



NATIONAL AND PROVINCIAL LEVEL POPULATION PROJECTIONS (2023-2050)

NATIONAL INSTITUTE OF POPULATION STUDIES, TRAINING AND RESEARCH

M/o National Health, Services, Regulations and Coordination

Contents

ACRONYMS/ABBREVIATIONS.....	iii
FOREWORD	iv
PREFACE.....	vi
ACKNOWLEDGEMENT	viii
SUMMARY	ix
INTRODUCTION	1
1.1 Background.....	1
1.2 Objectives.....	2
1.3 Data Sources and Data Quality Assessment.....	2
1.4 Methodology.....	4
1.4.1 Smoothing of age-sex Data.....	4
1.4.2 Fertility.....	4
1.5 Scenario Development.....	4
1.6 Assumption of Input Data.....	5
1.6.1 Base Year Population.....	5
1.6.2 Fertility: Total Fertility Rates (TFR)	5
1.6.3 Mortality	7
1.6.4 Migration	8
NATIONAL AND PROVINCIAL LEVEL POPULATION PROJECTIONS	10
2.1 Population Size	10
2.2 Comparison with other sources.....	12
2.3 Mortality Indicators for National and Provinces and ICT	13
2.3.1 Pakistan.....	13
2.3.2 Punjab	13
2.3.3 Sindh	14
2.3.4 Khyber Pakhtunkhwa.....	14
2.3.5 Balochistan.....	14
2.4 Vital Rates.....	15
2.4.1 Slow Decline in Fertility.....	15

2.4.2	Rapid Decline in Fertility.....	16
2.4.3	Family Planning Based Decline in Fertility.....	18
2.5	Migration	19
	ANNEXURE.....	21
	TECHNICAL NOTE	28
	REFERENCES	30

ACRONYMS/ABBREVIATIONS

TFR	Total Fertility Rate
ICT	Islamabad Capital Territory
TWG	Technical Working Group
MICS	Multiple Indicator Cluster Surveys
PDHS	Pakistan Demographic Health Survey
ASFR	Age-Specific Fertility Rate
CBR	Crude Birth Rate
CDR	Crude Death Rate
GFR	General Fertility Rate
IMR	Infant Mortality Rate
U5MR	Under 5 mortality Rate

FOREWORD

Accurate and timely population projections is an indispensable tool for evidence-based policy formulation, programme planning, and resource allocation. They allow decision-makers to anticipate future demographic shifts and ensure that investments in critical sectors such as education, health, employment, and infrastructure are aligned with emerging needs. As Pakistan continues to experience dynamic population changes, projections grounded in the latest data have become even more crucial for national and sub-national planning processes. This report presents the Population Projections at national and provincial level based on the most recent 2023 Population and Housing Census, offering robust estimates disaggregated by age, sex, and region from 2023 up to the year 2050.

Special appreciation is also due to the Technical Working Group (TWG) and subgroup of national level experts formulated to undertake this exercise of national importance on Population Projections, constituted under the guidance of the National Institute of Population Studies, Training and Research (NIPST&R) with the Ministry of Planning, Development and Special Initiatives as co-chair. TWG brought together distinguished demographers, statisticians, and policy experts, whose tireless efforts, technical expertise, and collaborative spirit were critical in reviewing existing methodologies, finalizing key assumptions, and achieving consensus on the projection outcomes. Their contributions have significantly enhanced the scientific rigor and credibility of the projections.

I would like to extend my sincere gratitude to the Ministry of Planning, Development and Special Initiatives (PD&SI) for their continued leadership and support in steering this important national exercise. The Ministry's unwavering commitment to data-driven development planning has been instrumental in ensuring the successful completion of this projections report.

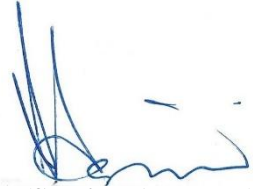
The role of the Pakistan Bureau of Statistics (PBS) deserves recognition for their successful completion of the 2023 Census. The availability of reliable and disaggregated data has served as a solid foundation for this round of projections.

I would like to commend *Ms. Rabia Zafar*, Director NIPST&R, for her leadership and strong coordination throughout the exercise. Her guidance, oversight, and continuous engagement played a pivotal role in ensuring the quality and timely delivery of this report.

I would also like to acknowledge the valuable support extended by the United Nations Population Fund (UNFPA) throughout this exercise. UNFPA's technical and financial collaboration has remained vital in strengthening the institutional and analytical capacities of NIPST&R. We are especially grateful to *Dr. Luay Shabaneh*, UNFPA Country Representative, for his contribution and continued support to strengthen the entire process of the population projection exercise. A special note of thanks is extended to *Mr. Muqaddar Shah*, Programme Analyst, Population and Development, UNFPA, for his technical guidance that made this exercise possible. UNFPA's continued support and longstanding partnership with NIPST&R are deeply appreciated.

This report represents a collective achievement, and we are confident that it will serve as a key resource for policymakers, researchers, development partners, and stakeholders across sectors to inform and guide Pakistan's journey toward sustainable development.

(Awais Manzur Sumra)
Secretary, M/o PD&SI



(Samina A. Hasan)
Executive Director, NIPST&R

PREFACE

Population dynamics are among the most decisive determinants of Pakistan’s development trajectory. They shape the demand for public services, influence economic growth potential, and define the country’s ability to achieve sustainable and inclusive development. In a rapidly changing context marked by urbanization, climate vulnerability, technological transformation, and evolving labour markets, policy decisions must be informed by robust demographic intelligence to be effective and forward-looking.

This report presents national and provincial population projections for 2023–2050, developed through a collaborative national effort with technical support from UNFPA. By integrating fertility, mortality, and internal migration trends, and grounding assumptions in the latest evidence from the 2023 Digital Census, it provides a comprehensive, harmonized, and scientifically rigorous demographic outlook. Beyond raw projections, the report generates actionable demographic intelligence, offering insights into the age structure, regional variations, and potential socio-economic implications of population change.

The projections underscore the dual challenge and opportunity of Pakistan’s demographic transition. The country’s population is expected to grow substantially over the next three decades, presenting heightened demands on health systems, education, infrastructure, employment, and social protection. At the same time, the rapid expansion of the working-age population represents a strategic window to harness a demographic dividend. Converting this potential into sustainable growth requires deliberate, evidence-based policies, investments in education, skills development, health, and employment, especially for youth and women.

Demographic intelligence derived from these projections provides policymakers with critical foresight. By understanding provincial and district-level variations, governments can target resources more effectively, design policies that address local realities, and monitor the implications of fertility, mortality, and migration trends over time. Such intelligence is vital for aligning population policies with broader national priorities, including economic planning, climate adaptation, urban development, and social protection.

Fertility transitions remain a key lever of Pakistan’s demographic future. Accelerating progress toward replacement-level fertility through voluntary, rights-based family planning, reproductive health services, and the empowerment of women and girls will directly shape population growth, labour force composition, and development outcomes. Simultaneously, the anticipated ageing of the population underscores the need for forward-looking policies in health care, social protection, and inclusive labour markets.

Importantly, demographic change is uneven across provinces and districts. This report’s subnational focus highlights these disparities and reinforces the need for decentralized, data-driven planning. Strengthening institutional capacity to use demographic intelligence at all levels of government will be essential to ensuring that policies are equitable, responsive, and effective.

While population projections are inherently uncertain, they remain indispensable for strategic planning. By presenting alternative scenarios, this report equips policymakers with the insights

needed to anticipate challenges, evaluate trade-offs, and design adaptive strategies in an uncertain and rapidly evolving environment.

UNFPA remains committed to supporting the Government of Pakistan in integrating demographic intelligence into national development planning. Strengthening data systems, building institutional capacities, and embedding evidence-based demographic analysis into policy design are central to translating population trends into sustainable, inclusive, and resilient development outcomes.

The choices made today, guided by rigorous demographic intelligence, will determine Pakistan's development trajectory for generations. By placing population at the center of strategic planning and investing decisively in human capital, the country can transform demographic change into a powerful driver of prosperity, equity, and resilience.

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Dr. Luay Shabaneh
Country Representative, UNFPA

ACKNOWLEDGEMENT

The successful completion of the 2024–25 Population Projections marks a significant milestone in Pakistan’s demographic planning landscape. This achievement is the result of a deeply collaborative and consultative effort, involving experts, institutions, and partners committed to data-driven policymaking. The National Institute of Population Studies, Training and Research (NIPST&R) expresses its profound appreciation to all those who contributed their time, expertise, and insights throughout this important national exercise.

NIPST&R would especially like to recognize the pivotal role of the Sub-Committee of the Technical Working Group (TWG) on Population Projections. This Sub-Committee served as the intellectual backbone of the entire process, reviewing technical inputs, debating assumptions, and guiding the methodology with scholarly rigor and professionalism. Our sincere thanks go to Dr. G. M. Arif, the esteemed Chairman of the Sub-Committee and an expert of the field, whose leadership, experience, and guidance shaped the trajectory of this exercise. We are also grateful to Dr. Mehtab S. Karim, whose contributions greatly enriched the deliberations. Special thanks are due to Dr. Tauseef Ahmed, Dr. Dure Nayab, and Dr. Saima Bashir, all of whom brought deep knowledge, dedication, and critical insights to the process. Dr. Dure Nayab’s commitment and technical clarity stood out throughout the consultation phase, while Dr. Saima Bashir’s initiative in arranging dedicated meetings with an international expert further elevated the quality and robustness of the projections.

A special note of appreciation is extended to Mr. Hussain Ahmed, whose role was central to the entire projection exercise. He is being the lead technical expert for undertaking population projections, skillfully applied demographic methods and models using updated datasets from the 2023 Census. Mr. Hussain worked closely with the Sub-Committee throughout, attending all meetings, incorporating feedback, and addressing a wide range of technical queries and suggestions with patience, professionalism, and clarity. His responsiveness, attention to detail, and deep understanding of demographic techniques significantly contributed to the quality and reliability of the final outcomes.

Dr. Muhammad Mohsin Latif Kiani, from NIPST&R, efficiently coordinated the overall exercise, ensuring smooth communication and timely execution of all related tasks. His professionalism and support throughout the exercise is deeply appreciated.

NIPST&R are also pleased to acknowledge UNFPA’s Population and Development team, especially Ms. Farah Ashraf, Programme Management Analyst, who, as a member of the Sub-Committee, worked closely with NIPST&R and played a key role in overseeing and monitoring the overall exercise. Her consistent engagement and support ensured a smooth coordination mechanism between UNFPA and NIPST&R at every stage.

This collaborative effort reflects the best of institutional partnership and professional excellence. NIPST&R thanks all contributors for their valuable time and commitment.



(Rabia Zafar)

Director, NIPST&R

SUMMARY

This report provides national and provincial population projections for Pakistan for the period 2023–2050, generated using the Demographic Analysis and Population Projections System (DAPPS). Provincial-level projections are developed based on detailed assumptions and a harmonized methodology. These projections form the basis for subsequent district-level estimates, enabling a more localized and evidence-based approach to population planning.

Historically, Pakistan’s population projections have primarily relied on basic demographic assumptions, focusing on fertility and mortality. For the development of provincial projections, however, it is necessary to incorporate internal migration, drawing on data from the 7th Population and Housing Census 2023, also known as “The Digital Census.” Accordingly, these projections are structured around three principal demographic components:

1. **Fertility:** Two scenarios are developed:
 - **Slow Decline:** Based on historical trends from the Multiple Indicator Cluster Surveys (MICS) and the Pakistan Demographic and Health Survey (PDHS).
 - **Rapid Decline:** Assumes a sharper reduction in total fertility rate (TFR) by subtracting 0.5 children per woman from the 2050 target.
 - A third scenario, based on the Bongaarts model linking TFR to contraceptive prevalence rate (CPR), is excluded from the final projections but retained for analytical insight.
2. **Mortality:** Life expectancy and child survival trends are modeled using life tables derived from survey and census data, with consideration given to provincial disparities.
3. **Internal Migration:** Inter-provincial migration data from the 2023 Census are incorporated. Although net migration has a limited effect on provincial totals except in the Islamabad Capital Territory (ICT), where it is substantial it is included to ensure the accuracy of provincial projections.

These assumptions are based on past data and expert judgment, but like all projections, are subject to uncertainty. Limitations include potential undercounts in census data, estimation errors in fertility and mortality, and unpredictable external factors (e.g., policy shifts, economic conditions, pandemics, or climate events). Therefore, caution is advised when using these projections, especially for long-term planning.

The projections under both fertility scenarios Slow Decline and Rapid Decline reveal clear differences in future population size at the national and provincial levels. The table below presents a comparison of population estimates for 2023 and projected populations for 2050 under both scenarios:

Key Results: National and Provincial Projections			
Province	Base line Population (2023)	Projected Population Slow Decline (2050)	Projected Population Rapid Decline (2050)
Pakistan	241.5	389.9	371.9
Punjab	127.7	199.5	190.3
Sindh	55.7	91.1	86.9
KPK	40.8	67.6	64.5
Balochistan	14.9	25	23.9
ICT	2.4	6.5	6.2

These projections provide a robust foundation for evidence-based planning in health, education, infrastructure, employment, and social protection. The shifting age structure marked by a declining child population, increasing working-age population, and growing elderly segment demands responsive policies. As the next step, district-level projections will be developed to guide decentralized planning and support local governments in delivering targeted services aligned with demographic realities.

