educational outcomes, and economic growth. The GDP growth rate of 3.0 percent is well below the 7 percent target, and the resulting productivity growth is limited to 1.4 percent (on average), which is very close to the population growth rate.

In the BAU scenario, limited progress will be achieved in industrialization (manufacturing), with the share of manufacturing in GDP increasing by just 2.6 percent per year (on average). This is very close to the trend in manufacturing employment (2.5 percent). Furthermore, informality would remain high if nothing is done in terms of investment. By 2030, it is likely that almost 74.4 percent of jobs will come from the informal sector, while the poverty rate would stand at around 18.7 percent. In short, these results show that if the government pursues the same strategy as in the past, the country will lag in achieving the SDGs by 2030.

When considering government projections, the country would make significant progress in reducing malnutrition, but limited progress in terms of economic growth, educational outcomes, productivity growth and poverty reduction. For example, we find that the prevalence of malnutrition would tend to zero while the percentage of students who achieved a satisfactory level in math would reach 43.0 percent by 2030 which is good but still below 100 percent.

The government scenario projected that overall public investment would increase by an average of 6.7 percent over 2023-2026 (Ministry of Economy and Finance, 2022), the results demonstrate that if policymakers allocate public investment to the sectors identified as drivers of the SDGs, Peru is likely to make progress on priority SDGs. Specifically, if the required allocation of public investment is implemented, the country should be on track to reduce the prevalence of malnutrition; it would also experience an improvement in educational outcomes and higher economic growth. However, additional efforts are needed to fully achieve the targets in terms of poverty reduction, educational outcomes, and economic growth.

Under the SDG Push scenario, Peru would be on track in terms of educational and health outcomes, economic growth, and poverty reduction, while it would make good progress on productivity growth and underemployment. According to this scenario, it's projected that by 2030 the poverty rate will be 12.6 percent, 50 percent lower than the reference value; annual economic growth will stand at 6.4 percent and annual productivity growth will exceed 4 percent (on average). The prevalence of malnutrition will tend towards zero, and the country will see a greater improvement in educational performance. Like the government projection scenario, public investments in infrastructure have a higher macroeconomic and social impact.

Increasing efficiency in the public sector and the SDG stimulus help maximize the impact of investments in SDG Push scenarios.

In summary, investments under the SDG Push scenarios will help the country achieve several SDGs related to education, health, economic growth, and poverty. However, the amount of public investment needed is extremely large for the Peruvian economy. Focusing on improving Government spending efficiency and targeting public investment in key economic sectors (infrastructure in telecommunications, energy and transportation, quality of education and universal quality health services) may be crucial for accelerating SDG achievement. These set of policies may pave the way for improving productivity, economic growth, and formal employment, but most importantly it will provide adequate incentives for the private sector to invest in these sectors.

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Technical Appendices

Appendix I: Scoping phase

The scoping note represented the initial step in the formation of Peru's SDG Push framework. To provide the Peruvian Government with a high-level overview of the development context and the challenges it faces, the first stage involved reviewing existing strategic policy and planning documents. This comprehensive examination of national development plans and strategies was crucial for gaining insights into the country's socio-economic, institutional, and environmental landscape. It allowed for the identification of gaps in SDG attainment, for the assessment of progress toward SDGs and for pinpointing potential interventions to expedite the achievement of the SDG 2030 Agenda. Furthermore, during the initial phase of developing the SDG Push framework, particular attention was paid to assessing data availability, disaggregation, and consistency in long-term monitoring. This emphasis on data is critical because having access to reliable and accurate data is essential for accurately identifying gaps in the SDGs' progress and for charting development pathways that can accelerate progress toward their attainment.

In the Peruvian case, the SDGs are linked to the axes of government policies developed by the National Agreement and are considered – but not incorporated – in the strategic development plans at the different levels of government, national policies, multiannual sectoral plans and in the different general government policies.

In the Peruvian context, public policies are divided into the following categories:

- State policies: these define the general guidelines that guide the actions of the State in the long term to achieve the welfare of citizens and the sustainable development of the country.

- General Government Policy: this is the set of prioritized policies that are developed through national policies during a period of government.

- National Policies: these constitute policy decisions through which a set of objectives and actions are prioritized to solve a certain public problem of national and sectoral or multi sectoral scope in a period.

State policies are grouped into four main spheres: (i) strengthening democracy and the rule of law; (ii) development with equity and social justice; (iii) promoting the country's competitiveness; and (iv) affirming an efficient, transparent, and decentralized State. From these 4 spheres 35 state policies emerge. These are set out in Table 1:

Table 1. National Agreement: State objectives and policies

1. Strengthening Democracy and the Rule of Law.	1. Strengthening democratic rule and the rule of law
	2. Democratization of political life and strengthening of the party system
	3. Affirmation of national identity
	4. Institutionalization of dialogue and consultation
	5. Governance based on objectives with strategic planning, national foresight, and transparent procedures
	6. Foreign policy for peace, democracy, development, and integration
	7. Eradication of violence and strengthening of citizenship and citizen security
	8. Political, economic, and administrative decentralization to promote the integral, harmonious, and sustained development of Peru
	9. National Security Policy
2. Development with Equity and Social Justice.	10. Poverty reduction
	11. Promotion of equal opportunities without discrimination
	12. Universal access to free and quality public education and promotion and defense of culture and sport
	13. Universal access to health services and social security
	14. Access to full, dignified, and productive employment
	15. Promoting food security and nutrition

