

Ensuring an Equal Start for All Pakistani Children

What Will It Cost?

Abdullah Alam

Amer Hasan

Elizabeth Hentschel



WORLD BANK GROUP

Education Global Practice

May 2024



Reproducible Research Repository

A verified reproducibility package for this paper is available at <http://reproducibility.worldbank.org>, click **here** for direct access.

Abstract

Quality early childhood education improves childhood development outcomes and has long-term implications for school readiness, workforce participation, and economic growth. Despite this, in Pakistan, the net enrollment rate of children ages 3 to 5 in early childhood education was only 31 percent in 2022. This paper estimates the cost of expanding access to early childhood education using an adapted version of the early childhood education Accelerator Costing and Simulation model. Using available administrative data, the paper presents cost estimates for three packages: (i) a business-as-usual package, (ii) a core service delivery package, and (iii) an augmented service delivery package. It considers how these costs might vary using alternate

delivery mechanisms, such as community construction and vouchers. To ensure 100 percent net enrollment in early childhood education by 2035, Pakistan must increase the amount of the education budget spent on early childhood education from the existing allocation of 5.3 percent to 10.4 percent by 2035. This means increasing the early childhood education budget from PKR 71 billion (US\$0.3 billion) in 2022 to PKR 418 billion (US\$1.85 billion) in 2035, suggesting an average annual increase of 14 percent. Using alternate delivery mechanisms, such as community construction and vouchers, the required budget can be reduced to PKR 311 billion (US\$1.37 billion) in 2035.

This paper is a product of the Education Global Practice. It is part of a larger effort by the World Bank to provide open access to its research and make a contribution to development policy discussions around the world. Policy Research Working Papers are also posted on the Web at <http://www.worldbank.org/prwp>. The authors may be contacted at ahasan1@worldbank.org. A verified reproducibility package for this paper is available at <http://reproducibility.worldbank.org>, click [here](#) for direct access.



The Policy Research Working Paper Series disseminates the findings of work in progress to encourage the exchange of ideas about development issues. An objective of the series is to get the findings out quickly, even if the presentations are less than fully polished. The papers carry the names of the authors and should be cited accordingly. The findings, interpretations, and conclusions expressed in this paper are entirely those of the authors. They do not necessarily represent the views of the International Bank for Reconstruction and Development/World Bank and its affiliated organizations, or those of the Executive Directors of the World Bank or the governments they represent.

Ensuring an Equal Start for All Pakistani Children: What Will It Cost?

Abdullah Alam[♦]
Amer Hasan^{*}
Elizabeth Hentschel[•]

Keywords: early childhood education, Pakistan, cost of universal access

JEL Classifications: H52, I10

[♦] Aflatoun International and Education Global Practice, South Asia Region, World Bank.

^{*} Education Global Practice, South Asia Region, World Bank.

[•] Harvard T.H. Chan School of Public Health and Education Global Practice, South Asia Region, World Bank.

Introduction

Approximately 20 million school-aged children in Pakistan did not attend school in 2021 (Pak Alliance for Maths and Science, 2021). Learning poverty in Pakistan is also extremely high, estimated to be 78 percent for 10-year-old children (World Bank, processed). Low participation in pre-primary education has major implications for human capital development, productivity, and skill acquisition (Holla et al., 2021). Research suggests that the availability of quality education in the early years could be one pathway for countries to achieve SDG-4 targets and tackle challenges such as poor access to education, retention in school, and marginalization (Rad et al., 2022). However, the net enrollment rate of children aged 3-5 in early childhood education (ECE) was only 31 percent in 2022 in Pakistan (Tomlinson et al., 2023) – far short of the SDG 4.2 target of universal access to quality pre-primary education. If Pakistan fails to close the universal ECE coverage gap, each consecutive cohort remaining at the present enrollment rate will cost Pakistan 3.4 percent of its GDP (Tomlinson et al., 2023).

Data limitations do not allow realistic planning and decision-making for the ECE sub-sector in Pakistan’s education system. There are currently no mechanisms in place to record the budgetary allocations and spending on ECE in federal or provincial budgets. Pre-primary and primary education budgets are combined into one budget and cannot be disaggregated.

Cognizant of the cost of inaction, Pakistan is committed to expanding ECE services for all children. To do so, it is imperative to have a robust strategic plan in place that relies on a realistic understanding of the existing investments in pre-primary education and scenarios for additional investments in the upcoming years.