Key Highlights (2023–2050)

- Pakistan’s population is projected to increase from 241.5 million in 2023 to 389.9 million under the Slow Decline scenario and to 371.9 million under Rapid Decline.
- Crude Birth Rate (CBR) will fall from 28.3 (2023) to 16.8 (2050) (Slow Decline), and to 16.3 under Rapid Decline. Crude Death Rate (CDR) will rise slightly due to population aging.
- The number of children aged below 18 years is projected to rise from 117.9 million in 2023 to 139.7 million by 2050, while the working-age population (15–64 years) is expected to increase markedly from 135.2 million to 255.4 million. This faster expansion of the working-age population relative to dependents indicates a favourable age-structural shift, creating potential for a demographic dividend, contingent on adequate investments in education, health, and employment.
- The youth population aged 15–29 years is projected to increase from 62.95 million in the base year to 99.76 million by 2050, reflecting a substantial expansion of the young labour-force cohort.
- The elderly population (65+) will rise from 8.6 million to 22.6 million, signaling the need for investments in elder care and social protection.
- In the base year 2023, approximately 67% of Pakistan’s population (161.1 million) is below the age of 30. By 2050, although the absolute number of individuals under age 30 is projected to increase to 211.6 million, their relative share is expected to decline to 54% of the total population. This shift reflects a gradual aging of the population age structure, driven by declining fertility and improving survival, and indicates a transition from a predominantly youthful population toward a more matured age profile.

CHAPTER 1

INTRODUCTION

1.1 Background

Population projections are fundamental tools for anticipating future demographic patterns for evidence-based planning and decision-making at both national and regional levels. These projections estimate future population size and composition by age, sex, and geographic distribution based on assumptions regarding fertility, mortality, and migration. As such, they enable policymakers, planners, and development partners to assess future demand for essential resources and services, including food, water, energy, health, education, housing, employment, transport, and social protection.

In the case of Pakistan, the importance of accurate and timely population projections has become critical, particularly in the context of evolving demographic challenges and ongoing socio-economic transformation. The 2023 Population and Housing Census, conducted digitally for the first time by the Pakistan Bureau of Statistics (PBS), provides an updated and robust demographic baseline for projecting future population trends. The census captures key demographic and spatial dynamics reflecting current population realities, including population growth, age and sex composition, rapid urbanization, internal population redistribution, and the early stages of population ageing. These trends have important implications for policy formulation, service delivery, and sustainable development planning.

Population change is driven by three key demographic components: fertility, mortality, and migration. In developing countries like Pakistan, fertility plays a particularly significant role in shaping future population size and age structure. Persistently high fertility rates in recent decades have resulted in a youthful age profile, creating demographic momentum. This means that even if fertility falls to replacement level, population growth would continue for decades due to the large number of young people entering their reproductive years. This reality underscores the need for sustained investments in reproductive health services, family planning, and education and empowerment of women and girls to support a gradual and voluntary fertility transition.

Migration also significantly influences population dynamics. Internal migration particularly from rural to urban areas is reshaping the demographic and economic makeup of cities and provinces. Meanwhile, international migration, including labor migration to and from the Gulf and other regions, impacts labor supply, household composition, and remittance flows. Mortality trends, while improving due to advances in public health and medical care, continue to affect life expectancy and age composition, especially among infants and older populations.

While population projections are grounded in historical trends and expert judgments, they are inherently subject to uncertainty especially over extended time horizons. Unpredictable events such as pandemics, economic crises, natural disasters, policy reforms, and technological shifts can

significantly alter demographic behavior. The COVID-19 pandemic, for instance, illustrated how rapidly fertility and migration patterns can change in response to health emergencies and mobility restrictions. Therefore, this report presents not only a principal projection but also a set of variant projections, which explore alternative future scenarios based solely on varying fertility assumptions, while mortality and migration rates are held constant. These variants provide users with a broader understanding of possible demographic outcomes and promote more flexible and resilient planning.

This report aims to provide a scientifically robust, policy-relevant, and user-oriented projection framework to support Pakistan’s planning, programming, and monitoring processes. By offering a shared demographic outlook across sectors, it facilitates the coordination of strategies, efficient resource allocation, and the anticipation of future service demands. Ultimately, it supports the development of rights-based, evidence-informed, and gender-responsive strategies that uphold the well-being and dignity of all segments of the population.

1.2 Objectives

Population Projections are essential tools for anticipating demographic changes and enabling proactive, evidence-based decision-making across all sectors of society.

- The major objective is to project the population at national and province levels for a relatively longer period, 2023-2050, to understand the dynamics of population including:
 - Population Growth: changes in population size and growth rates overtime.
 - Spatial Distribution: population distribution across provinces
 - Age Structure: changes in the age structure of the population, including the youth bulge, working-age population, and elderly dependency ratio.
- Population projections will contribute to Policy Development such as:
 - Resource Allocation: Guiding decisions on allocating resources for education, healthcare, infrastructure, and social services, etc.
 - Economic Planning: Supporting economic development strategies by understanding the size and structure of the labor force and consumer markets.
 - Social Policy: Developing policies related to family planning, aging populations, and youth development.
 - Disaster Preparedness: Assessing the potential impact of population growth on disaster risk and planning for effective responses.

1.3 Data Sources and Data Quality Assessment

The Population and Housing Census 2023 is the primary source for the base-year, disaggregated by age and sex at the national and provincial levels.

Fertility data for the provinces are compiled from successive rounds of the Pakistan Demographic and Health Surveys (PDHS) and the Multiple Indicator Cluster Surveys (MICS). Initially, PDHS rounds (1990–91, 2006–07, 2012–13, and 2017–18) are reviewed to ensure comparability of national fertility trends. However, given that the second phase of the study involves district-level population projections, and MICS provides more recent and sub-nationally disaggregated estimates, provincial fertility levels are ultimately based on MICS-derived Total Fertility Rates (TFRs). Accordingly, province-specific MICS data are used for Punjab (2011–12, 2014, 2017–18), Sindh (2014, 2018–19), Khyber Pakhtunkhwa (2016–17, 2018–19), and Balochistan (2019), while fertility estimates for Islamabad Capital Territory (ICT) are derived from PDHS 2012–13 and 2017–18 due to the absence of a dedicated MICS round.

This approach ensured consistency between provincial and forthcoming district-level projections, while maintaining alignment with nationally representative fertility trends. The combined data sources provided robust estimates of Total Fertility Rates (TFRs) and Age-Specific Fertility Rates (ASFRs), facilitating the assessment of long-term fertility differentials and the formulation of empirically grounded fertility assumptions for population projections.

Mortality assumptions are developed by life expectancy and life tables derived from Pakistan Maternal Mortality Survey (PMMS-2019).

Migration constitutes the most uncertain component of the projection exercise due to persistent data limitations. Internal migration is incorporated indirectly using provincial redistribution patterns derived from the 2023 Population and Housing Census. In contrast, international migration is not taken into account due to lack of data availability of reliable and officially endorsed provincial estimates.

Although the UN Population Division’s website reports about 1.5 million annual net international migration from Pakistan, and international migration is often discussed in various national and international fora, in the projection exercise it has not been included, due to the unavailability of reliable and officially endorsed data particularly at the provincial level. There are three major concerns regarding its use: First, the officially available data mainly pertains to the labour migration to the Gulf countries, about the workers who migrating temporarily. Second, proper records are not available about those migrating permanently to Europe, North America and other countries therefore, lack-government ownership, and raise questions about its reliability. Third, detailed disaggregation such as provincial-level estimates, which are necessary for this projection is not available, however, the projections will be revised once reliable provincial-level international migration data becomes available from PBS or other concerned authorities.

Data quality issues such as age misreporting, under-enumeration, and inconsistencies across sources are critically reviewed. Where necessary, adjustments and smoothing techniques are applied to ensure demographic plausibility and internal consistency.

1.4 Methodology

This study applies the cohort–component method, the internationally accepted standard for population projections. The method advances the population forward by age and sex over successive time intervals by explicitly accounting for the three demographic components of change: fertility, mortality, and migration. The projection process is implemented using the Demographic Analysis and Population Projections System (DAPPS), an R-based platform designed for demographic analysis and projection.

1.4.1 Smoothing of age-sex Data

Age–sex composition is fundamental to demographic analysis and planning. Cross-classification of socio-economic and demographic characteristics by age and sex enhances the usefulness of the data manifold. Reporting on sex generally poses minimal difficulty, as inaccuracies are often easily corrected by referencing the individual's name or other questionnaire entries. However, obtaining accurate age data remains a challenge. One common source of error in age reporting is “age heaping,” where individuals tend to report ages ending in zero (0) and, to a lesser extent, five (5). This error is categorized as misreporting of age.

To assess the quality of the reported age–sex distributions, the UN Age–Sex Accuracy Index is computed for each province. The results indicated that only Balochistan has an index value exceeding 20, suggesting moderate to high age misreporting; consequently, the Carrier–Farrag smoothing technique is applied to adjust its age distribution. In contrast, the index values for the remaining provinces, as well as for the national and ICT levels, are below 20, indicating acceptable data quality, and therefore no further smoothing adjustments are required.

1.4.2 Fertility

Fertility assumptions are developed through a comprehensive assessment of historical trends in Total Fertility Rates (TFR) and Age-Specific Fertility Rates (ASFRs) at national and provincial levels. Baseline assumptions reflect recent observed patterns, while alternative scenarios capture plausible variations in the pace of fertility decline. In provinces where fertility decline has been slow or uneven, assumptions emphasize gradual rather than abrupt change.

1.5 Scenario Development

The bottom-to-top approach is adopted by using MICS fertility trends data for both provincial-level projections and national-level aggregation. This version introduced two primary fertility scenarios: the Medium variant (Slow Decline) scenario (*The Medium variant (Slow Decline) scenario assumes that fertility will continue to decline gradually in line with observed historical trends, reflecting a steady but moderate reduction in Total Fertility Rates*), and the “Rapid Decline” scenario assuming a reduction of 0.5 births per woman by 2050 relative to the baseline. These are developed using logistic models based on observed fertility trends in the MICS dataset.

To further enhance the robustness of the projections, an additional model is evaluated using the Bongaarts framework, which assesses the relationship between the Contraceptive Prevalence Rate (CPR) and TFR. This is intended to reflect the impact of recent programmatic interventions on fertility behavior.

1.6 Assumption of Input Data

The initial stage of the projection process involves reviewing the input data and resolving any related issues. For this purpose, the **Demographic Analysis and Population Projections System (DAPPS) software (Versions 3.3 and 4.0)** developed for cohort-component demographic analysis is utilized.

1.6.1 Base Year Population

For cohort-component population projections, the base-year population must be classified by single-year ages or five-year age groups (0–4, 5–9, 10–14, ..., 70–74, and 75+). In the present study, the base-year population is taken from the 2023 Population and Housing Census. Age–sex distributions are assessed for quality using the UN age–sex accuracy index. On this basis, age–sex smoothing is applied only for Balochistan, where data quality issues are identified, while the age–sex distributions for Punjab, Sindh, Khyber Pakhtunkhwa, and ICT, each with an accuracy index below 20, are assessed to be of acceptable quality and therefore, did not require smoothing. The adjusted base-year population is subsequently converted to a mid-year population, as most demographic rates and indicators are conventionally calculated using the mid-year population as the denominator.

1.6.2 Fertility: Total Fertility Rates (TFR)

Total Fertility Rate represents the average number of children that would be born alive to a woman (or a group of women) over her lifetime, assuming she passes through all her childbearing years conforming to the age-specific fertility rates of a given year.

As previously discussed, a bottom-to-top approach is adopted for generating national and provincial population projections. Under this approach, fertility trends from Multiple Indicator Cluster Surveys (MICS) are used for the provinces. These regional level projections are then aggregated to produce the national-level projections. As shown in Table 1.1, MICS is conducted at the provincial level; therefore, for ICT, the TFR from the Demographic and Health Survey (DHS) is used.

Table 1.1: Total Fertility Rates Reported in Different Surveys, for Provinces and ICT

Country/Region	DHS	DHS	MICS	DHS	MICS	MICS	MICS	DHS	MICS	MICS
	1991	2006	2011	2012	2014	2016	2017	2017	2018	2019
Pakistan	5.4	4.1		3.8				3.6		
Punjab	5.4	3.9	3.5	3.8	3.6		3.7	3.4		
Sindh	5.1	4.3		3.9	4.0			3.6	3.7	
Khyber Pakhtunkhwa	5.5	4.3		3.9		4.0		4.1	4.0	
Balochistan	5.8	4.1		4.2				4.0		4.0
ICT	0	0		3.0				3.0		

Limitation pertain to estimating fertility trends for Balochistan and Islamabad Capital Territory (ICT). For Balochistan, only one MICS-based TFR observation is available, while for ICT only two survey-based TFR estimates are obtainable. However, the logistic projection model requires a minimum of three time points to reliably estimate the parameters of the fertility transition curve. Owing to this data constraint, a probabilistic fertility estimation approach is applied for Balochistan and ICT. This approach draws on fertility transition patterns from demographically comparable countries or provinces to inform the likely trajectory of future fertility decline. In contrast, for the remaining provinces, where sufficient historical TFR observations are available, the logistic model is employed to estimate future fertility trends.