	16. Strengthening the family, promotion and protection of children, adolescents, and youth
3. Promotion of the Competitiveness of the Country.	17. Affirmation of the social market economy
	18. Search for competitiveness, productivity, and formalization of economic activity
	19. Sustainable development and environmental management
	20. Development of science and technology
	21. Infrastructure development and housing
	23. Agricultural and rural development policy
	22. Foreign trade policy for the expansion of markets with reciprocity
4. Affirmation of an Efficient, Transparent and Decentralized State	24. Affirmation of an efficient and transparent State
	25. Caution of the institution of the Armed Forces and their service to democracy
	26. Promotion of ethics and transparency and eradication of corruption, money laundering, tax evasion and smuggling in all its forms
	27. Eradication of illegal drug production, trafficking, and consumption
	28. Full validity of the Constitution and human rights and access to justice and judicial independence
	29. Access to information, freedom of expression and freedom of the press
	30. Elimination of terrorism and affirmation of National Reconciliation
	31. Fiscal sustainability and reducing the debt burden
	32. Disaster risk management
	33. State policy on water resources

	34. Territorial planning and management
	35. Information society and knowledge society.

As part of the National Agreement, the Peru' National Development Vision 2050 was approved whose details and alignment with the SDGs is provided in Table 2. In addition, the National Agreement in session 131 agreed on six issues of national priority for the five-year period 2021-2026, namely health, education, the fight against poverty and extreme poverty, sustainable economic growth with decent employment, political reform, and reform of the judicial administrative system.

Table 2. Alignment of Vision 2050, 5 pillars of SDG 2030 Agenda and SDGs

Vision 2050 Peru	Agenda 2030	ODS
People reach their potential in equal opportunities and without discrimination to enjoy a full life	People	1, 2, 3, 4, 5 and 10
Sustainable nature management and climate change measures	Planet	6, 10, 12, 13, 14 and 15
Sustainable development with decent employment in harmony with nature	Prosperity	7,8,9,10 and 11
Democratic, peaceful society, respectful of human rights and free from fear and violence	Peace	10 and 16
Modern, efficient, transparent, and decentralized state that guarantees a fair and inclusive society, without corruption and leaving no one behind	Alliances	10, 16, 17

The General Government Policy[4] 2021-2026 contains axes, priority guidelines and lines of intervention aimed at the development and updating of national policies, plans and government interventions and are in accordance with state policies, the strategic national development plan, the Peru Vision 2050, and the SDGs:

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[4] During the course of the SDG push process a presidential vacancy occurred and the new president approver another general government policy see: https://www.gob.pe/institucion/pcm/informes-publicaciones/4033369-politica-general-de-gobierno-para-el-presente-mandato-presidencial

1. Generation of welfare and social protection with food security.

2. Economic revival and productive activities with agrarian and rural development.

3. Promotion of science, technology, and innovation.

4. Strengthening of the educational system and learning recovery.

5. Decentralization, institutional and civil service strengthening.

6. Strengthening the democratic system, public security and the fight against corruption, drug trafficking and terrorism.

7. Efficient management of risks and threats to the rights of people and their environment.

8. Governance and digital transformation with equity.

9. Conduct of a national, autonomous, democratic, social, and decentralized diplomacy.

10. Intercultural State for the promotion of cultural diversity

Thus, the framework for the development of the implementation of the Sustainable Development Goals is given by the Political Constitution of Peru, the State Policies of the National Agreement, the National Vision to 2050, the National Development Plan proposed to 2050 and is implemented through the different general government policies.

An integral aspect of the scoping process is the utilization of the SDG Push Diagnostic Simulator, which leverages sophisticated machine learning techniques to detect disparities in SDG advancement on a national scale. Moreover, it undertakes a preliminary, in-depth examination of accessible national data and knowledge reservoirs to pinpoint areas of paramount importance for national development.

Based on the diagnostic simulator it was possible to assess the progress Peru has made in attaining distinct SDG targets, systematically organized in accordance with the five Ps of sustainable development: People (comprising 47 targets), Peace (encompassing 12 targets), Planet (encompassing 46 targets), Prosperity (encompassing 45 targets) and Partnership (comprising 19 targets). As illustrated below, countries' national priorities are generated using machine learning in a process that reveals the most salient SDGs referenced in national policy documents.

Assessing a set of strategic documents (Política Nacional de Desarrollo Industrial; Política Nacional de Desarrollo e Inclusión Social al 2030; Informe de Análisis Prospectivo (2021-2022); Visión del Peru al 2050; Políticas de Estado 2019; Política Nacional de Empleo Decente; Políticas Generales de Gobierno 2023; Política Nacional de Igualdad de Género; Política Nacional de Productividad y Competitividad) – SDGs 16, 8, 9 and 11 seem to be the most prominent goals.

There are potentially many synergies and complementarities among the different SDGs and targets. But there are also several negative trade-offs with regards to specific SDGs that are conversely interrelated. The SDG Diagnostic Simulator has highlighted and visualized specific SDG targets with the most synergies and interlinkages with other SDG targets.

Through the analysis of synergies and trade-offs, more than 70 synergy links with other targets, shared across all SDGs, have been found for indicator 16.6 which is identified as one of the priorities in the SDG Diagnostic Simulator. Target 16.6 has multiple potential multiplier effects across several SDGs and targets that are relevant to Peru, cutting across other high priority development areas, such as decent work and economic growth.

For Peru, investing in institutions must be accompanied with advancing implementation capacity and citizen engagement to decrease informality and reach vulnerable populations with public services effectively. Improving institutional capacity could also lead to progress on zero hunger (target 2.2), on affordable and clean energy (targets 7.1 and 7.2), as well as to promoting inclusive and sustainable industrialization (target 9.2).