Despite the gaps in existing data, there are mechanisms through which this information gap can be filled in the short to medium term until such systems are developed and implemented. This paper is one attempt to fill this information gap. It presents a simulation exercise using an adapted version of the ECE Accelerator Costing and Simulation Model¹ to outline the ECE costs, financing gap, and human resources and infrastructure needed to achieve government goals and SDG 4.2 targets. The aim is to facilitate evidence-based planning and decision-making for the ECE subsector in the upcoming years. The model also considers alternative scenarios for meeting targets by 2035. The discussion section considers system capacities and additional support mechanisms required for these endeavors.

This paper draws on administrative data sources, the population census, and publicly available data on government spending to consider what a core package of ECE services might cost in Pakistan. It considers goals such as those articulated in SDG 4.2 as well as prospective goals being considered by the government.² This paper presents cost estimates for three packages: (i) a business-as-usual package, (ii) a core service delivery package, and (iii) an augmented service delivery package. Various approaches to service delivery are costed including community construction and vouchers.

¹ The development of this tool was supported by UNICEF in collaboration with others. The original tool is available at <https://www.ece-accelerator.org/resources/early-childhood-accelerator-simulation-model>.

² The analyses presented in this paper were motivated by a government request to understand the costs of expanding ECE provision across Pakistan.

Cost of Inaction

Improving human capital development in Pakistan by improving ECE attendance and the quality of ECE provided has immediate costs and long-term benefits. In 2022, Pakistan’s Human Capital Review calculated the cost of inaction of failing to invest in ECE (Tomlinson et al., 2023). The cost society pays for failing to implement such an intervention was estimated for three scenarios in Pakistan.³ Low coverage was estimated by equalizing enrollment rates between households in the highest income quintile and those in the other quintiles to achieve 27.2 percent enrollment across income levels (based on the Pakistan Social and Living Standards Measurement Survey 2019-20 enrollment rates for children in the highest income quintile). Medium coverage was estimated using the enrollment rate of a regional peer, Nepal, at 61.9 percent, and full coverage was estimated as achieving one year of universal ECE enrollment, meeting Pakistan’s commitment to SDG 4.2 and 2009 National Education Policy objectives.

Continuing coverage at present levels and not raising coverage levels would be expensive. The cost of inaction would be 0.34 percent of GDP for the low-coverage scenario (failing to boost enrollment to 27.2 percent of all 3- to 5-year-olds in preprimary school), 1.79 percent of GDP for the medium-coverage scenario (failing to enroll 61.9 percent of 3- to 5-year-olds), and 3.39 percent of GDP for the full-coverage scenario. The cost of inaction on medium coverage is conservatively estimated at US\$ 4.7 billion for each cohort that fails to receive medium coverage. The cost of failing to invest in ECE is high. As such, the next step is understanding the upfront costs of investment in ECE.

Evidence from Other Countries

Costing and simulation models are fairly common in education sector planning. However, because of data availability and consolidation challenges, ECE is often not included as its own education level. In most cases, ECE is grouped together with primary education. However, there are examples of countries that have been able to achieve significant milestones through better planning and budgeting. For example, Uzbekistan developed dedicated strategies and costing simulations for preschool education as part of its Education Sector Plan 2019-2023 (Government of Uzbekistan, 2019). The preschool enrollment rates increased from less than 30 percent in 2017 to 69 percent in 2022 (Ministry of Preschool Education, Uzbekistan & UNICEF, 2022). In addition, more than 12,000 non-state family preschools were established between 2018 and 2021 using public-private partnership models.

Given the need to estimate ECE costs, a variety of different ECE costing and simulation modeling tools have been developed and utilized in various periods and contexts. Some well-known tools

³ The approach used a benefit–cost ratio from Engle et al. (2011), data on the population aged 3–5-years from the 2020 Pakistan Census, government expenditure per primary student from World Bank (2015), and GDP from World Bank (2020). The benefit–cost ratio was estimated at a conservative 6.4:1 and a discount rate of 6 percent was applied based on a study modeling the impact of increased ECE attendance on school attainment and subsequent wage changes in 73 low- and middle-income countries (LMICs) (Engle et al., 2011).

include the UNICEF WCARO tool,⁴ CARICOM costing model,⁵ Estimator Cost Analysis Tool,⁶ Brookings Childhood Cost Calculator,⁷ ILO Care Policy Investment Simulator,⁸ and UNESCO's SDG 4.2 costing model.⁹ For the case of Pakistan, UNICEF's ECE Accelerator Costing and Simulation Model was preferred over other available models because it is open source, easy to adapt, and allows the planners and decision-makers to use the model iteratively.