As per the decision of the Sub-Committee, the TFR from the most recent available survey is adopted as the base year estimate for 2023. Table 2 presents the TFR values used for the base year (2023) and the projected TFR for the target year 2050, derived using a logistic model.

Table 1.2: Total Fertility Rates for the base year (2023) and target year (2050) based on various scenarios for provinces & ICT

Scenarios using MICS TFR for provinces and DHS TFR for ICT					
Country/Province	Base year 2023	2050			
		Scen#01	Scen#02	Scen#03 (using Bongaarts Model)	
		Slow Decline	Rapid Decline	TFR	CPR
Punjab	3.7	2.23	1.73	1.95	61.0%
Sindh	3.7	2.35	1.85	2.33	58.0%
Khyber Pakhtunkhwa	4.0	2.62	2.12	2.39	57.0%
Balochistan	4.0	2.72	2.22	2.75	41.6%
ICT	3.0	2.18	1.68	2.10	60.0%

Age-Specific Fertility Rate (ASFR):

Age-Specific Fertility Rate (ASFR) refers to the number of children born per woman in a particular age group. For this projection exercise, ASFRs from the MICS are used. Table 1.3 presents the ASFRs for the provinces and ICT. However, since ASFR is not calculated for ICT in MICS, the Population Analysis Spreadsheet (PAS) using the CBR-GFR Excel tool is applied to estimate the ASFR for the base year 2023.

Table 1.3: Age-Specific Fertility Rates per woman for the base year 2023 for provinces and ICT

Age Groups	Punjab	Sindh	KPK	Balochistan	ICT
15-19	0.040	0.049	0.064	0.044	0.033
20-24	0.166	0.163	0.18	0.166	0.123
25-29	0.227	0.196	0.208	0.185	0.225
30-34	0.179	0.162	0.172	0.162	0.126
35-39	0.091	0.1	0.106	0.115	0.067
40-44	0.031	0.046	0.049	0.068	0.022
45-49	0.009	0.024	0.023	0.049	0.009

Sex-Ratio: The sex ratio refers to the number of males per 100 females in the total population for a given year. For this projection exercise, the sex ratio at birth for the base year (2023) has taken from the PDHS 2017-18 for all provinces, and ICT.

Table 1.4: Sex-Ratio at birth of national, sub-national and ICT, PDHS-2017-18

Province/Capital	Sex-Ratio	Province/Capital	Sex-Ratio
Pakistan	104.7	ICT	105.2
Punjab	103.2	Sindh	104.7
Khyber Pakhtunkhwa	103.6	Balochistan	107.4

1.6.3 Mortality

Life Expectancy and Age Specific Mortality: Life Expectancy is the average number of years a newborn can be expected to live based on the age-specific mortality schedule. It is computed with the help of a Life Table, separately for males and females, each have different mortality pattern. For the current projection, the life expectancy for provinces and ICT are taken from the life table based on Ages Specific Mortality Rate (ASMR) per 1000 population as reported in the Pakistan Maternal Mortality Survey (PMMS), 2019. ASMR and life-expectancy at birth by sex for the provinces and ICT are shown in Tables 1.5 and 1.5.

Table 1.5: Age-Specific Mortality Rates, by Sex for Provinces and ICT, PMMS-2019

Age	KP		Balochistan		Sindh		Punjab		ICT	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
0	0.05777	0.05265	0.05000	0.04501	0.06980	0.06635	0.07235	0.06054	0.06718	0.05901
1-4	0.00193	0.00228	0.00354	0.00312	0.00208	0.00299	0.00222	0.00319	0.00222	0.00294
5-9	0.00105	0.00056	0.00088	0.00039	0.00112	0.00059	0.00088	0.00072	0.00097	0.00063
10-14	0.00071	0.00065	0.00104	0.00016	0.00098	0.00076	0.00068	0.00045	0.00078	0.00054
15 – 19	0.00197	0.00073	0.00101	0.00078	0.00139	0.00111	0.00136	0.00064	0.00146	0.00077
20 – 24	0.00128	0.00073	0.00123	0.00115	0.00117	0.00121	0.00155	0.00118	0.00139	0.00110
25 – 29	0.00282	0.00130	0.00187	0.00029	0.00173	0.00101	0.00158	0.00119	0.00185	0.00112
30 – 34	0.00240	0.00149	0.00133	0.00204	0.00179	0.00127	0.00220	0.00156	0.00209	0.00151
35 – 39	0.00251	0.00168	0.00045	0.00283	0.00155	0.00327	0.00223	0.00232	0.00200	0.00245
40 – 44	0.00449	0.00338	0.00281	0.00229	0.00454	0.00302	0.00539	0.00299	0.00491	0.00303
45 – 49	0.00367	0.00341	0.00349	0.00391	0.00908	0.00389	0.00821	0.00576	0.00741	0.00483
50 – 54	0.00679	0.00522	0.00589	0.00540	0.01227	0.01052	0.01507	0.00772	0.01267	0.00774
55 – 59	0.01314	0.01253	0.01171	0.01016	0.02034	0.01330	0.01839	0.01572	0.01751	0.01431
60 – 64	0.01940	0.02541	0.01741	0.02981	0.02848	0.02989	0.03025	0.02702	0.02721	0.02740
65 – 69	0.03219	0.03444	0.01998	0.01692	0.03390	0.03361	0.03735	0.03455	0.03477	0.03352
70 – 74	0.06260	0.05540	0.05592	0.06724	0.06784	0.07232	0.07093	0.06011	0.06826	0.06166
75+	0.12157	0.13115	0.09442	0.09926	0.12155	0.12366	0.11220	0.11651	0.11467	0.11973

Table 1.5A: Life Expectancy at Birth, PMMS-2019

Province	Male life-expectancy at birth	Female life-expectancy at birth
Punjab	63.40	66.24
Sindh	63.80	65.22
Khyber Pakhtunkhwa	66.31	67.64
Balochistan	69.80	69.47
Islamabad	64.30	66.50

Note: Since life expectancy at birth is not estimated separately for Islamabad in the PMMS 2019 dataset, the national-level life expectancy at birth for Pakistan has been used as for the Islamabad Capital Territory (ICT) in this analysis.

1.6.4 Migration

For the provincial-level population projections, data on internal migration are derived from the 2023 Population and Housing Census. In the census, an individual is classified as a migrant if their place of birth (district) differs from their current place of residence (district) at the time of enumeration (i.e., inter-provincial migration).

For this projection exercise, the proportion of inter-provincial migration is extracted from Census 2023. Based on these data, annual net migration rates per 1,000 population per year are calculated for each province, shown in Tables 1.6 and 1.7.

Table 1.6: Net-Migrant and Net-Migration Rate per year by Province, census 2023

Region	Number of Net Migrants	Net Migration rate (per 1000)
Punjab	-3535	-0.03
Khyber Pakhtunkhwa	-73781	-1.82
Sindh	47281	0.85
Balochistan	-9113	-0.63
ICT	60295	26.39

Table 1.7: Number of Inter-provincial migrants per year, census 2023

Moved From	Moved To					
	Punjab	KP	Sindh	Balochistan	ICT	Total
Punjab	-	8045	37486	1955	35359	82,844
Khyber Pakhtunkhwa	43344	-	23435	1173	18908	86,861
Sindh	17274	2760	-	4885	3193	28,112
Balochistan	4806	707	10679	-	1164	17,357
ICT	2838	348	465	36	-	3,687
GB	2580	566	1685	46	996	5,874
AJK	8466	654	1642	148	4362	15,273
Total	79,309	13,080	75,393	8,244	63,982	240,008

The net migration rates given in Table 1.6 reflect the net effect of population movements into and out of each province. The underlying data capturing the number of individuals migrating between provinces are presented in Tables 1.7, which provides a migration matrix that served as the basis for calculating the net migration rates used in the projections.

CHAPTER 2

NATIONAL AND PROVINCIAL LEVEL POPULATION PROJECTIONS

In the preceding sections, a detailed overview of the population projection process has been provided, outlining the key assumptions used, particularly those related to future targets for TFR. These foundational elements shape the accuracy and relevance of the projections. Building on this groundwork, the current section shifts focus to the core objective of the exercise: presenting the projected population for Pakistan, its Provinces and ICT, over the coming decades. These projections are intended for strategic planning, guided resource allocation, and evidence-based policy formulation at both national and provincial levels.

2.1 Population Size

Population size is a fundamental demographic indicator that significantly influences planning and policymaking across various sectors, including health, education, social protection and infrastructure development. It reflects both the scale of resource requirements and the potential of a country's human capital. According to the 2017 Population and Housing Census, Pakistan's population stood at 207.7 million. Over the following six years, the country witnessed significant growth, reaching 241.5 million as per the 2023 census reflecting an average annual growth rate of approximately 2.55%. At the provincial level, Punjab remained the most populous province, with its population rising from 110 million in 2017 to approximately 127.7 million in 2023. Sindh population grew from 47.8 million to 55.7 million, while Khyber Pakhtunkhwa's population increased from 30.5 million to 40.8 million. Balochistan, although sparsely populated, saw its population grow from 12.3 million to 14.9 million. Notably, ICT, though the smallest administrative unit in terms of population, experienced rapid growth from 2 million in 2017 to 2.4 million in 2023. These figures underscore the critical importance of timely and accurate population data to guide national and sub-national development strategies amid rapidly evolving demographic dynamics.

Projected Population under Different scenarios

a. Slow Decline in Fertility

Based on the 2023 Population and Housing Census, Pakistan's total population stood at 241.86 million, which under the "slow fertility decline scenario" is projected to reach 389.78 million by 2050, an increase of approximately 147.92 million people. This rapid growth reflects underlying demographic momentum driven by fertility patterns, and population dynamics across provinces. Adding internal net-migration in the equation, population of each province is projected to grow significantly, with varying levels of increase in both absolute numbers and in percentage terms.

Table 2.1: National, Provincial and ICT Population Projections (in million), with slow decline in fertility

Year	Pakistan	Islamabad	Punjab	Sindh	Khyber Pakhtunkhwa	Balochistan
2023	241.9	2.3	128.0	56.0	40.9	14.7
2025	252.1	2.5	133.4	58.3	42.7	15.2
2030	278.4	3.1	146.9	64.3	47.3	16.8
2035	305.9	3.8	160.5	70.8	52.3	18.6
2040	334.7	4.6	174.2	77.7	57.5	20.7
2045	363.5	5.5	187.5	84.7	62.8	22.9
2050	389.9	6.5	199.6	91.2	67.6	25.0

Punjab, already the most populous province, is expected to grow from 128 million in 2023 to 199.6 million in 2050. Sindh’s population is expected to increase from 56 million to 91.2 million, while Khyber Pakhtunkhwa’s population is expected to increase from 40.9 million to 67.6 million. Balochistan’s population, from a relatively smaller base, is expected to increase from 14.7 million to 25 million, showing the highest percentage increase. Notably, ICT’s population is projected to witness the fastest growth rate, with its population almost tripling from 2.29 million in 2023 to 6.5 million by 2050. These projections highlight the urgent need for comprehensive planning to ensure adequate infrastructure, services, and resources across both urban and rural areas in response to Pakistan’s evolving demographic landscape.

b. Rapid Decline in Fertility

Under the “rapid fertility decline scenario” where the TFR is assumed to decrease sharply by subtracting half a birth from the 2050 target the country’s population is projected to reach 371.9 million by 2050. This represents an increase of 129.93 million over the base year. The trend reflects a significant slowdown in the pace of growth compared to the projected population under the slow fertility decline scenario, with a relatively balanced increase in both male and female populations.

At the provincial and federal level, Punjab, the most populous province’s population is expected to increase from 128.03 million in 2023 to 190.3 million in 2050. Population of Sindh will increase from 55.95 million to 86.9 million, while Khyber Pakhtunkhwa will experience an increase in its population from 40.9 million to 64.6 million. Balochistan will experience an increase in its population from 14.65 million to 23.9 million. Due to being the Capital, its urban character and in-migration trends, ICT’s population nearly triple from 2.29 million to 6.2 million. These projections under the rapid fertility decline scenario highlight a more moderate demographic expansion, which can offer a window of opportunity for economic and social planning if accompanied by strategic investments in health, education, and employment sectors.