Furthermore, having more efficient institutions will improve the quality of expenditures which in turn may have a positive effect on Peruvian lower productivity rates, (Peru currently has over 2,300 paralyzed public works for the equivalent of $11.3 billion and an estimated of $7 billion in investments to implement).

In addition, Peru is one of the LAC countries with the highest level of labor informality (above 78 percent according to the latest data). Thus, advancing in decent work and productivity (SDG target 8.5) could have positive impacts on several areas of development and help advance many SDGs.

By investing in initiatives to advance on SDG 8.5, Peru can jointly address employment challenges, while also helping to close the gaps on poverty, health, well-being, and inequality target indicators. The government considers all these as development priority areas. Making progress on formalization could also help to increase the tax base and improve coverage of

social protection systems. Policies and reforms need to consider the behavioral aspects and incentives that workers face when deciding between the formal and the informal sectors.

Despite progress in some dimensions, poverty remains a significant issue in Peru, with 27.5 percent of the population living below the poverty line in 2022. With the COVID-19 pandemic further exacerbating these challenges and disproportionately affecting the most vulnerable populations (e.g., indigenous people and people living in rural areas). It has been estimated that 7 in 10 Peruvians are either poor or vulnerable (World Bank, 2023).

Recent climate-related events have also demonstrated the high level of vulnerability and low coping capacity that vulnerable populations have in Peru. Thus, investing in building resilience could both help the poor and vulnerable and have positive impacts on other priority areas, such as industry, innovation, and infrastructure (SDG 9), and on productivity through education and overall economic growth (SDGs 4 and 8).

Beyond providing a clear view of the development priorities and the SDGs' status in Peru, the scoping phase also helped to identify some initial challenges that needed to be addressed during the rest of the implementation. First, the continuous political turmoil led the bureaucracy to focus on short-term development issues, prioritizing the current situation, omitting the medium and long-term development strategy, which is what the SDG Push aims at supporting.

Secondly, Peru's complex development planning institutional infrastructure and the absence of an institutionalized governance mechanism for the SDGs made it challenging to assess the alignment of national priorities to the SDGs, which was key for the next steps of the SDG Push.

Moreover, the scoping phase identified the lack of a clear governance structure in charge of the SDGs. In Peru different entities have assumed responsibility for the implementation of the 2030 Agenda for Sustainable Development. CEPLAN, the National Centre for Strategic Planning, is responsible for the preparation of the Voluntary National Review (VNR), the National Institute of Statistics and Informatics manages the system for monitoring and follow-up of the indicators of the SDGs, and the Ministry of Foreign Affairs coordinates the support from the United Nations system. However, no entity has been designated as the SDG coordinator, instead responsibility has been assigned to an existing entity, or special commissions have been established.

Appendix II: Summary of the multi-stakeholder SDG Push Accelerator Dialogues

Part of the SDG Push process is the incorporation of a series of systemic and multi-stakeholder dialogues. The UNDP SDG Push Dialogue in Peru was held from 28-29 September 2022. For Peru, eight development priorities were identified and became the primary subjects for phase 2. These were: (i) poverty; (ii) security; (iii) rural and agricultural development; (iv) public administration efficiency; (v) risk and disaster management; (vi) infrastructure and housing; (vii) access to health services; and (viii) access to quality education. These priorities were then mapped to SDGs 1, 2, 3, 4, 9, 11 and 16.

During the multi-stakeholder dialogues, participants were encouraged to collectively understand the strengths (what is working), gaps (what needs attention), trends (what are emerging risks and opportunities) and interlinkages (interconnection of issues, solutions, and SDG indicators), and to then identify intervention points and optimal acceleration pathways.

The Sense-making and Accelerating Protocol methodology, initially prepared for the development dialogues, consisted of a series of exercises to discuss, and prioritize development areas and specific policies based on what emerged from the scoping phase.

The dialogues were structured as a two-stage process, starting with a 1.5-day in-person workshop, and finishing with a one-day virtual event. In between these stages a survey was conducted with all participants of the first dialogues to narrow down the interventions initially identified to feed the second part of the dialogues.

In the initial phase of the dialogues, over 45 participants from civil society, academia, government, and the UN system gathered to deliberate development priorities, the SDGs, and necessary reforms. The workshop featured a diverse range of exercises with the overarching aim of aiding participants in understanding essential information and encouraging initial group interactions.

Subsequently, the participants engaged in a discussion designed to validate the list of primary priorities. These dialogues also entailed a comprehensive review of the content outlined during the scoping phase, serving a dual purpose: a) the participants were provided with an additional opportunity to absorb the information from the scoping note; and b) any emerging trends on the relative significance of each priority were identified.

Building on the session, a concise overview of the SDGs and the 2030 Agenda was presented, serving as a preparatory step that greatly assisted participants in grasping how Peru's crucial

intersections and complex interrelationships could be identified (see Box 1). Following this, CEPLAN delivered a presentation on trends and horizon mapping, setting the stage for subsequent exercises in this area. During these exercises, participants took an active role in envisioning the future, mapping out the key trends likely to influence Peru's development path over the next 5-10 years.