The ECE accelerator simulation model was developed in 2021. Governments have been using the tool for ECE sub-sector planning. For example, Lesotho used the results of the simulation exercise to undertake focused advocacy with the government and public representatives to increase funding for ECE. The resulting analysis suggested that universal expansion would not be feasible given available resources. The government instead opted to support the expansion of one year of ECE. The costing exercise also resulted in leveraging additional funding from development partners for ECE.

Data and Methods

The approach

This paper analyzes data from the Pakistan Bureau of Statistics (2017 Census)¹⁰ and the provincial Education Management Information Systems¹¹ on the population size, enrollment rates, and achievement rates (dropout and retention rates) in ECE. Data on existing infrastructure, human resources, ECE and education financing, and unit rates for key inputs such as teachers and basic ECE supplies were also collected from each provincial government. These inputs were categorized under 3 heads: salary, non-salary (such as payment of electricity bills), and development (such as construction of classrooms). Policy options and targets for ECE were then defined based on best practices and in line with national and provincial policies and implied service standards. Enrollment estimates from the PSLM were updated. Using data on population growth and enrollment in public and private ECE we use an estimated enrollment rate of 31% for all scenarios in this paper. Enrollment rates were then projected for 2023-2035 using the population projections contained in the most recent published census files.¹² Infrastructure and human resource

⁴<https://www.ece-accelerator.org/resources/unicef-west-and-central-africas-regional-prototype-supporting-cost-effective-policy-development-early-childhood-development>

⁵ <https://www.humanitarianlibrary.org/sites/default/files/2014/02/ECD-CoNo30-rev.pdf>

⁶ <https://www.costtoolkit.org/>

⁷ <https://www.brookings.edu/articles/the-childhood-cost-calculator-c3/>

⁸ <https://www.ilo.org/globalcare/?language=en#simulator>

⁹ https://bangkok.unesco.org/sites/default/files/assets/article/Early%20Childhood%20Care%20and%20Education/file/Costing%20and%20Financing%20SDG%204.2%20Webinar/2.1_Kristy%20Bang.pdf

¹⁰ <https://www.pbs.gov.pk/content/final-results-census-2017>

¹¹ <http://www.emis.gob.pk/>; <https://semis.rsu-sindh.gov.pk/>; <https://open.punjab.gov.pk/schools/>; https://ese.kp.gov.pk/page/education_management_information_system_emis; <http://hrmis.fde.gov.pk/>;

¹² The rates used for each province are available online at <https://www.pbs.gov.pk/content/final-results-census-2017-0>, Table 1. These are 2.4 for Pakistan overall, 2.13 percent for Punjab, 2.89 percent for KP, 2.41 for Sindh, and 3.37 for Balochistan. While newer population growth rates are available from the 2023 census, age-wise population estimates are not yet published. Hence these newer growth rates were not used.

requirements were based on prevailing policies and service standards in each province.¹³ An example of the calculations undertaken for enrollment is presented below.

$$\text{Preprimary Year 1 Enrolment}_{2024} = \text{Preprimary Year 1 Enrolment}_{2023} * (1 + m\%)$$

m = assumed increase in enrolment required to meet targets in each scenario

$$\text{Preprimary Year 1 Enrolment}_{2025} = \text{Preprimary Year 1 Enrolment}_{2024} * (1 - n\%)$$

n = assumed dropout rate between preprimary year 1 and year 2

The dropout rate is the difference between the enrollment in pre-primary year 1 (2022) and year 2 (2023) taken as a proportion of pre-primary year 1 (2022) enrollment.

Using unit rates, the costs for ECE provision were calculated for the 2023-2035 period, incorporating inflation – which was assumed to be 5 percent per year over this period (except for salaries for which a 10 percent inflation was assumed). The costs were disaggregated by salary, non-salary, and development heads. The required financing for ECE and additional investments needed were then calculated as follows:

$$\text{Cost}_{\text{year}} = \sum \text{Salary Expenses}_{\text{year}} + \sum \text{Non - Salary Expenses}_{\text{year}} + \sum \text{Development Expenses}_{\text{year}}$$

An illustrative calculation

The model presents various policy scenarios from a planning, decision-making, and investment perspective. An illustrative calculation using this approach is presented below.