Table 2.2: National and Provincial Projected Population (in million) 2023-50 under Rapid Fertility Decline Scenario

Year	Pakistan	Islamabad	Punjab	Sindh	Khyber Pakhtunkhwa	Balochistan
2023	241.9	2.3	128.0	56.0	40.9	14.7
2025	252.0	2.5	133.4	58.3	42.7	15.2
2030	277.5	3.1	146.4	64.1	47.1	16.8
2035	303.2	3.7	159.1	70.1	51.8	18.5
2040	328.6	4.5	171.0	76.3	56.5	20.3
2045	352.4	5.3	181.8	82.1	60.9	22.3
2050	371.9	6.2	190.3	86.9	64.6	23.9

c. Contraceptive-Based Decline in Fertility

This third variant of population projections applies to simulate fertility trends under an evidence-based contraceptive use trajectory across Pakistan’s provinces and ICT. The model links Contraceptive Prevalence Rate (CPR) directly with TFR, allowing for producing nuanced, province specific estimates through 2050. Under this scenario, Pakistan’s population will swallow from 241.86 million in 2023 to 383.2 million by 2050 in 27 years. The national CPR is projected to average 55.32%, bringing the national TFR down to 2.30 children per woman. These outcomes reflect incremental yet impactful gains in family planning uptake, consistent with region-specific socio-economic and programmatic capacities.

Table 2.3: National and Provincial Projected Population (in million) 2023-50 under Bongaarts Model

Year	Pakistan	Islamabad	Punjab	Sindh	Khyber Pakhtunkhwa	Balochistan
2023	241.9	2.3	128.0	56.0	40.9	14.7
2025	252.1	2.5	133.4	58.3	42.7	15.2
2030	278.1	3.1	146.6	64.3	47.2	16.8
2035	304.9	3.7	159.7	70.7	52.0	18.6
2040	332.4	4.5	172.4	77.6	57.1	20.7
2045	359.3	5.4	184.3	84.6	61.9	23.0
2050	383.2	6.5	194.4	91.0	66.2	25.1

2.2 Comparison with other sources

Pakistan’s population has also been projected for the period 2023–2050 by the Population Council and the United Nations Population Division. According to the Population Council, Pakistan’s population is expected to reach approximately 386 million by 2050 under a Business-as-Usual (slow fertility decline) scenario (Population Council, 2023). The United Nations Population Division, using a globally standardized cohort–component framework with zero migration and high fertility assumptions, projects a slightly higher population of around 397 million by 2050 (United Nations Population Division, 2024).

The present study projects Pakistan’s population to reach approximately 390 million by 2050, placing it between the Population Council and UN projections. This convergence suggests broad consistency across independent projection exercises, despite differences in baseline data, fertility assumptions, and model structures. Minor differences among projections can be attributed to

variations in assumptions regarding the pace of fertility decline, improvements in life expectancy, and the demographic momentum inherent in Pakistan’s youthful age structure. While the Population Council projection reflects more optimistic assumptions regarding fertility reduction through family planning expansion, both the UN and the present study assume a more gradual fertility transition, particularly in provinces with higher fertility rates.

Table 2.4: comparison of Pakistan Population Projections under Slow Decline Scenario

Year	Present Study Medium Variant (Slow Decline)	UN with Zero Migration	Population Council Business-as-Usual (BaU)
2023	241.9	241.9	241.9
2025	252.1	257.3	249.91
2030	278.4	284.4	274.86
2035	305.9	312.8	301.71
2040	334.7	341.7	329.85
2045	363.5	369.9	358.66
2050	389.9	397.1	385.62

Overall, the close alignment of the present study’s projection with internationally recognized estimates reinforces the credibility, robustness, and policy relevance of the results.

2.3 Mortality Indicators for National and Provinces and ICT

2.3.1 Pakistan

Pakistan’s mortality indicators demonstrate continuous improvement. Between 2023 and 2050, average life expectancy at birth of males is likely to increase from 65.61 years to 68.25 years, and of females from 68.09 years to 72.01 years. Infant Mortality Rate (IMR) for males is expected to drop from 47.1 to 40.3 deaths per 1000 live births, and of females from 42.3 to 32.4 per 1000 live births. Similarly, under-5 mortality is expected to decline from 52.5 to 44.8 per 1000 live births for males and from 48.7 to 36.6 per 1000 live births for females. These figures suggest some progress driven by health reforms, improved service delivery, and investment in child and maternal health. However, the projected IMR values for 2050 remain relatively high, indicating that significant efforts are still needed to address regional disparities and further improve child survival outcomes.

2.3.2 Punjab

Punjab demonstrates steady improvement in health and mortality indicators throughout the projection period. Male life expectancy is expected to improve from 65.48 to 68.07 years, and that of females from 68.11 to 72.03 years. The male IMR is likely to drop from 51.0 in 2023 to 43.4 per 1000 live births in 2050, and the female IMR from 48.0 to 36.9 per 1000 live births. Under-5 mortality rates is also expected to decline, with male child mortality rate expected to reduce from

56.0 to 46.8 per 1000 live births, and of females from 53.0 to 38.4 per 1000 live births. While starting from higher mortality levels, Punjab's steady improvements reflect a positive trajectory, especially in female survival.

2.3.3 Sindh

Sindh shows notable but moderate improvements in mortality over the years. Male life expectancy increases from 65.57 in 2023 to 68.18 years in 2050, while female life expectancy rises from 67.87 to 71.74 years. IMR for males is expected to decline from 39.0 to 31.4 per 1000 live births, and for females from 38.0 to 26.9 deaths per 1000 live births. The under-5 mortality rates follow suit, with for males dropping from 46.0 to 36.8 deaths per 1000 live births, and for females from 46.0 to 31.4 per 1000 live births. Although Sindh performs relatively well in reducing child mortality, disparities within urban and rural areas apparently still influences aggregate trends.

2.3.4 Khyber Pakhtunkhwa

Khyber Pakhtunkhwa shows consistent and encouraging improvements in health outcomes. Male and female life expectancies is expected to increase from 65.67 and 68.16 years in 2023 to 68.33 and 72.10 years, respectively in 2050. Male IMR will decrease from 40.0 to 36.0 per 1000 live births, and of females from 29.0 to 23.0 per 1000 live births, maintaining KP's position as a relatively low-mortality province. Under-5 mortality is also expected to improve significantly, with for males declining from 44.0 to 39.6 per 1000 live births, and for females from 34.0 to 27.0 per 1000 live births. This trend reflects the province's success in strengthening child and maternal healthcare interventions.

2.3.5 Balochistan

Balochistan's health indicators show modest improvement over time. Male life expectancy is expected to increases from 65.67 years in 2023 to 68.33 years in 2050, and of females from 68.16 to 72.10 years. Infant mortality rate for males is expected to decline from 48.0 to 41.2 per 1000 live births, and for females from 47.0 to 36.9 per 1000 live births. Likewise, under-5 mortality rates for both sexes is expected to decline; for males dropping from 53.0 to 46.2 per 1000 live births, and for females from 53.0 to 42.9 per 1000 live births. Despite this progress, Balochistan still exhibits relatively higher mortality rates than other provinces, highlighting ongoing challenges in maternal and child health services.

Table 2.4: life expectancy at birth, Pakistan, Provinces and ICT, 2023-2025

Life Expectancy at Birth												
	Pakistan		ICT		Punjab		Sindh		Khyber Pakhtunkhwa		Balochistan	
Year	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
2023	65.61	68.09	65.68	68.16	65.48	68.11	65.57	67.87	65.67	68.16	65.67	68.16
2025	65.81	68.39	65.88	68.46	65.67	68.41	65.77	68.17	65.89	68.47	65.88	68.46
2030	66.31	69.13	66.38	69.20	66.16	69.15	66.25	68.90	66.38	69.21	66.38	69.20
2035	66.79	69.86	66.87	69.94	66.64	69.88	66.74	69.61	66.87	69.94	66.87	69.94
2040	67.29	70.58	67.36	70.66	67.12	70.60	67.22	70.33	67.37	70.66	67.36	70.66
2045	67.77	71.30	67.85	71.39	67.60	71.32	67.71	71.04	67.85	71.39	67.85	71.38
2050	68.25	72.01	68.33	72.10	68.07	72.03	68.18	71.74	68.33	72.10	68.33	72.10

Table 2.5: Infant Mortality Rate, U5MR of Pakistan, Provinces and ICT, 2023-2050

Year	Pakistan				Islamabad				Punjab			
	Male IMR	Female IMR	Male U5MR	Female U5MR	Male IMR	Female IMR	Male U5MR	Female U5MR	IMR Male	IMR Female	Male U5MR	Female U5MR
2023	46.9	42.0	52.3	48.4	57.28	49.37	63.73	57.73	51.00	48.00	56.00	53.00
2025	46.4	41.3	51.7	47.5	56.69	48.51	63.01	56.57	50.44	47.18	55.32	51.92
2030	45.1	39.4	50.3	45.2	55.28	46.42	61.25	53.8	49.02	45.12	53.61	49.21
2035	43.9	37.6	48.9	43.0	53.89	44.35	59.53	51.08	47.61	43.07	51.91	46.51
2040	42.6	35.8	47.4	40.7	52.5	42.3	57.81	48.42	46.20	41.01	50.20	43.81
2045	41.4	33.9	46.0	38.5	51.13	40.27	56.14	45.81	44.79	38.96	48.50	41.10
2050	40.3	32.4	44.8	36.6	49.76	38.26	54.47	43.25	43.38	36.90	46.79	38.40
Year	Balochistan				Khyber Pakhtunkhwa				Sindh			
	IMR Male	IMR Female	Male U5MR	Female U5MR	IMR Male	IMR Female	Male U5MR	Female U5MR	IMR Male	IMR Female	Male U5MR	Female U5MR
2023	48.00	47.00	53.00	53.00	40.00	29.00	44.00	34.00	39.00	38.00	46.00	46.00
2025	47.50	46.25	52.50	52.25	39.70	28.56	43.67	33.48	38.44	37.18	45.32	44.92
2030	46.24	44.38	51.25	50.38	38.96	27.44	42.86	32.19	37.02	35.12	43.61	42.21
2035	44.98	42.51	50.00	48.51	38.22	26.33	42.04	30.89	35.61	33.07	41.91	39.51
2040	43.72	40.64	48.74	46.64	37.48	25.22	41.23	29.59	34.20	31.01	40.20	36.81
2045	42.46	38.77	47.49	44.77	36.74	24.11	40.41	28.30	32.79	28.96	38.50	34.10
2050	41.20	36.90	46.24	42.90	36.00	23.00	39.60	27.00	31.38	26.90	36.79	31.40

2.4 Vital Rates

2.4.1 Slow Decline in Fertility

Based on this scenario from 2023 to 2050, Pakistan is projected to experience a steady demographic transition, with declining birth and death rates nationwide and across its provinces and in ICT. At the national level, Crude Birth Rate (CBR) is expected to decline from 26.0 in 2023 to 19.1 per 1000 population per year in 2050, while the Crude Death Rate (CDR) is expected to rise modestly from 5.5 to 6.2 per 1000 population during the period, due to increasing median age, leading to a decrease in the Rate of Natural Increase (RNI) from 2.1% to 1.3% by 2050.

Among the provinces, Punjab and Sindh are likely to exhibit substantial fertility decline. Punjab's CBR is expected to fall from 27.8 to 18.0 births per 1000 population per year, and Sindh's from

25.6 to 18.7 per 1000 during the period, with respective rates of natural increase slowing down to 1.14% and 1.34% by 2050. Khyber Pakhtunkhwa will also follow a declining trajectory in crude birth rates, from 28.9 to 21.0 births per 1000 population, with its rate of natural increase reducing to 1.35%. ICT is expected to have the most rapid demographic change, with CBR dropping from 23.7 to 15.6 births per 1000 population and consequently a decline in the rate of natural increase from 1.8% to 0.8% per annum and population growth declining from 4.4% in 2023 to 3.42% by 2050, despite consistently high net in-migration.

In contrast, Balochistan is expected to maintain relatively higher crude birth rate due to slower fertility decline. Its CBR is expected to decrease from 24.4 to 21.9 per 1000 population and rates of natural increase from resulting in the lowest from 1.9% to 1.6%. Notably, Balochistan and KP show persistent net out-migration, while ICT and Sindh register consistent net in-migration throughout the projection period.

Overall, while Pakistan’s population will continue to grow under this scenario as well, the pace of growth will decelerate steadily, driven by declining fertility and modest increases in mortality, alongside regional variations in migration and demographic behavior.