Box 1: Leverage points identified for Peru
1.2 By 2030, reduce at least by half the proportion of men, women and children of all ages living in poverty in all its dimensions according to national definitions.   **10.2** By 2030, empower and promote the social, economic, and political inclusion of all, irrespective of age, sex, disability, race, ethnicity, origin, religion, or economic or other status.   **10.1** By 2030, progressively achieve and sustain income growth of the bottom 40 percent of the population at a rate higher than the national average.   **1.5** By 2030, build the resilience of the poor and those in vulnerable situations and reduce their exposure and vulnerability to climate-related extreme events and other economic, social, and environmental shocks and disasters.   **8.1** Sustain per capita economic growth in accordance with national circumstances and attain at least 7 per cent gross domestic product growth per annum in least developed countries.   **3.4** By 2030, reduce by one third premature mortality from non-communicable diseases through prevention and treatment and promote mental health and well-being.   **2.2** By 2030, end all forms of malnutrition, including achieving, by 2025, the internationally agreed targets on stunting and wasting in children under 5 years, and address the nutritional needs of adolescent girls, pregnant and lactating women, and older persons.   **10.3** Ensure equal opportunity and reduce inequalities of outcome, including by eliminating discriminatory laws, policies, and practices and by promoting appropriate legislation, policies, and actions in that regard

Between phases 1 and 2 of the dialogues, a survey was prepared and administered to all participants involved in them, the aim being to create a series of interventions aligned with the SDGs and thematic priorities. This survey was thoughtfully structured into three sections: the prioritization of the SDGs, the delineation of primary subjects linked to the designated SDGs and the ranking of public policy interventions.

The second phase of the Development Dialogues was strategically centered on two key objectives: validating previously identified potential accelerators through collaborative work within small groups and discovering new interventions with active participation from attendees. Simultaneously, this phase aimed to collect detailed information about these interventions. This phase focused on five main spheres: (i) Poverty alleviation; (ii) Health care service provision;(iii) Advancement of education; (iv) Promotion of economic growth; and (v) Enhancement of government transparency and effectiveness. The participants were organized into groups based on their expertise and affiliations and tasked with gathering policy insights within these specific domains. Each group then compiled a comprehensive dossier containing intricate details related to their respective interventions.

The SDG Push initiative in Peru has proven to be a valuable tool used to identify accelerator pathways to sustainable development. The evidence produced during this process has been useful for government counterparts when preparing sectoral plans and having policy discussions across different development areas. The systems lens through which development was analyzed during the SDG Push has been embraced by sectoral ministries and planning entities in Peru.

Table A5: External data used for calibration of CGE model

Substitution between categories of labor	2.00	https://repositorio.pucp.edu.pe/index/handle/123456789/47013	Peru
Substitution between imports and domestic production	3.50	https://doi.org/10.1016/j.econmod.2006.12.002	average
Transformation between domestic production and exports	2.00	https://www.taylorfrancis.com/chapters/edit/10.4324/9780203965832-11/Peru-impact-analysis-trade-liberalization-poverty-inequality-alonso-segura-vasi-juan-garc%C3%ADa-carpio	Peru
Substitution among imports from different exporters	7.00	https://doi.org/10.1016/j.econmod.2006.12.002	average
Export demand elasticity	0.50	https://doi.org/10.1016/j.econmod.2006.12.002	Peru
Income elasticity of demand for imports	2.21	https://www.tandfonline.com/doi/abs/10.1080/01603477.2016.1136565	Peru
Substitution between value added and intermediate demand	0.60	https://www.taylorfrancis.com/chapters/edit/10.4324/9780203965832-11/Peru-impact-analysis-trade-liberalization-poverty-inequality-alonso-segura-vasi-juan-garc%C3%ADa-carpio	Peru
Elasticity for investment demand	2.00	https://www.taylorfrancis.com/chapters/edit/10.4324/9780203965832-11/Peru-impact-analysis-trade-liberalization-poverty-inequality-alonso-segura-vasi-juan-garc%C3%ADa-carpio	Peru
Frish parameters	-2.4	https://www.cepal.org/sites/default/files/events/files/documento_cristian_mardones_universidad_de_concepcion_chile.pdf	
Output PIB elasticities Agriculture and fishing	0.74	https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2649490	Peru
Mining	0.79	https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2649490	Peru
Manufacturing	0.33	https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2649490	Peru
Electricity, gas, and water	0.76	https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2649490	Peru
Construction	0.67	https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2649490	Peru
Trade	0.89	https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2649490	Peru
Other services	0.75	https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2649490	Peru
Elasticity of real wage to unemployment rate- Wage curve	-0.06	(Yamada, 2008) for Peru	https://onlinelibrary.wiley.com/doi/abs/10.1111/j.1467-9361.2008.00469.x

Table A6. Elasticities used for calibration of CGE model

Elasticity in externality function (infrastructure)	Montaud and al (2020) for Peru	
Telecommunication	Mean	SE
Agro-industry	1.6	0.4
Commerce	2.0	0.1
Construction	0.6	41.7
Energy and water	0.9	125.4
Oil and mining	2.6	0.7
Manufacture	1.7	0.1
Fishing	0.8	41.2
Other services	0.2	0.0
Energy		
Agro-industry	0.0	0.0
Commerce	0.0	0.0
Construction	0.0	18.3
Energy and water	0.1	18.3
Oil and mining	0.3	42.0
Manufacture	0.0	
Fishing	0.6	20.7
Other services	0.1	8.7
Transportation		
Agro-industry	0.7	0.2
Commerce	0.6	0.1
Construction	0.4	0.2
Energy and water	0.5	21.8
Oil and mining	0.0	
Manufacture	0.7	0.1
Fishing	0.4	33.5
Other services	0.7	0.1

Table A7. Other external data

GDP growth rate (average over 2010-2019)	0.045	World Development Indicators
Unemployment rate (average over 2010-2019)	0.035	World Development Indicators
Interest rate (average over 2014-2019)	0.034	Central Bank of Peru
Population growth rate (average over 2010-2019)	0.012	World Development Indicators
Depreciation rate	0.05	

Appendix IV: Data availability per determinant

Data Base

- After having identified the determinants of each indicator, the suggested variables were built based on the availability of regional and representative data using different surveys.
- The following table summarizes the main information regarding the sources used to build each determinant.