- Balochistan has a baseline (2022) population of 1.4 million boys and 1.3 million girls in the 0-5 age group. The enrollment at the pre-primary level includes 156,011 boys and 104,809 girls (including the public and private sectors), with a net enrollment of 19 percent at the pre-primary level. The government allocated PKR 4.5 billion (US\$ 0.02 billion) for ECE, which is 4 percent of the education budget allocation for 2022.¹⁴
- Policy decisions in Balochistan suggest that schools must have a Student-Classroom Ratio of 40:1 and a Student-Teacher Ratio of 30:1. Given existing enrollments, classrooms and teachers – there is a shortfall of both rooms and teachers in Balochistan.
- The model estimates the cost of addressing the current gap of teachers and classrooms in the next twelve years as well as of achieving 62 percent enrollment by 2035. This requires a total enrollment of 871,253. To deliver quality ECE in public schools and to comply with existing service standards, 16,248 additional teachers will need to be hired in the next 12 years. The model assumes these salaries grow with a 10 percent inflation rate. The current average annual salary of teachers in the system is estimated to be PKR 384,000 (US\$ 1,696).

¹³ For instance, a student to classroom ratio of 40:1 was used.

¹⁴ For the purposes of estimates reported in this paper, the ready exchange rate of the State Bank of Pakistan as of December 30, 2022 is used. This was PKR 226.4 to USD 1.

- Likewise, to ensure these students are not enrolled in overcrowded rooms – an additional 22,358 rooms will be needed over the next 12 years.
- To provide an augmented service delivery package (enhanced infrastructure, improving quality of service delivery, providing school meals, etc.), the current budget for ECE in Balochistan must be increased from PKR 4.5 billion (US\$ 0.02 billion) to PKR 28.5 billion (US\$ 0.13 billion) by 2035. This corresponds to an annual increase of 14 percent on average.¹⁵
 - If alternate delivery mechanisms (community construction and vouchers) are used, the budget requirement by 2035 will be substantially reduced to PKR 19.4 billion (US\$ 0.09 billion), with an annual increase of 11 percent on average.

The simulation modeling relied heavily on data availability, which varied from province to province. Due to data limitations, several assumptions are made throughout data consolidation and analysis. Population, public enrollment, and unit rates are largely available for the exercise. However, data on human resources and infrastructure was unavailable at the pre-primary level. The figures were, however, available at the primary level. We assume that if a primary school has six classrooms and six teachers, one of them should be for the pre-primary level. So, the total number of teachers at primary level was divided by six to calculate the pre-primary level figures. Similar assumptions were used for baseline education financing data.

The baseline enrollment in private schools was estimated based on private to public enrollment at the pre-primary level ratio using the latest available Pakistan Education Statistics Report 2020-21 (Pakistan Institute of Education, 2022). The data on teacher training was also not available. It was assumed that public school ECE teachers are currently untrained in ECE teaching and must undergo extensive training. Table 1 provides an overview of the baseline data used for simulation modeling.

¹⁵ These calculations assume that the baseline year is 2022. Estimated figures are projected up to 2035 – resulting in 14 periods. The compounding formula used in this case is $((28.5/4.5)^{(1/14)})-1$.

Table 1: Baseline data used for simulation modeling, 2022

Province	Population (3-5y) millions	Public Enrollment (3-5y)	Private Enrollment (3-5y)	ECE Classrooms	ECE Teachers	Classroom Construction Cost Millions, PKR	New Teacher Salary (annual) Millions, PKR	WASH Facility Provision Millions, PKR
Balochistan	1.36	185,814	66,766	1,430	2,025	3.1	0.3	0.7
Islamabad Capital Territory	0.15	11,241	79,615	174	298	3	0.42	0.8
Khyber Pakhtunkhwa	3.54	693,349	453,363	2,216	2,216	3	0.46	0.21
Punjab	9.1	796,756	1,776,028	19,895	18,560	3	0.54	0.6
Sindh	4.57	822,675	822,675	6,264	16,784	2.5	0.42	1.6

Notes: Public enrollment statistics are from the Annual School Census of each province. Private enrollment statistics are computed based on the share of the population that reports being enrolled in a private school. The number of ECE teachers and classrooms is estimated based on the figures reported for the primary level in each province's Annual School Census. The cost of classroom construction, teacher salary and the cost of providing a WASH facility are provided by provincial education departments. A WASH facility is comprised of one enclosed flush toilet and one sink connected to piped water.