Table 2.6: CBR, CDR, RNI and Annual Growth rate of Pakistan, Provinces and ICT, 2023-2050 under slow fertility decline scenario

Pakistan						Islamabad						Punjab					
Year	CBR	CDR	RNI	Net Migrant	Annual Growth Rate	Year	CBR	CDR	RNI	Net Migrant	Annual Growth Rate	Year	CBR	CDR	RNI	Net Migrant	Annual Growth Rate
2023	26.1	5.5	20.6	0	2.6%	2023	23.7	5.9	17.9	60563	4.4%	2023	27.8	6.1	21.7	-3841	2.2%
2025	25.7	5.7	20.0	0	2.1%	2025	22.9	6.5	16.5	65985	4.3%	2025	27.0	6.3	20.7	-4002	2.1%
2030	24.9	5.7	19.2	0	2.0%	2030	21.3	6.7	14.6	81141	4.1%	2030	25.2	6.2	19.0	-4407	1.9%
2035	24.5	5.9	18.7	0	1.9%	2035	20.3	6.9	13.4	99026	4.0%	2035	23.8	6.3	17.5	-4816	1.7%
2040	23.8	6.0	17.8	0	1.8%	2040	19.2	7.2	12.0	120104	3.8%	2040	22.4	6.3	16.1	-5226	1.6%
2045	21.7	6.1	15.6	0	1.6%	2045	17.5	7.5	10.1	144443	3.6%	2045	20.5	6.4	14.1	-5625	1.4%
2050	19.1	6.2	12.8	0	1.3%	2050	15.6	7.8	7.8	171918	3.4%	2050	18.0	6.5	11.5	-5985	1.1%
Sindh						Khyber Pakhtunkhwa						Balochistan					
Year	CBR	CDR	RNI	Net Migrant	Annual Growth Rate	Year	CBR	CDR	RNI	Net Migrant	Annual Growth Rate	Year	CBR	CDR	RNI	Net Migrant	Annual Growth Rate
2023	25.6	5.3	20.3	47560	2.1%	2023	28.9	5.4	23.5	-74500	2.2%	2023	24.4	4.7	19.8	-9232	1.9%
2025	25.2	5.5	19.7	49543	2.1%	2025	28.5	5.7	22.8	-77694	2.1%	2025	24.9	4.5	20.4	-9589	2.0%
2030	24.4	5.6	18.8	54674	2.0%	2030	27.9	5.6	22.2	-86062	2.0%	2030	26.0	4.6	21.4	-10585	2.1%
2035	24.1	5.8	18.4	60144	1.9%	2035	27.4	5.6	21.8	-95109	2.0%	2035	27.0	4.7	22.3	-11734	2.2%
2040	23.6	5.9	17.7	66009	1.9%	2040	26.2	5.6	20.6	-104730	1.9%	2040	27.3	4.8	22.5	-13047	2.2%
2045	21.6	6.1	15.5	71979	1.6%	2045	23.8	5.6	18.2	-114324	1.6%	2045	25.1	4.9	20.3	-14452	2.0%
2050	18.7	6.2	12.5	77435	1.3%	2050	21.0	5.7	15.4	-123097	1.4%	2050	21.9	4.9	17.0	-15761	1.6%

2.4.2 Rapid Decline in Fertility

Under the “Rapid Fertility Decline” scenario, Pakistan is projected to undergo a significant demographic transition, driven by sustained fertility reduction. The national Crude Birth Rate (CBR) falls from 26.1 in 2023 to 16.3 per 1000 population per year by 2050, while the Crude

Death Rate (CDR) rises modestly from 5.5 to 6.3 deaths per 1000 population per year, reflecting an aging population. As a result, the Rate of Natural Increase is expected to drop sharply from 2.06% to 1.00% per annum, and the annual population growth rate slows down from 2.56% to 0.94%. These trends mark a slowing momentum of population growth, indicating the effectiveness of fertility transition efforts amid historical high fertility levels.

Punjab exhibits the most pronounced demographic transition. Its CBR declines from 27.8 in 2023 to 14.5 per 1000 population per year in 2050, while CDR increases from 6.1 to 6.6 per 1000 population per year, mainly due to population aging. As a result, the Rate of Natural Increase drops from 2.18% to 0.79% per annum and the annual growth rate decreases significantly from 2.17% to 0.78%, reflecting slowing momentum and aging population dynamics.

Sindh demonstrates a steady transition, with its CBR falling from 25.6 to 15.3 per 1000 population per year, and CDR rising from 5.3 to 6.3 per 1000 population per year. The Rate of Natural Increase declines from 2.03% to 0.90% per annum, and the annual growth rate reduces from 2.12% in 2023 to 0.99% in 2050, suggesting moderate but continuous fertility decline.

Khyber Pakhtunkhwa sees similar trends, with the CBR declining from 28.9 to 17.6 births per 1000 population per year, and the CDR increasing slightly from 5.4 to 5.7 per 1000 population per year. Its Rate of Natural Increase reduces from 2.35% to 1.19% per annum, while the growth rate drops from 2.17% to 1.01%, indicating gradual demographic transition with sustained improvements in reproductive health.

Balochistan, starting from a relatively high-fertility base, shows a slower pace of change. Its CBR decreases from 24.4 to 18.4 per 1000 population per year, CDR rises from 4.65 to 4.91 deaths per 1000 population per year, and Rate of Natural Increase falls from 1.98% to 1.35% per annum.¹ The annual population growth rate declines modestly from 1.92% to 1.29%, underscoring the need for accelerated interventions.

ICT follows a trajectory aligned with national trends rather than being distinctly different. Its CBR declines from 23.8 to 15.6 births per 1000 population per year, and the CDR increases from 5.9 to 7.8 per 1000 population per year. Consequently, Rate of Natural Increase of ICT drops from 1.79% to 0.78% per annum, however, despite this decline, ICT will experience the highest growth rate as compared to all the provinces, falling from 4.43% in 2023 to 3.09% in 2050, primarily due to continue in-migration and urban expansion.

Table 2.7: CBR, CDR, RNI and Annual Growth rate of Pakistan, Provinces and ICT, 2023-2050 under rapid decline

Pakistan						Islamabad					Punjab				
Year	CBR	CDR	RNI	Net Migrant	Annual Growth Rate	CBR	CDR	RNI	Net Migrant	Annual Growth Rate	CBR	CDR	RNI	Net Migrant	Annual Growth Rate
2023	26.1	5.5	20.6	0	2.6%	23.7	5.9	17.9	60563	4.4%	27.8	6.1	21.7	-3841	2.2%
2025	25.5	5.7	19.8	0	2.1%	22.9	6.5	16.5	65967	4.3%	26.7	6.2	20.4	-4001	2.0%
2030	24.2	5.7	18.5	0	1.9%	21.3	6.7	14.6	80881	4.0%	24.3	6.2	18.1	-4393	1.8%
2035	23.3	5.8	17.4	0	1.7%	20.3	6.9	13.4	98113	3.8%	22.3	6.2	16.0	-4772	1.6%
2040	22.0	6.0	16.0	0	1.5%	19.2	7.2	12.0	117907	3.6%	20.2	6.3	13.9	-5131	1.4%
2045	19.4	6.1	13.3	0	1.3%	17.5	7.5	10.1	140065	3.4%	17.7	6.4	11.2	-5453	1.1%
2050	16.3	6.3	10.0	0	0.9%	15.6	7.8	7.8	164139	3.1%	14.5	6.6	7.9	-5707	0.8%
Sindh						Khyber Pakhtunkhwa					Balochistan				
Year	CBR	CDR	RNI	Net Migrant	Annual Growth Rate	CBR	CDR	RNI	Net Migrant	Annual Growth Rate	CBR	CDR	RNI	Net Migrant	Annual Growth Rate
2023	25.6	5.3	20.3	47560	2.1%	28.9	5.4	23.5	-74500	2.2%	24.4	4.7	19.8	-9232	1.9%
2025	24.9	5.5	19.4	49531	2.0%	28.3	5.7	22.6	-77674	2.1%	24.7	4.5	20.2	-9587	2.0%
2030	23.5	5.6	18.0	54512	1.9%	27.0	5.6	21.4	-85797	2.0%	25.1	4.5	20.5	-10556	2.0%
2035	22.6	5.7	16.9	59615	1.8%	25.9	5.6	20.3	-94249	1.8%	25.3	4.7	20.7	-11634	2.0%
2040	21.4	5.9	15.5	64821	1.6%	24.0	5.6	18.5	-102823	1.7%	24.9	4.8	20.1	-12818	2.0%
2045	18.7	6.1	12.6	69777	1.3%	21.0	5.6	15.4	-110847	1.4%	22.1	4.8	17.3	-14020	1.7%
2050	15.3	6.3	9.0	73855	1.0%	17.6	5.7	11.9	-117492	1.0%	18.4	4.9	13.5	-15058	1.3%

2.4.3 Family Planning Based Decline in Fertility

In the third scenario, Pakistan’s vital rates particularly CBR and CDR -show a steady decline during 2023 to 2050, reflecting demographic transition driven by fertility reduction and improvements in health outcomes. Nationally, CBR falls from 26.1 in 2023 to 18.2 in 2050 per 1000, while CDR increases slightly from 5.5 to 6.3, a typical trend as mortality shifts toward older ages. Consequently, Rate of Natural Increase declines from 2.06% to 1.20%, corresponding to a drop-in population growth from 2.56% to 1.16%. This pattern signifies the significance reduction in TFR, due to increase in CPR, leading to lower fertility and smaller family size. The decline in vital rates (births and deaths) at the national level, is aligned with demographic targets of slower growth through enhanced reproductive health services and family planning.

Across provinces, and ICT, the expected fertility transition unfolds at different paces. ICT will experience the most dramatic reduction in CBR (from 23.7 to 15.1 per 1000) however, will maintains a relatively high CDR due to a more aged population, but benefits from high net migration and consistent annual growth rate above 3.3%, reflects pull due to it being the Nation’s Capital and its urban character. Punjab and Sindh, the two most populous provinces, show significant CBR declines (Punjab: 27.8 to 16.1, Sindh: 25.6 to 18.6 per 1000) with Sindh's transition slightly slower, especially evident in continued high Rate of Natural Increase, beyond 2035. Khyber Pakhtunkhwa also shows a substantial decline in CBR (from 28.9 to 19.5 per 1000) but remains one of the higher fertility regions until the mid-century. Balochistan, historically the most demographically lagging province, shows a slower decrease in CBR (from 24.4 to 21.9 per 1000) and steady decline in Rate of Natural Increase, suggesting that even the least developed

province can benefit from increased CPR. Overall, the trajectory across provinces confirms that the progress of TFR reduction is effectively reinforced by increased contraceptive uptake, resulting in consistent declines in vital rates and population momentum under this scenario.

Table 2.8: CBR, CDR, RNI and Annual Growth rate of Pakistan, Provinces and ICT, 2023-2050 family planning based decline

Pakistan						Islamabad						Punjab					
Year	CBR	CDR	RNI	Net Migrant	Annual Growth Rate	Year	CBR	CDR	RNI	Net Migrant	Annual Growth Rate	Year	CBR	CDR	RNI	Net Migrant	Annual Growth Rate
2023	26.1	5.46	20.64		2.6%	2023	23.7	5.9	17.9	60563	4.4%	2023	27.8	6.1	21.7	-3841	2.2%
2025	25.6	5.69	19.95		2.1%	2025	22.9	6.5	16.4	65982	4.3%	2025	26.8	6.3	20.6	-4001	2.1%
2030	24.7	5.74	18.99		1.9%	2030	21.1	6.7	14.5	81099	4.1%	2030	24.7	6.2	18.5	-4399	1.8%
2035	24.1	5.85	18.30		1.8%	2035	20.0	6.9	13.1	98879	4.0%	2035	22.9	6.3	16.7	-4791	1.7%
2040	23.2	5.98	17.25		1.7%	2040	18.9	7.2	11.7	119752	3.8%	2040	21.2	6.3	14.9	-5172	1.5%
2045	21.0	6.10	14.93		1.5%	2045	17.1	7.5	9.6	143742	3.6%	2045	18.9	6.4	12.5	-5529	1.2%
2050	18.2	6.25	11.98		1.2%	2050	15.1	7.9	7.3	170671	3.4%	2050	16.1	6.6	9.5	-5829	0.9%
Sindh						Khyber Pakhtunkhwa						Balochistan					
Year	CBR	CDR	RNI	Net Migrant	Annual Growth Rate	Year	CBR	CDR	RNI	Net Migrant	Annual Growth Rate	Year	CBR	CDR	RNI	Net Migrant	Annual Growth Rate
2023	25.6	5.3	20.3	47560	2.1%	2023	28.9	5.4	23.5	-74500	2.2%	2023	24.4	4.7	19.8	-9232	1.9%
2025	25.2	5.5	19.7	49542	2.1%	2025	28.4	5.7	22.7	-77684	2.1%	2025	24.9	4.5	20.4	-9589	2.0%
2030	24.4	5.6	18.8	54668	2.0%	2030	27.5	5.6	21.8	-85941	2.0%	2030	26.0	4.6	21.4	-10587	2.1%
2035	24.1	5.8	18.3	60123	1.9%	2035	26.7	5.6	21.1	-94714	1.9%	2035	27.0	4.7	22.3	-11739	2.2%
2040	23.5	5.9	17.6	65961	1.8%	2040	25.2	5.6	19.7	-103853	1.8%	2040	27.3	4.8	22.5	-13061	2.2%
2045	21.5	6.1	15.4	71891	1.6%	2045	22.5	5.6	16.9	-112725	1.5%	2045	25.1	4.9	20.3	-14477	2.0%
2050	18.6	6.2	12.4	77292	1.3%	2050	19.5	5.7	13.8	-120516	1.2%	2050	21.9	4.9	17.0	-15804	1.6%

2.5 Migration

The projections indicate that ICT and Sindh are consistent net receivers of migrants, largely due to strong urban pull factors such as infrastructure, employment opportunities, education, and healthcare services. Among the two, ICT stands out as the region where migration meaningfully influences population growth. Under the “Slow Fertility Decline” scenario, net migration to ICT, increases from 60,563 in 2023 to 171,918 in 2050, while Sindh sees a modest inflow rising from 47,560 to 77,435 over the same period. These trends are also evident under the “Rapid Fertility Decline” as well as TFR-over-CPR scenarios, with ICT reaching 164,139 and 170,671 and Sindh rising to 73,855 and 77,292, respectively. The modest net in-migration supplements population growth in already urbanized areas but remains secondary to fertility as the primary driver of demographic change.