Variable	Time period	Source
Population in a situation of monetary poverty, by region (Percentage of the total population)	2004-2021	ENAHO annual
Malnutrition prevalence in children under 5 years of age	2009-2021	ENDES
Prevalence of anemia in girls and boys from 6 to 59 months of age	2010-2021	END ES
Percentage of students who achieved a satisfactory level in math in the 2nd grade of secondary school	2015-2019	ECE
Percentage of students who achieved a satisfactory level in math in the 2nd grade of primary school	2007-2016	ECE
Average total monthly salary (main and secondary occupation) of full-time workers and private dependents	2004-2021	ENAHO annual
Labor informality	2004-2021	ENAHO annual
Current expenditure allocated to education	2009-2022	SIAF
Head of household has Quechua, Aimara or another native language (ashaninka, awajún, shipibo, shawi, machiguenga, achuar or another) as mother tongue	2004-2021	ENAHO annual
Public schools in good conditions (Percentage of the total)	2001- 2021	Censo Escolar
Ratio of workers with completed secondary education or less	2004-2021	ENAHO annual
Percentage of independent workers	2004-2021	ENAHO annual
Average educational level of heads of household in the region	2004-2021	ENAHO annual
Average ratio of household members with completed basic education	2004-2021	ENAHO annual
Percentage of households with landline, cell phone or internet	2004-2021	ENAHO annual
Percentage of households with electricity	2004-2021	ENAHO annual
Percentage of households with drinking water from a pipe	2004-2021	ENAHO annual
Dependency ratio: Unemployed household members over the number of employed members	2004-2021	ENAHO annual
Unemployment rate	2004-2021	ENAHO annual

Variable	Time period	Source
Average spending on food as a percentage of GDP	2004-2021	ENAHO annual
Average age of workers	2004-2021	ENAHO annual
Average squared age of workers	2004-2021	ENAHO annual
Percentage of households located in rural areas	2004-2021	ENAHO annual
Percentage of women who were or are pregnant and who did not have their prenatal check-up	2004-2021	ENDES
Percentage of households with two or more children	2004-2021	ENDES
Percentage of households where the mother has incomplete primary school or less	2004-2021	ENAHO annual
Percentage of households with bathrooms inside the house	2004-2021	ENAHO annual
Number of students per teacher, in basic education	2000-2022	Censo Escolar
Percentage of households where at least one parent has completed secondary education or higher education	2004-2021	ENAHO annual
Teachers with a pedagogical career at the University, in basic education (% of the total)	2000-2021	Censo Escolar
Proportion of workers in micro and small enterprises	2004-2021	ENAHO annual
Ratio of women of the total labor force	2004-2021	ENAHO annual
Percentage of the labor force that are young (15-29 years)	2004-2021	ENAHO annual
Progress ratio in the execution of the public budget allocated for education, by region as of the third quarter of the year	2009-2022	SIAF
Average degree of public workers, by region	2004-2021	ENAHO annual
Average ratio of public workers hired as *"locavores de servicio"* in the local educational management institution, by region	2016-2022	Censo DRE/GRE – UGEL
Average ratio of professors appointed in a public educational institution, with respect to the total	2004-2022	Censo Educativo
Progress ratio in the execution of the public budget allocated for the National Program against Anemia, by region	2008-2022	SIAF
Average expenditure per household	2004-2021	ENAHO annual
Public schools with basic services (drinking water, electricity, and drainage)	2006-2022	Censo Educativo
Percentage of teenagers who are mothers or pregnant for the first time (Percentage of the age group 15-19)	2009-2021	ENDES

- The results of the literature review and availability of data allowed the setup of different models for each SDG indicator. These models are intertwined, representing a dynamic system.
- The model was recursively adapted to analyze which determinants were statistically significant for each indicator.
- All models used panel data to estimate the parameters using data from 2010-2021, considering Peruvian regions as individuals and using Clustered standard errors.
- The models for each selected SDG indicator are detailed in the following section.

  i.   *Model N°1: Reducing Monetary Poverty - Monetary poverty.*
 ii.   *Model N°2.1: Universal access to quality public health services – Malnutrition.*
iii.   *Model N°2.2: Universal access to quality public health services – Anemia.*
 iv.   *Model N°3.1: Access to free quality public education - Quality of education.*
  v.   *Model N°3.2: Access to free quality public education - Quality of education.*
 vi.   *Model N°4: Promoting sustainable, inclusive economic growth with decent job – Informality.*
vii.   *Model N°5: Efficient and transparent government – Efficiency of public expenditure in education.*