Costing Scenarios

To build and sustain a well-functioning ECE system in Pakistan, financing support across actors will be needed. It is, therefore, essential to consider costs from multiple angles, including donor support, public financing, the role of civil society organizations, leveraging private sector contributions, and exploration of innovative multisectoral approaches that will maximize investments in the ECE sub-sector. A preliminary examination of the costs of continuing business-as-usual and undertaking a realistically ambitious financing approach for ECE in Pakistan follows.

The paper presents costs for three packages of service delivery: a business-as-usual package, a core package, and an augmented package. It also presents costs for alternate delivery mechanisms that do not solely rely on the public sector. The business-as-usual approach means that provincial governments follow existing budgetary trends for ECE and allocate ECE budgets in the future based on them. This is without routing any significant additional resources for the sub-sector. It does, however, rely on construction of additional classrooms using existing approaches.

The core package focuses on using existing ECE facilities to the maximum – thereby minimizing additional construction.¹⁶ This package assumes no additional investments into infrastructure.

The augmented service delivery package includes services that are not currently offered to ensure quality ECE delivery in the provinces. For example, capacity building of ECE human resources and providing school meals to a subset of children (on the basis of need) have been included in the simulation models. These are in addition to constructing additional classrooms and providing additional human resources for the ECE sub-sector.

The alternate delivery approach introduces cost-effective service delivery mechanisms that can also deliver quality ECE. For this paper, we consider providing education vouchers to parents for enrolling their children in private schools and community construction as alternate modalities.¹⁷

Results

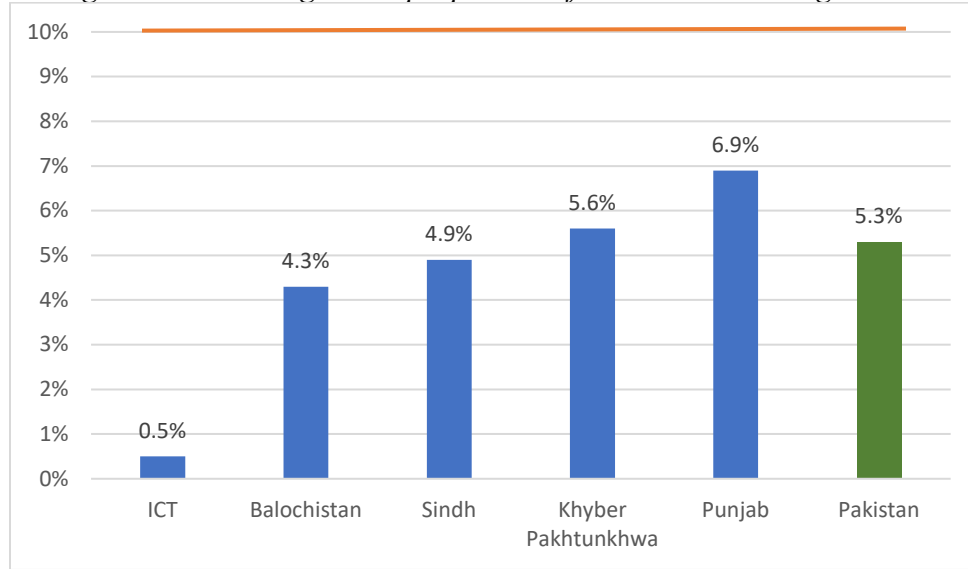
The simulation exercise was undertaken for the four provinces of Pakistan and the Islamabad Capital Territory (ICT). The results are presented below at the provincial and ICT levels, and then aggregated at the country level. The costs are calculated using two criteria: a) provinces reaching 62 percent net enrollment in ECE (medium coverage) and b) 100 percent net enrollment in ECE (full coverage).

In 2022, Pakistan earmarked a budget of PKR 70.64 billion (US\$ 0.31 billion) for ECE out of the total education budget of PKR 1,345 billion (US\$ 5.94 billion). The allocation for ECE equals 5.3 percent of the total education budget for the year. While there are efforts underway to ensure that governments allocate at least 10 percent of the education budget to ECE (UNICEF, Education Commission & LEGO Foundation, 2022), in reality, few countries achieve this threshold. The allocations for ECE in Pakistan are well below this global benchmark (Figure 1).

¹⁶ For example, no new classrooms are constructed during the simulation period and existing classrooms are used to accommodate new enrollment. This could be through double shift schools as one example.

¹⁷ There are various other alternate modalities possible.