In contrast, Punjab, Khyber Pakhtunkhwa, and Balochistan exhibit minor levels of net out-migration, which are relatively stable over time and have limited influence on overall population dynamics. For instance, in Punjab the net out-migration remains negligible, changing from -3,841 in 2023 to -5,985 in 2050 under the “Slow Fertility Decline” scenario, Khyber Pakhtunkhwa’s and Balochistan’s net outflows are somewhat larger, but still small in relation to their total populations (e.g., -123,097 and -15,761, respectively, by 2050). Similar patterns hold across the other two scenarios, with only slight variations. These net migration trends, while useful for understanding

internal mobility patterns, do not significantly alter the overall demographic trajectory of the provinces, which is overwhelmingly shaped by trends in fertility. The findings underscore the need to focus on fertility reduction efforts and reproductive health policies as the central levers for managing population growth, with migration playing only a minor, localized role most notably in ICT.

Figure 6: Projected Net-internal migrant of Pakistan Provinces and ICT

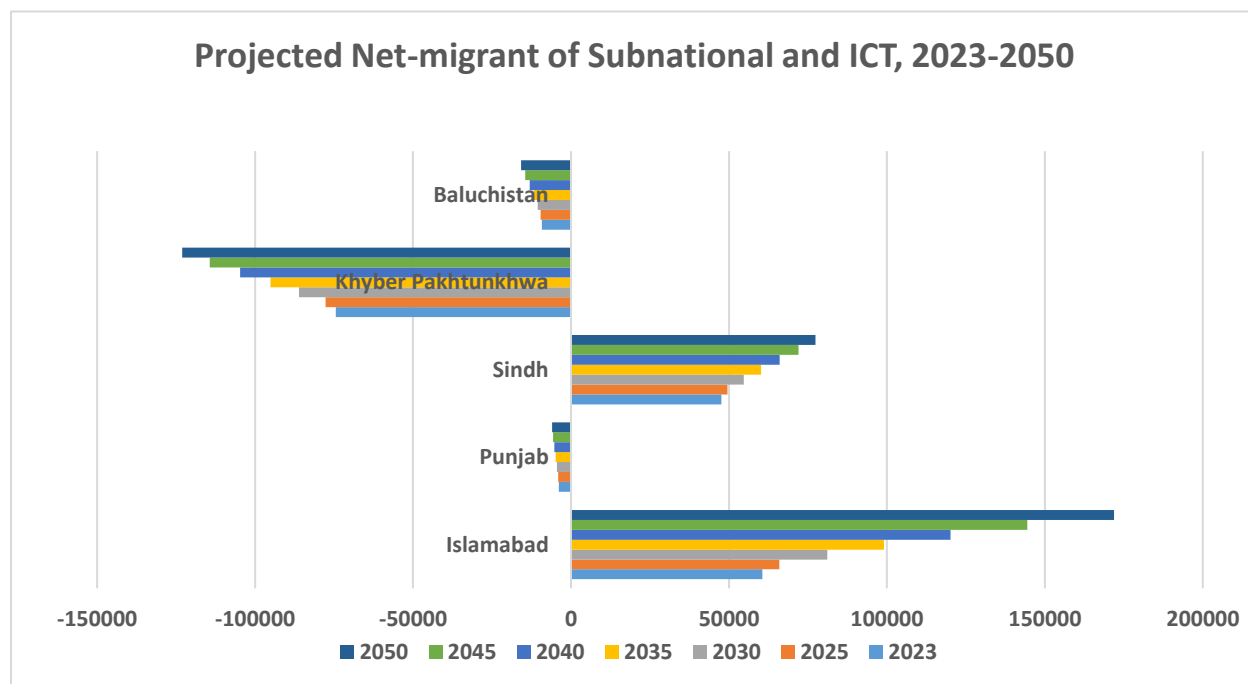


Table 2.9: Projected Internal Net Migration (per year) by Province and ICT (2023–2050)

Year	Islamabad	Punjab	Sindh	Khyber Pakhtunkhwa	Balochistan
2023	60563	-3841	47560	-74500	-9232
2025	65985	-4002	49543	-77694	-9589
2030	81141	-4407	54674	-86062	-10585
2035	99026	-4816	60144	-95109	-11734
2040	120104	-5226	66009	-104730	-13047
2045	144443	-5625	71979	-114324	-14452
2050	171918	-5985	77435	-123097	-15761

ANNEXURE

Table A1: Projected Population of Pakistan & Provinces (Male, Female, Total) Slow Decline: 2023-2050

Year	Pakistan			Islamabad			Punjab			Sindh			Khyber Pakhtunkhwa			Balochistan		
	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female
2023	241,861,958	124,557,971	117,303,987	2,294,704	1,215,212	1,079,492	128,025,300	65,639,671	62,385,629	55,953,618	29,153,155	26,800,463	40,933,887	20,892,617	20,041,270	14,654,449	7,657,316	6,997,133
2024	246,969,140	127,064,607	119,904,533	2,396,070	1,266,994	1,129,076	130,715,460	66,949,252	63,766,208	57,116,558	29,731,686	27,384,872	41,809,517	21,321,778	20,487,739	14,931,535	7,794,897	7,136,638
2025	252,094,605	129,577,332	122,517,273	2,500,167	1,320,087	1,180,080	133,400,197	68,254,531	65,145,666	58,286,031	30,312,512	27,973,519	42,688,817	21,752,080	20,936,737	15,219,393	7,938,122	7,281,271
2026	257,262,993	132,109,848	125,153,145	2,607,681	1,374,865	1,232,816	136,090,119	69,561,576	66,528,543	59,467,240	30,898,430	28,568,810	43,580,760	22,188,532	21,392,228	15,517,193	8,086,445	7,430,748
2027	262,474,725	134,662,550	127,812,175	2,718,725	1,431,380	1,287,345	138,784,658	70,870,300	67,914,358	60,660,739	31,489,771	29,170,968	44,485,918	22,631,406	21,854,512	15,824,685	8,239,693	7,584,992
2028	267,731,448	137,236,559	130,494,889	2,833,438	1,489,701	1,343,737	141,484,020	72,180,991	69,303,029	61,867,407	32,087,078	29,780,329	45,405,022	23,081,118	22,323,904	16,141,561	8,397,671	7,743,890
2029	273,035,334	139,833,104	133,202,230	2,951,975	1,549,906	1,402,069	144,188,815	73,494,008	70,694,807	63,088,179	32,690,899	30,397,280	46,338,732	23,538,025	22,800,707	16,467,633	8,560,266	7,907,367
2030	278,387,256	142,452,601	135,934,655	3,074,482	1,612,067	1,462,415	146,899,270	74,809,417	72,089,853	64,323,531	33,301,502	31,022,029	47,287,158	24,002,182	23,284,976	16,802,815	8,727,433	8,075,382
2031	283,787,059	145,094,987	138,692,072	3,201,097	1,676,253	1,524,844	149,615,007	76,127,007	73,488,000	65,573,834	33,919,097	31,654,737	48,250,065	24,473,488	23,776,577	17,147,056	8,899,142	8,247,914
2032	289,236,403	147,761,075	141,475,328	3,331,982	1,742,546	1,589,436	152,335,743	77,446,612	74,889,131	66,840,295	34,544,290	32,296,005	49,227,722	24,952,079	24,275,643	17,500,661	9,075,548	8,425,113
2033	294,739,318	150,452,837	144,286,481	3,467,327	1,811,042	1,656,285	155,061,538	78,768,245	76,293,293	68,125,082	35,178,152	32,946,930	50,221,018	25,438,370	24,782,648	17,864,353	9,257,028	8,607,325
2034	300,301,365	153,173,020	147,128,345	3,607,341	1,881,846	1,725,495	157,793,061	80,092,210	77,700,851	69,430,763	35,821,962	33,608,801	51,231,119	25,932,936	25,298,183	18,239,081	9,444,066	8,795,015
2035	305,924,397	155,922,488	150,001,909	3,752,205	1,955,049	1,797,156	160,529,971	81,418,282	79,111,689	70,758,674	36,476,378	34,282,296	52,258,175	26,435,863	25,822,312	18,625,372	9,636,916	8,988,456
2036	311,604,045	158,698,996	152,905,049	3,902,029	2,030,705	1,871,324	163,270,127	82,745,359	80,524,768	72,108,231	37,141,098	34,967,133	53,300,555	26,946,325	26,354,230	19,023,103	9,835,509	9,187,594
2037	317,330,490	161,497,693	155,832,797	4,056,837	2,108,825	1,948,012	166,010,137	84,071,786	81,938,351	73,477,121	37,814,971	35,662,150	54,354,735	27,462,576	26,892,159	19,431,660	10,039,535	9,392,125
2038	323,080,252	164,306,979	158,773,273	4,216,488	2,189,336	2,027,152	168,742,605	85,393,966	83,348,639	74,858,995	38,494,819	36,364,176	55,413,010	27,980,829	27,432,181	19,849,154	10,248,029	9,601,125
2039	328,852,256	167,126,600	161,725,656	4,381,144	2,272,319	2,108,825	171,468,668	86,712,614	84,756,054	76,252,631	39,180,088	37,072,543	56,474,873	28,500,891	27,973,982	20,274,940	10,460,688	9,814,252
2040	334,663,375	169,965,272	164,698,103	4,551,089	2,357,915	2,193,174	174,195,578	88,031,477	86,164,101	77,661,638	39,872,671	37,788,967	57,544,853	29,025,034	28,519,819	20,710,217	10,678,175	10,032,042
2041	340,508,265	172,820,434	167,687,831	4,726,259	2,446,089	2,280,170	176,922,051	89,349,972	87,572,079	79,084,291	40,571,739	38,512,552	58,620,754	29,552,157	29,068,597	21,154,910	10,900,477	10,254,433
2042	346,359,891	175,678,468	170,681,423	4,906,414	2,536,717	2,369,697	179,637,890	90,663,000	88,974,890	80,513,157	41,273,555	39,239,602	59,695,966	30,078,918	29,617,048	21,606,464	11,126,278	10,480,186
2043	352,146,316	178,502,851	173,643,465	5,090,888	2,629,456	2,461,432	182,313,810	91,955,780	90,358,030	81,929,267	41,968,493	39,960,774	60,755,012	30,597,444	30,157,568	22,057,339	11,351,678	10,705,661
2044	357,839,184	181,279,326	176,559,858	5,279,970	2,724,454	2,555,516	184,939,765	93,223,316	91,716,449	83,323,384	42,651,914	40,671,470	61,793,871	31,105,731	30,688,140	22,502,194	11,573,911	10,928,283
2045	363,458,855	184,018,388	179,440,467	5,474,481	2,822,130	2,652,351	187,525,759	94,470,743	93,055,016	84,698,930	43,325,628	41,373,302	62,818,484	31,606,839	31,211,645	22,941,201	11,793,048	11,148,153
2046	368,997,921	186,716,292	182,281,629	5,674,431	2,922,484	2,751,947	190,068,193	95,696,243	94,371,950	86,053,832	43,988,608	42,065,224	63,827,216	32,099,941	31,727,275	23,374,249	12,009,016	11,365,233
2047	374,440,672	189,365,119	185,075,553	5,879,512	3,025,356	2,854,156	192,558,776	96,895,600	95,663,176	87,384,120	44,638,861	42,745,259	64,817,608	32,583,817	32,233,791	23,800,656	12,221,485	11,579,171
2048	379,754,285	191,948,354	187,805,931	6,088,735	3,130,237	2,958,498	194,979,368	98,059,584	96,919,784	88,682,198	45,272,560	43,409,638	65,785,184	33,056,268	32,728,916	24,218,800	12,429,705	11,789,095
2049	384,918,842	194,455,946	190,462,896	6,302,136	3,237,140	3,064,996	197,319,082	99,182,637	98,136,445	89,942,738	45,887,012	44,055,726	66,727,655	33,516,145	33,211,510	24,627,231	12,633,012	11,994,219
2050	389,931,475	196,886,334	193,045,141	6,520,406	3,346,409	3,173,997	199,576,281	100,263,874	99,312,407	91,164,278	46,481,452	44,682,826	67,645,106	33,963,440	33,681,666	25,025,404	12,831,159	12,194,245

Table A2: Pakistan Regional Population Forecast: Integrated Education, Health, and Labor Force Cohorts (2023–2050) Slow Decline