Table A4. Micro econometric model results

Variables	Poverty headcount ratio		Prevalence of malnutrition among children under 5 years of age		% students who achieved satisfactory level in math in the national evaluation (2nd primary school)		Ratio of workers with completed secondary education or less		Labor informality rate		Income under-employment rate		Efficiency of public expenditures in education	
	Model 1		Model 2		Model 3.1		Model 3.2		Model 4.1		Model 4.2		Model 5	
Average educational level of heads of household in the region	0.0014						-0.0209	***						
% of households with landline, cell phone or internet (at least one)	-0.0060				0.5111	**	-0.0440	**						
% of households with native language other than Spanish	0.0533													
% of households with electricity	-0.4056	***												
Dependency ratio	0.1413	***												
Average unemployment rate in the region	0.9593	***												
Average annual household expenditure (thousands of soles)	-0.0155	***					-0.0446	***	-0.0046	***	-0.0043	***	0.0129	*
% of households with drinking water from a pipe			-0.2205	**										
% of the population in monetary poverty			0.1533	***										

	(1)		(2)		(3)		(4)		(5)	
% households with bathroom inside the house	-0.2346	***								
Budget for the National Anemia Program (NAP) (billions of soles)	-0.4441	***							0.1843	***
NAP squared	0.5115	***								
Budget education per-capita (millions of soles)			105.7965	***					0.0413	***
c. (Budget education per-capita) #c. (Budget education per-capita)			-9208.3280	***						
Ratio of workers with completed secondary education or less					0.3281	***	0.2290	***		
% of independent workers					0.3444	***	0.1973	***		
Average age of workers					-0.1689	***	-0.1527	***		
c. (Average age of workers) #c. (Average age of workers)					0.0021	***	0.0020	***		
% households in rural areas					-0.2293	***	-0.1212	***		
Public schools with basic services (drinking water, electricity, and drainage)									0.4647	

Table 5. Reduced results framework under government projection scenario

	Target	Baseline value (2021)	BAU	S1	S2	S3	S4	S5
GDP growth rate	7.00	2.75	2.9	3.5	3.5	3.6	3.6	3.6
Change in unemployment	<		-8.0	-10.2	-10.2	-10.6	-10.1	-10.0
Changes in manufacturing value added share of GDP	>		2.6	2.9	2.8	3.2	3.3	3.3
Changes in manufacturing employment share of total employment	>		2.5	2.9	2.8	3.1	3.4	3.4
Labor share of GDP	>	28.48	32.8	32.5	32.6	32.8	32.5	32.5
GDP per employed growth	>		1.2	1.7	1.7	1.8	1.8	1.8
Poverty rate	-50%	25.9	18.9	17.9	17.8	17.7	17.7	17.7
Prevalence of malnutrition	<	11.5	3.8	3.7	3.7	3.7	3.7	0.0
Percentage of students who achieved a satisfactory level in math in the Student Census Evaluation (2nd grade - Primary)	100%	17.0	27.9	27.9	27.9	27.9	43.1	43.1
Ratio of workers with completed secondary education or less	<	69.11	66.7	66.4	66.3	66.3	66.3	66.3
Proportion of informal employment in total employment	<	76.8	74.4	74.0	74.0	73.9	73.9	73.9
Underemployment	<	12.69	10.4	10.0	10.0	9.9	9.9	9.9

S1 =infrastructure scenario, S2=S1 + reduction of cost of doing business; S3=S2+ increase in efficiency in public sector; S4=S3+ increase in investment in public expenditure on education; S5=S4+ increase in investment in public expenditure on health.

Below 50% and above 30% of the target, slow progress

Above 50% of the target and below 90% of the target, good progress

Above 90% of the target, on track

Below 30% of the target, no progress

Table 6. Reduced results framework under the SDG Push scenario

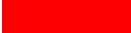|	BAU	S1	S2	S3	S4	S5	Stimulus
GDP growth rate	2.9	5.6	5.5	5.7	5.9	5.9	6.4
Change in unemployment	-8.0	-20.0	-19.9	-20.5	-18.8	-18.7	-22.2
Changes in manufacturing value added share of GDP	2.6	2.4	2.3	2.4	2.5	2.5	2.6
Changes in manufacturing employment share of total employment	2.5	2.5	2.4	2.5	3.1	3.1	3.0
Labor share of GDP	32.8	32.1	32.2	32.4	31.2	31.2	31.4
GDP per employed growth	1.2	3.6	3.6	3.7	4.0	4.0	4.4
Poverty rate	18.93	14.1	14.0	13.7	13.8	13.8	12.6
Prevalence of malnutrition	3.8	3.4	3.4	3.4	3.4	0.0	0.0
Percentage of students who achieved a satisfactory level in math in the Student Census Evaluation (2nd grade - Primary)	27.9	27.9	27.9	27.9	100.0	100.0	100.0
Ratio of workers with completed secondary education or less	66.7	64.8	64.8	64.7	64.7	64.7	64.2
Proportion of informal employment in total employment	74.4	72.4	72.3	72.2	72.2	72.3	71.8
Underemployment	10.4	8.5	8.5	8.4	8.4	8.4	7.9

S1 =infrastructure scenario, S2=S1 + reduction of cost of doing business; S3=S2+ increase in efficiency in public sector; S4=S3+ increase in investment in public expenditure on education; S5=S4+ increase in investment in public expenditure on health.

Below 50% and above 30% of the target, slow progress
Above 50% of the target and below 90% of the target, good progress
Above 90% of the target, on track
Below 30% of the target, no progres

Appendix VII: Criteria used to assess progress.