Figure 1: ECE budget as a proportion of the education budget, 2022



A provincial analysis highlights that none of the provinces currently achieve this benchmark target. As per the figure above, in 2022 Punjab spent the highest portion of its education budget on ECE (6.9 percent), followed by Khyber Pakhtunkhwa (5.6 percent), Sindh (4.9 percent), Balochistan (4.3 percent), and ICT (0.5 percent).

Business as Usual

The business-as-usual approach means that the provinces allocated ECE budgets per the ongoing trends in previous years. This is without routing any significant additional resources for the sub-sector. This approach also sets a baseline for our analyses to see what the additional investments will look like if the government opts to deliver only a core package, an augmented package, or if it chooses to deploy alternate service delivery mechanisms. Table 2 outlines the budgetary projections for ECE at the provincial levels for a business-as-usual approach which would result in a net enrollment rate of 43 percent in ECE by 2035; an increase of 12 percent points compared to the current ECE net enrollment rate of 31 percent.

As an illustration, based on ECE budget trends in the last five years, Khyber Pakhtunkhwa is expected to demonstrate the highest average annual percentage increase (13 percent) in the ECE budget. In 2035, it will also be the province with the highest allocation for ECE in absolute terms. The remaining three provinces and ICT are projected to increase their ECE budgets by 5-7 percent annually. Overall – across Pakistan, using a business-as-usual approach, the ECE budget will rise from PKR 71 billion (US\$ 0.3 billion) in 2022 to PKR 217 billion (US\$ 0.96 billion), representing an increase of 8 percent annually.

Table 2: ECE budget projections for a business-as-usual approach, billions of PKR

Province	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	Average Annual Inc %
Balochistan	4.5	4.7	5.0	5.3	5.6	6.0	6.3	6.7	7.1	7.5	8.0	8.4	8.9	9.5	6%
Islamabad Capital Territory	0.6	0.7	0.7	0.8	0.9	0.9	1.0	1.1	1.1	1.2	1.3	1.4	1.6	1.7	7%
Khyber Pakhtunkhwa	15.5	17.7	20.2	23.2	26.5	30.3	34.7	39.8	45.6	52.3	60.0	68.8	79.0	90.7	13%
Punjab	33.8	36.2	38.8	41.5	44.4	47.5	50.9	54.5	58.3	62.4	66.8	71.5	76.6	82.0	7%
Sindh	16.3	17.2	18.1	19.1	20.2	21.3	22.5	23.7	25.0	26.4	27.9	29.4	31.1	32.8	5%
Pakistan	70.6	76.5	82.8	89.8	97.5	106.0	115.4	125.7	137.1	149.9	164.0	179.6	197.1	216.6	8%

Notes: A business-as-usual package assumes that the provinces allocate ECE budgets per the ongoing trends in previous years without significant additional investments for the sub-sector.

Core Package

Considering resource limitations, it is also essential to consider the scenario where the existing facilities are utilized to the maximum. This means no additional investments in infrastructure. Table 3 shows the budget projections for achieving 62 percent net enrollment in ECE.

To achieve the medium coverage of 62 percent net enrollment in ECE through a core package of services, Pakistan must increase its ECE budget by 9 percent on average annually. In aggregate terms, if this percentage increase is maintained, the budget for ECE will increase from PKR 71 billion (US\$ 0.3 billion) in 2022 to PKR 237 billion (US\$ 1.05 billion) in 2035. Khyber Pakhtunkhwa needs the highest annual growth of 14 percent to achieve the target of 62 percent net enrollment. Sindh, Balochistan, and Punjab follow Khyber Pakhtunkhwa with an 7 percent yearly increase. ICT must enhance its ECE budget by 7 percent annually.

To achieve universal enrollment in ECE (full coverage) by 2035 and provide a core package of ECE services means an annual increase of 10 percent in the ECE budget. Using this annual increase, the budget earmarked for ECE will grow from PKR 71 billion (US\$ 0.3 billion) to PKR 261 billion (US\$ 1.15 billion) in 2035. Khyber Pakhtunkhwa will need the highest increase of 14 percent, while ICT, Sindh, and Punjab need a yearly increase of 8 percent on average. Balochistan has to enhance its ECE budget by 9 percent annually to achieve universal enrollment at the pre-primary level. Table 4 shows the budgets needed to achieve a universal enrollment scenario by providing core ECE services.

以上内容仅为本文档的试下载部分，为可阅读页数的一半内容。如要下载或阅读全文，请访问：<https://d.book118.com/828051002020006072>