Year	Region	5-9'	5-24'	5-16'	15-29	<30	15-49 WRA	18-60	0-14	15-64	65+	0-18	15-24
2023	Pakistan	32464842	106307208	71680610	62951802	161065454	568224535	116169719	98113652	135167421	8580885	117885553	44881968
2023	Islamabad	250040	926947	594551	617154	1358057	580380	1271360	740903	1454830	98971	920417	424746
2023	Punjab	15696164	54057404	35784776	33408189	82336578	30907826	63904190	48928389	73974529	5122382	59095065	23540510
2023	Sindh	7971985	24878417	16960819	14358480	37737723	12767077	26587575	23379243	30859681	1714694	27944108	10276962
2023	Khyber Pakhtunkhwa	6111746	19187361	13236062	10749830	28537624	9492222	18507141	17787794	21811066	1335027	21317734	7793251
2023	Balochistan	2434907	7257079	5104402	3818149	11095472	3077030	5899453	7277323	7067315	309811	8608229	2846499
2025	Pakistan	35718140	114002448	77067327	66953442	166446626	60232210	122988263	99493184	143399959	9201462	120790115	47995772
2025	Islamabad	272718	1006878	643739	673578	1458934	637065	1396399	785356	1601749	113062	986367	466983
2025	Punjab	17230731	57344943	38099409	35262555	85174514	32600972	67160473	49911959	77999390	5488848	60893817	24968454
2025	Sindh	8819785	26962779	18467483	15295074	38921585	13535510	28244911	23626511	32817213	1842307	28492153	11002242
2025	Khyber Pakhtunkhwa	6607890	20640636	14196386	11540841	29518112	10120874	19748365	17977271	23293822	1417724	21793905	8430724
2025	Balochistan	2787016	8047212	5660310	4181394	11373481	3337789	6438115	7192087	7687785	339521	8623873	3127369
2030	Pakistan	33251191	125064043	81255346	77950494	179597746	69302657	142544774	101647252	165827293	10912711	126041358	56196740
2030	Islamabad	278041	1173020	708401	833855	1733033	795161	1771495	899178	2020643	154661	1141909	584673
2030	Punjab	17415028	63097724	40648286	39940152	91883700	36839699	76651811	51943548	88496052	6459670	64053382	28497759
2030	Sindh	7650477	29609706	19499281	18140293	41848133	15731836	32819225	23707840	38374995	2240696	29533112	13129422
2030	Khyber Pakhtunkhwa	5670735	22324378	14499377	13824365	32008299	11859304	23347537	18183934	27467779	1635445	22672835	10128760
2030	Balochistan	2236910	8859215	5900001	5211829	12124581	4076657	7954706	6912752	9467824	422239	8640120	3866126
2035	Pakistan	32570342	131307703	81372516	91453223	192067406	79860352	164005329	100614183	192368824	12941390	129839547	65565509
2035	Islamabad	352436	1366846	817721	1016837	2045644	972658	2203943	1028807	2514690	208708	1315161	697984
2035	Punjab	17233765	66773040	42183696	45497615	98070565	41469374	86283785	52572950	100430001	7527020	66681813	32166708
2035	Sindh	7214907	30854622	18745576	21963005	44664200	18518209	38326991	22701195	45274278	2783201	29971817	15978829
2035	Khyber Pakhtunkhwa	5891372	23373664	14282196	16412225	34425512	13852159	27418551	18013287	32347895	1896993	23290692	11881125
2035	Balochistan	1877862	8939531	5343327	6563541	12861485	5047952	9772059	6297944	11801960	525468	8580064	4840863
2040	Pakistan	34672233	135632786	79662899	98385034	202606137	88424593	190662379	104221103	215106320	15335952	129211003	68453504
2040	Islamabad	408368	1570536	970095	1152845	2381834	1150353	2711222	1228989	3040439	281661	1505251	760996
2040	Punjab	17863537	69447693	41771143	49350153	102952838	45745489	98495405	53602685	111845062	8747831	66925767	34389735
2040	Sindh	7816055	31548177	17800083	23649440	47221221	20592966	45149545	23571781	50677499	3412358	29260111	16505841
2040	Khyber Pakhtunkhwa	6419448	24112134	14423316	17232426	36497797	15214611	32099843	19265371	36040270	2239212	23407249	11872312
2040	Balochistan	2164825	8954246	4698262	7000170	13552447	5721174	12206364	6552277	13503050	654890	8112625	4924620
2045	Pakistan	36856231	136882402	84692198	100646087	210298716	95897663	207042103	109652629	235307657	18498569	135763495	65411809
2045	Islamabad	476163	1806690	1124270	1321203	2736442	1373529	3221767	1415239	3673001	386241	1780722	865602
2045	Punjab	18449063	70682328	43214150	51398307	106478144	49509479	107027001	55079837	122070461	10375461	68851859	34407549
2045	Sindh	8524109	31260730	19311713	23748643	49039898	22319574	48768963	25291255	55186781	4220894	31120153	14906658
2045	Khyber Pakhtunkhwa	6921124	24460281	15631524	17446431	37935104	16523326	34846110	20488673	39645770	2684041	25129614	11195611
2045	Balochistan	2485772	8672373	5410541	6731503	14109128	6171755	13178262	7377625	14731644	831932	8881147	4036389
2050	Pakistan	38020024	141730314	88939594	99767754	211663025	103451142	224859215	111895271	255431964	22604240	139723961	66903959
2050	Islamabad	538568	2128870	1294333	1513036	3114431	1635784	3843175	1601395	4384327	534684	2025802	1048092
2050	Punjab	18718715	72003460	44331109	52058515	107375774	53115835	115856155	55317259	131774849	12484173	69600195	34871831
2050	Sindh	8936737	32559420	20699939	22758576	48902599	24090292	52812530	26144023	59803466	5216789	32470601	15081766
2050	Khyber Pakhtunkhwa	7121275	25892894	16545997	17300954	38284823	17941527	38029362	20983869	43367517	3293720	26045055	11930819
2050	Balochistan	2704729	9145670	6068216	6136673	13985398	6667704	14317993	7848725	16101805	1074874	9582308	3971451

Table B1: Projected Population of Pakistan & Provinces (Male, Female, Total) Rapid Decline: 2023-2050

Year	Pakistan			Islamabad			Punjab			Sindh			Khyber Pakhtunkhwa			Balochistan		
	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female
2023	241,861,958	124,557,971	117,303,987	2,294,704	1,215,212	1,079,492	128,025,300	65,639,671	62,385,629	55,953,618	29,153,155	26,800,463	40,933,887	20,892,617	20,041,270	14,654,449	7,657,316	6,997,133
2024	246,952,999	127,056,404	119,896,595	2,395,900	1,266,907	1,128,993	130,706,647	66,944,786	63,761,861	57,112,977	29,729,858	27,383,119	41,806,788	21,320,393	20,486,395	14,930,687	7,794,460	7,136,227
2025	252,029,670	129,544,353	122,485,317	2,499,473	1,319,733	1,179,740	133,364,810	68,236,608	65,128,202	58,271,606	30,305,151	27,966,455	42,677,824	21,746,507	20,931,317	15,215,957	7,936,354	7,279,603
2026	257,115,435	132,034,940	125,080,495	2,606,079	1,374,047	1,232,032	136,009,889	69,520,957	66,488,932	59,434,411	30,881,684	28,552,727	43,555,735	22,175,853	21,379,882	15,509,321	8,082,399	7,426,922
2027	262,209,004	134,527,692	127,681,312	2,715,794	1,429,883	1,285,911	138,640,532	70,797,346	67,843,186	60,601,524	31,459,572	29,141,952	44,440,768	22,608,540	21,832,228	15,810,386	8,232,351	7,578,035
2028	267,310,171	137,022,799	130,287,372	2,828,716	1,487,289	1,341,427	141,256,100	72,065,639	69,190,461	61,773,361	32,039,125	29,734,236	45,333,300	23,044,807	22,288,493	16,118,694	8,385,939	7,732,755
2029	272,419,103	139,520,475	132,898,628	2,944,954	1,546,320	1,398,634	143,856,289	73,325,733	70,530,556	62,950,355	32,620,635	30,329,720	46,233,613	23,484,821	22,748,792	16,433,892	8,542,966	7,890,926
2030	277,534,580	142,020,085	135,514,495	3,064,605	1,607,023	1,457,582	146,440,365	74,577,212	71,863,153	64,132,455	33,204,104	30,928,351	47,141,424	23,928,441	23,212,983	16,755,731	8,703,305	8,052,426
2031	282,654,245	144,520,460	138,133,785	3,187,754	1,669,440	1,518,314	149,006,948	75,819,364	73,187,584	65,319,466	33,789,457	31,530,009	48,056,096	24,375,364	23,680,732	17,083,981	8,866,835	8,217,146
2032	287,777,361	147,021,210	140,756,151	3,314,507	1,733,625	1,580,882	151,554,698	77,051,495	74,503,203	66,511,953	34,376,975	32,134,978	48,977,451	24,825,503	24,151,948	17,418,752	9,033,612	8,385,140
2033	292,905,260	149,522,949	143,382,311	3,444,984	1,799,638	1,645,346	154,082,536	78,273,047	75,809,489	67,711,333	34,967,349	32,743,984	49,905,872	25,279,020	24,626,852	17,760,535	9,203,895	8,556,640
2034	298,040,506	152,026,914	146,013,592	3,579,323	1,867,548	1,711,775	156,589,890	79,483,701	77,106,189	68,919,321	35,561,427	33,357,894	50,841,960	25,736,205	25,105,755	18,110,012	9,378,033	8,731,979
2035	303,181,962	154,532,455	148,649,507	3,717,627	1,937,406	1,780,221	159,075,170	80,682,601	78,392,569	70,136,394	36,159,431	33,976,963	51,785,323	26,196,870	25,588,453	18,467,448	9,556,147	8,911,301
2036	308,322,510	157,035,942	151,286,568	3,859,931	2,009,228	1,850,703	161,535,044	81,868,047	79,666,997	71,361,183	36,760,660	34,600,523	52,733,875	26,659,963	26,073,912	18,832,477	9,738,044	9,094,433
2037	313,449,956	159,531,330	153,918,626	4,006,184	2,082,987	1,923,197	163,965,007	83,037,826	80,927,181	72,590,697	37,363,621	35,227,076	53,683,797	27,123,590	26,560,207	19,204,271	9,923,306	9,280,965
2038	318,539,756	162,006,495	156,533,261	4,156,188	2,158,581	1,997,607	166,356,944	84,187,984	82,168,960	73,818,293	37,964,989	35,853,304	54,627,500	27,584,027	27,043,473	19,580,831	10,110,914	9,469,917
2039	323,587,658	164,459,582	159,128,076	4,310,010	2,236,043	2,073,967	168,710,373	85,318,423	83,391,950	75,041,973	38,563,818	36,478,155	55,563,998	28,040,839	27,523,159	19,961,304	10,300,459	9,660,845
2040	328,605,227	166,896,631	161,708,596	4,467,815	2,315,454	2,152,361	171,030,080	86,431,650	84,598,430	76,264,012	39,161,325	37,102,687	56,496,827	28,495,800	28,001,027	20,346,493	10,492,402	9,854,091
2041	333,583,573	169,313,303	164,270,270	4,629,456	2,396,737	2,232,719	173,312,974	87,526,179	85,786,795	77,481,797	39,756,232	37,725,565	57,423,328	28,947,579	28,475,749	20,736,018	10,686,576	10,049,442
2042	338,494,723	171,695,526	166,799,197	4,794,629	2,479,735	2,314,894	175,548,141	88,596,556	86,951,585	78,687,722	40,344,720	38,343,002	58,336,941	29,392,864	28,944,077	21,127,290	10,881,651	10,245,639
2043	343,272,277	174,009,607	169,262,670	4,962,674	2,564,108	2,398,566	177,708,433	89,629,091	88,079,342	79,864,354	40,917,948	38,946,406	59,223,432	29,824,416	29,399,016	21,513,384	11,074,044	10,439,340
2044	347,888,342	176,241,535	171,646,807	5,133,738	2,649,933	2,483,805	179,783,502	90,618,639	89,164,863	81,002,921	41,471,516	39,531,405	60,078,768	30,240,225	29,838,543	21,889,413	11,261,222	10,628,191
2045	352,357,027	178,398,648	173,958,379	5,308,398	2,737,504	2,570,894	181,780,029	91,568,661	90,211,368	82,105,609	42,006,607	40,099,002	60,907,617	30,642,710	30,264,907	22,255,374	11,443,166	10,812,208
2046	356,668,051	180,475,765	176,192,286	5,486,528	2,826,754	2,659,774	183,692,807	92,476,536	91,216,271	83,169,785	42,521,912	40,647,873	61,707,937	31,030,843	30,677,094	22,610,994	11,619,720	10,991,274
2047	360,804,437	182,464,340	178,340,097	5,667,741	2,917,481	2,750,260	185,512,851	93,337,707	92,175,144	84,191,288	43,015,344	41,175,944	62,477,051	31,403,296	31,073,755	22,955,506	11,790,512	11,164,994
2048	364,735,720	184,349,072	180,386,648	5,851,109	3,009,209	2,841,900	187,223,462	94,143,681	93,079,781	85,163,097	43,483,373	41,679,724	63,210,694	31,757,981	31,452,713	23,287,358	11,954,828	11,332,530
2049	368,442,492	186,120,180	182,322,312	6,036,524	3,101,877	2,934,647	188,814,141	94,889,102	93,925,039	86,080,185	43,923,461	42,156,724	63,906,473	32,093,699	31,812,774	23,605,169	12,112,041	11,493,128
2050	371,919,423	187,774,867	184,144,556	6,224,380	3,195,678	3,028,702	190,282,001	95,572,458	94,709,543	86,940,752	44,334,674	42,606,078	64,563,963	32,410,187	32,153,776	23,908,327	12,261,870	11,646,457