Target	Baseline value	Indicators	Criteria
7	2.74	GDP growth rate	>50% of target value on track;<50% and >20% good progress
<		Changes in Unemployment rate	Decrease at least by 10% per year good progress, below 10% little progress
>		Changes in Manufacturing value added share of GDP	Increase at least by 3% per year good progress, below 3% per year little progress
>		Changes in Manufacturing employment share of total employment	Increase at least by 3% per year good progress, below 3% little progress
>	28.48	Labor share of GDP	If difference with baseline is lower than 5 pp, little progress: higher than 5 pp and below 15 pp good progress
>		GDP per employed growth	Below 2%, little progress
12.95 (-50%)	25.90	Poverty rate	Below 70% of target little progress and above 70 % of target and below 90% good progress
<	11.50	Prevalence of malnutrition	Below 1% on track, >1% and < 5% good progress

1	17.00	Percentage of students who achieved a satisfactory level in math in the Student Census Evaluation (2nd grade - Primary)	Below 30% limited progress
<	69.11	Ratio of workers with completed secondary education or less	If difference (absolute value) with baseline is lower than 5 pp, little progress: higher than 5 pp and below 15 pp good progress
<	76.80	Proportion of informal employment in total employment	Difference (absolute value) with baseline higher 3% good progress, below 3% little progress
	12.69	Underemployment	Difference (absolute value) with baseline higher 3% good progress, below 3% little progress

Appendix VIII: Summaries of key determinants

Summaries of key determinants per selected SDG indicator according to literature review

Indicator	Key determinants	Sign	Academic references
Monetary poverty	Years of education of the head of the household	-	Valenzuela, I. (2013). Activos y contexto económico: Factores relacionados con la pobreza en el Peru.
	Access to landline and/or cell phone at home	-	
	Agricultural income as % of total household income	+	
	Rate of households with public electricity	-	
	Head of household has Quechua, Aimara or another native language as mother tongue	+	
	Dependency ratio: Unemployed household members over the number of employed members	+	
	Availability of drinking water	-	

Indicator	Key determinants	Sign	Academic references
	Rate of individuals with completed secondary education	-	Palomino, J., & Sánchez, T. (2021). Where Are the Poor Located? A Spatial Heterogeneity Analysis of Monetary Poverty in Peru. Economia, 44(87), 89-114. https://doi.org/10.18800/economia.202101.006
	Rate of households with public electricity	-	
	Rate of households connected to a public sewage system inside or outside the home	-	
	Percentage of female heads of household	-	
	Unemployment rate	+	
	Chronic child malnutrition	+	
	Altitude	+	
	Landless	+	Laderchi, C. R., Saith, R., & Stewart, F. (2003). Does it matter that we do not agree on the definition of poverty? A comparison of four approaches. Oxford development studies, 31(3), 243-274.
	Head of household with Quechua, Aimara or another native language as mother tongue	+	
	Having only precarious (or no) employment.	+	
Malnutrition	Percentage of income spent on food	+	UNICEF (1998). Estado mundial de la infancia.
	Inadequate care for the child and mother: excessive physical work during pregnancy, lack of time for breastfeeding or stimulation of the child.	+	
	Insufficient health services and lack of basic sanitation	+	
	Monetary poverty	+	
	Lack of prenatal control in the mother during pregnancy	+	Suárez, M. A. (1999). Determinantes de la desnutrición aguda y crónica en niños menores de 3 años: Un subanálisis de la ENDES 1992 y 1996. In Determinantes de la desnutrición aguda y crónica en niños menores de 3 años: Un subanálisis de la ENDES 1992 y 1996 (pp. 88-88).
	Have four or more living children	+	
	Low birth weight	+	
	Education level of the mother: incomplete primary education or less	+	
	Lack of bathrooms hygienic services or the possession of latrines	+	
	Child caregiver above 40 years old	+	

Indicator	Key determinants	Sign	Academic references
	Households with dirt floors	+	
	Birth order	+	Balcázar, R., Paulini, J., Aquino, O., Cordero, L., & Figueroa, J. (2001). Política Nacional para la Reducción de la Desnutrición Crónica en el Perú. Documento de Trabajo. Lima: Instituto Apoyo.
	Education level of the mother	-	Sobrino, M., Gutiérrez, C., Cunha, A. J., Dávila, M., & Alarcón, J. (2014). Desnutrición infantil en menores de cinco años en Perú: tendencias y factores determinantes. Revista panamericana de salud pública, 35, 104-112.
	Altitude above 2 500 m.a.m.s.l.	+	
	Presence of two or more children in the home	+	
	Be the third or successive child	+	
	Inadequate nutrient intake	+	Sánchez-Abanto, J. (2012). Evolution of chronic malnutrition in children under five in Peru. Revista Peruana de Medicina Experimental y Salud Publica, 29(3), 402-405.
	Infectious diseases	+	
	Education level of the mother: incomplete primary education or less	+	
	Inadequate health and sanitary conditions	+	
	Low social status of the mother in decision-making within the home	+	
	Mothers having incomplete primary education or less	+	Urke, H. B., Bull, T., & Mittelmark, M. B. (2011). Socioeconomic status and chronic child malnutrition: wealth and maternal education matter more in the Peruvian Andes than nationally. Nutrition Research, 31(10), 741-747.
	Mothers working at home compared with mothers in professional occupations	-	
	Monetary poverty	+	
Anemia	Sex	+	Sobrino, M., Gutiérrez, C., Cunha, A. J., Dávila, M., & Alarcón, J. (2014). Desnutrición infantil en menores de cinco años en Perú: tendencias y factores determinantes. Revista Panamericana de salud pública, 35, 104-112.
	Children under 2 years old	+	
	Region	+	
	Altitude above 2 500 m.a.m.s.l.	+	
	Availability of public water network	-	

Indicator	Key determinants	Sign	Academic references
	Rate of households connected to a public sewage system inside the home	-	
	Presence of two or more children in the home	+	
	Lack of iron in blood	+	Instituto Nacional de Estadística e Informática. Encuesta Demográfica y de Salud Familiar 2016 Nacional y Regional (ENDES 2016) [Internet]. Lima: Instituto Nacional de Estadística e Informática; 2017. Disponible en: http://proyectos.inei.gob.pe/endes/resultados.asp.
	Presence of parasites	+	World Health Organization (WHO). (2011). Intermittent Iron Supplementation in Preschool and School-Age Children. WHO: Geneva, Switzerland.
	Low birth weight	+	
	Frequent episodes of diarrheal infections	+	
	Place of residence outside of Lima	+	Velásquez-Hurtado, J. E., Rodríguez, Y., Gonzáles, M., Astete-Robilliard, L., Loyola-Romaní, J., Vigo, W. E., & Rosas-Aguirre, Á. M. (2016). Factores asociados con la anemia en niños menores de tres años en Perú: análisis de la Encuesta Demográfica y de Salud Familiar, 2007-2013. Biomédica, 36(2), 220-229.
	Low socioeconomic status	+	
	Teenage mother	+	
	Mothers having incomplete primary education or less	+	
	Age less than 24 months	+	
	Lack of prenatal control and treatment against anemia during the pregnancy	+	
	Home birth	+	
	Maternal anemia	+	
	Absence of antiparasitic treatment in the minor	+	
	Age	-	Accinelli, R. A., & Leon-Abarca, J. A. (2020). Age and altitude of residence determine anemia prevalence in Peruvian 6 to 35 months old children. PloS one, 15(1), e0226846.
	Altitude	-	
Quality of education	Recognized as indigenous	-	Arteaga, I., & Glewwe, P. (2019). Do community factors matter? An analysis of the achievement gap between indigenous and non-indigenous children in Peru. International Journal of Educational Development, 65, 80-91.
	Father's education: years of study	+	

Indicator	Key determinants	Sign	Academic references
	Mother's education: years of study	+	
	Early childhood nutrition: child's height-for-age z-score	+	
	Parent's literacy: Parents have some tertiary education	+	Hernandez-Zavala, M., Patrinos, H. A., & Sakellariou, C. (2006). Quality of schooling and quality of schools for indigenous students in Guatemala, Mexico, and Peru (Vol. 3982). World Bank Publications.
	Teacher experience	+	
	Pupil per teacher ratio	+	
	Access to private school	+	
	Poor classroom conditions	-	
	Living in rural areas	-	
	Highest level of schooling between the care takers	+	León, G., & Valdivia, M. (2015). Inequality in school resources and academic achievement: Evidence from Peru. International Journal of Educational Development, 40, 71-84.
	Percentage teachers in the school who have completed a university degree	+	
	Number of operative computers in the school, divided by the number of students enrolled (*1000 for scaling).	+	
	Number of operative libraries in the school, divided by the number of students enrolled (*1000 for scaling purposes).	+	
Wages	Increase in the supply of skilled workers	-	Lustig, N., Lopez-Calva, L. F., Ortiz-Juarez, E., & Monga, C. (2016). Deconstructing the decline in inequality in Latin America (pp. 212-247). Palgrave Macmillan UK.
	Quality of higher education	+	Castro, J., & Yamada, G. (2012). "Convexification" and "Deconvexification" of the Peruvian Wage Profile: A Tale of Declining Education Quality.
	Education level	+	Céspedes, N., Lavado, P., & Ramírez Rondán, N. (2016). Productividad en el Perú: medición, determinantes e implicancias. Universidad del Pacífico.
	Age	+	
	Sex	+	

Indicator	Key determinants	Sign	Academic references
	Years of labor experience	+	Zambrano-Monserrate, M. A., & Sanchez-Loor, D. A. (2015). Factores determinantes del salario del sector privado en el Ecuador para el año 2014: Un caso de estudio en la ciudad de Guayaquil. Cuadernos de Economía, 38(108), 139-151.
	Enterprise size	+	
	Education level	+	
	Years of education	+	Van der Gaag, J., & Vijverberg, W. (1988). A switching regression model for wage determinants in the public and private sectors of a developing country. The review of economics and statistics, 244-252.
	Complete education levels	+	
	Certificate of studies	+	
	Years of labor experience	+	
	Age	+	
	Non-wage labor costs	+	Loayza, N. (2008). Causas y consecuencias de la informalidad en el Perú. Revista Estudios Económicos, 15(3), 43-64.
	Average education level achieved by the adult population	-	
	Agriculture's contribution as a percentage of GDP	+	
	Percentage of rural population	+	
	Percentage of young population	+	
Informality	Sex	-	Tomaselli, A. (2021). Determinantes departamentales y estimación del riesgo distrital del trabajo informal en el Perú.
	Age	-	
	Age squared	+	
	Years of study	-	
	Percentage of independent workers	+	
	Employees	+/-	
	Rate of workers in the transportation sector	+	
	Rate of workers in the manufacturing sector	+/-	
	Rate of workers in the construction sector	+	
	Rate of workers in the hotel sector	+	
	Rate of workers in commerce	+/-	

Indicator	Key determinants	Sign	Academic references
	increase in the employment allocation in traditionally "informal" sectors (retail trade and transport)	+	Chong, A., Galdo, J., & Saavedra-Chanduví, J. (2007). Informality and productivity in the labor market: Peru 1986-2001.
	Increase in non-wage labor costs	+	
	Labor productivity	-	