Table B2: Pakistan Regional Population Forecast: Integrated Education, Health, and Labor Force Cohorts (2023–2050) Rapid Decline:

Year	Region	5-9'	5-24'	5-16'	15-29	<30	15-49 WRA	18-60	0-14	15-64	65+	0-18	15-24
2023	Pakistan	32464842	106307208	71680610	62951802	161065454	56824535	116169719	98113652	135167421	8580885	117885553	44881968
2023	Islamabad	250040	926947	594551	617154	1358057	580380	1271360	740903	1454830	98971	920417	424746
2023	Punjab	15696164	54057404	35784776	33408189	82336578	30907826	63904190	48928389	73974529	5122382	59095065	23540510
2023	Sindh	7971985	24878417	16960819	14358480	37737723	12767077	26587575	23379243	30859681	1714694	27944108	10276962
2023	Khyber Pakhtunkhwa	6111746	19187361	13236062	10749830	28537624	9492222	18507141	17787794	21811066	1335027	21317734	7793251
2023	Balochistan	2434907	7257079	5104402	3818149	11095472	3077030	5899453	7277323	7067315	309811	8608229	2846499
2025	Pakistan	35718138	114002449	77067327	66953440	166381686	60232210	122988263	99428246	143399961	9201463	120725173	47995773
2025	Islamabad	272717	1006877	643739	673577	1458238	637066	1396398	784661	1601750	113062	985670	466982
2025	Punjab	17230731	57344945	38099409	35262553	85139127	32600971	67160473	49876574	77999389	5488847	60858430	24968453
2025	Sindh	8819785	26962780	18467484	15295073	38907159	13535511	28244911	23612086	32817214	1842306	28477727	11002243
2025	Khyber Pakhtunkhwa	6607890	20640635	14196385	11540842	29507119	10120873	19748366	17966277	23293821	1417726	21782911	8430723
2025	Balochistan	2787015	8047212	5660310	4181395	11370043	3337789	6438115	7188648	7687787	339522	8620435	3127372
2030	Pakistan	33187396	125000243	81191543	77950505	178745075	69302656	142544768	100794570	165827299	10912711	125188675	56196742
2030	Islamabad	277261	1172240	707620	833859	1723155	795166	1771494	889296	2020647	154662	1132029	584677
2030	Punjab	17380257	63062954	40613517	39940154	91424797	36839697	76651811	51484643	88496054	6459668	63594477	28497759
2030	Sindh	7636235	29595458	19485035	18140295	41657060	15731833	32819222	23516765	38374991	2240699	29342035	13129418
2030	Khyber Pakhtunkhwa	5660045	22313692	14488687	13824365	31862566	11859301	23347535	18038201	27467780	1635443	22527103	10128763
2030	Balochistan	2233598	8855899	5896684	5211832	12077497	4076659	7954706	6865665	9467827	422239	8593031	3856125
2035	Pakistan	31787437	130461124	80525930	91453218	189324970	79860348	164005317	97871752	192368820	12941390	127097101	65565502
2035	Islamabad	342135	1355661	806532	1016838	2011069	972658	2203941	994231	2514693	208703	1280582	697985
2035	Punjab	16812979	66317580	41728233	45497614	96615761	41469375	86283785	51118147	100430001	7527022	65227010	32166710
2035	Sindh	7038645	30664092	18555045	21962999	44041916	18518205	38326988	22078917	45274272	2783205	29349533	15978825
2035	Khyber Pakhtunkhwa	5758723	23230462	14138995	16412229	33952667	13852158	27418547	17540438	32347898	1896987	22817841	11881122
2035	Balochistan	1834955	8893329	5297125	6563538	12703557	5047952	9772056	6140019	11801956	525473	8422135	4840860
2040	Pakistan	32787773	132903013	76933048	98321441	196547984	88393209	190662365	98226543	215042734	15335950	123152849	68389904
2040	Islamabad	381847	1531276	930843	1151838	2298564	1149854	2711217	1146726	3039431	281658	1421980	759979
2040	Punjab	16870653	68000405	40323814	49315555	99787341	45728388	98495403	50471786	111810465	8747829	63760270	34355133
2040	Sindh	7385107	30926406	17178284	23635151	45823592	20585947	45149541	22188441	50663214	3412357	27862479	16491558
2040	Khyber Pakhtunkhwa	6095159	23646378	13957548	17221999	35449768	15209451	32099843	18227769	36029843	2239215	22359223	11861886
2040	Balochistan	2055007	8798548	4542559	6996898	13188719	5719569	12206361	6191821	13499781	654891	7748897	4921348
2045	Pakistan	33544537	130844522	79070038	99802065	199196876	95480536	206780434	99394811	234463645	18498571	124806549	64567806
2045	Islamabad	426210	1712064	1036916	1306707	2570354	1366419	3217138	1263647	3658513	386238	1617234	851118
2045	Punjab	16740508	67529756	40285966	50945038	100732411	49285148	106885426	49787373	121617199	10375457	63184699	33954283
2045	Sindh	7749075	29862921	18007796	23557591	46446578	22225624	48709922	22888987	54995723	4220899	28559489	14715603
2045	Khyber Pakhtunkhwa	6347773	23426830	14666274	17306776	36024235	16454016	34803364	18717459	39506113	2684045	23242316	11055958
2045	Balochistan	2280971	8312951	5073086	6685953	13423298	6149329	13164584	6737345	14686097	831932	8202811	3990844
2050	Pakistan	32976996	130719648	79683126	97045582	193650975	102104410	223414699	96605393	252709778	22604252	122832280	64245091
2050	Islamabad	457438	1941331	1140046	1462206	2818411	1610814	3815446	1356205	4333489	534686	1751490	998564
2050	Punjab	16138346	66312149	39572643	50618413	98081493	52402351	115085409	47463080	130334749	12484172	60905219	33466067
2050	Sindh	7741648	29978514	18519210	22135017	44679072	23783393	52483686	22544055	59179899	5216798	28501746	14472511
2050	Khyber Pakhtunkhwa	6256629	24017518	14961311	16846768	35203679	17715787	37791215	18356911	42913332	3293720	23147884	11486777
2050	Balochistan	2382935	8470136	5489916	5983178	12868320	6592065	14238943	6885142	15948309	1074876	8525941	3821172

Table C1: Projected Population of Pakistan & Provinces (Male, Female, Total) Decline Due To Family Planning: 2023-2050

Year	Pakistan			Islamabad			Punjab			Sindh			Khyber Pakhtunkhwa			Balochistan		
	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female
2023	241,861,958	124,557,971	117,303,987	2,294,704	1,215,212	1,079,492	128,025,300	65,639,671	62,385,629	55,953,618	29,153,155	26,800,463	40,933,887	20,892,617	20,041,270	14,654,449	7,657,316	6,997,133
2024	246,962,831	127,061,408	119,901,423	2,396,043	1,266,980	1,129,063	130,710,525	66,946,751	63,763,774	57,116,415	29,731,613	27,384,802	41,808,262	21,321,141	20,487,121	14,931,586	7,794,923	7,136,663
2025	252,069,249	129,564,486	122,504,763	2,500,055	1,320,030	1,180,025	133,380,380	68,244,494	65,135,886	58,285,453	30,312,217	27,973,236	42,683,761	21,749,517	20,934,244	15,219,600	7,938,228	7,281,372
2026	257,205,458	132,080,712	125,124,746	2,607,424	1,374,734	1,232,690	136,045,191	69,538,830	66,506,361	59,465,925	30,897,759	28,568,166	43,569,251	22,182,701	21,386,550	15,517,667	8,086,688	7,430,979
2027	262,371,270	134,610,172	127,761,098	2,718,256	1,431,140	1,287,116	138,703,949	70,829,447	67,874,502	60,658,369	31,488,562	29,169,807	44,465,151	22,620,889	21,844,262	15,825,545	8,240,134	7,585,411
2028	267,567,681	137,153,661	130,414,020	2,832,683	1,489,315	1,343,368	141,356,387	72,116,395	69,239,992	61,863,643	32,085,159	29,778,484	45,372,032	23,064,416	22,307,616	16,142,936	8,398,376	7,744,560
2029	272,796,162	139,712,054	133,084,108	2,950,854	1,549,333	1,401,521	144,002,603	73,399,775	70,602,828	63,082,664	32,688,088	30,394,576	46,290,381	23,513,553	22,776,828	16,469,660	8,561,305	7,908,355
2030	278,056,841	142,285,394	135,771,447	3,072,904	1,611,261	1,461,643	146,642,285	74,679,383	71,962,902	64,315,886	33,297,606	31,018,280	47,220,123	23,968,262	23,251,861	16,805,643	8,728,882	8,076,761
2031	283,348,805	144,873,239	138,475,566	3,198,964	1,675,164	1,523,800	149,274,496	75,954,728	73,319,768	65,563,658	33,913,912	31,649,746	48,160,844	24,428,353	23,732,491	17,150,843	8,901,082	8,249,761
2032	288,672,886	147,475,986	141,196,900	3,329,188	1,741,120	1,588,068	151,898,359	77,225,347	74,673,012	66,827,160	34,537,598	32,289,562	49,112,602	24,893,856	24,218,746	17,505,577	9,078,065	8,427,512
2033	294,032,222	150,095,162	143,937,060	3,463,754	1,809,219	1,654,535	154,513,299	78,490,935	76,022,364	68,108,530	35,169,720	32,938,810	50,076,055	25,365,071	24,710,984	17,870,584	9,260,217	8,610,367
2034	299,431,387	152,733,017	146,698,370	3,602,860	1,879,560	1,723,300	157,119,287	79,751,446	77,367,841	69,410,304	35,811,541	33,598,763	51,052,110	25,842,442	25,209,668	18,246,826	9,448,028	8,798,798
2035	304,871,254	155,389,919	149,481,335	3,746,674	1,952,227	1,794,447	159,715,283	81,006,301	78,708,982	70,733,781	36,463,700	34,270,081	52,040,667	26,325,928	25,714,739	18,634,849	9,641,763	8,993,086
2036	310,346,552	158,063,172	152,283,380	3,895,295	2,027,270	1,868,025	162,298,481	82,254,064	80,044,417	72,078,348	37,125,880	34,952,468	53,039,886	26,814,600	26,225,286	19,034,542	9,841,358	9,193,184
2037	315,846,675	160,747,531	155,099,144	4,048,734	2,104,692	1,944,042	164,864,865	83,492,768	81,372,097	73,441,664	37,796,917	35,644,747	54,046,107	27,306,644	26,739,463	19,445,305	10,046,510	9,398,795
2038	321,347,777	163,431,214	157,916,563	4,206,842	2,184,416	2,022,426	167,406,635	84,718,615	82,688,020	74,817,366	38,473,625	36,343,741	55,051,679	27,798,301	27,253,378	19,865,255	10,256,257	9,608,998
2039	326,847,622	166,113,387	160,734,235	4,369,764	2,266,515	2,103,249	169,924,021	85,931,865	83,992,156	76,204,204	39,155,437	37,048,767	56,055,873	28,289,267	27,766,606	20,293,760	10,470,303	9,823,457
2040	332,361,189	168,801,812	163,559,377	4,537,767	2,351,121	2,186,646	172,422,888	87,135,567	85,287,321	77,605,731	39,844,217	37,761,514	57,062,760	28,781,584	28,281,176	20,732,043	10,689,323	10,042,720
2041	337,881,868	171,493,297	166,388,571	4,710,773	2,438,193	2,272,580	174,900,933	88,328,629	86,572,304	79,020,188	40,539,118	38,481,070	58,069,927	29,274,044	28,795,883	21,180,047	10,913,313	10,266,734
2042	343,382,213	174,174,022	169,208,191	4,888,531	2,527,600	2,360,931	177,347,549	89,505,749	87,841,800	80,440,132	41,236,399	39,203,733	59,070,781	29,763,315	29,307,466	21,635,220	11,140,959	10,494,261
2043	348,792,059	176,808,367	171,983,692	5,070,374	2,618,999	2,451,375	179,734,633	90,652,750	89,081,883	81,846,656	41,926,465	39,920,191	60,050,412	30,241,813	29,808,599	22,089,984	11,368,340	10,721,644
2044	354,082,824	179,381,963	174,700,861	5,256,571	2,712,528	2,544,043	182,051,952	91,764,542	90,287,410	83,230,542	42,604,687	40,625,855	61,004,787	30,707,528	30,297,259	22,538,972	11,592,678	10,946,294
2045	359,272,285	181,904,005	177,368,280	5,447,901	2,808,584	2,639,317	184,307,612	92,845,305	91,462,307	84,595,156	43,272,847	41,322,309	61,939,248	31,163,219	30,776,029	22,982,368	11,814,050	11,168,318
2046	364,351,846	184,370,156	179,981,690	5,644,352	2,907,158	2,737,194	186,497,064	93,892,746	92,604,318	85,938,401	43,929,906	42,008,495	62,851,958	31,607,958	31,244,000	23,420,071	12,032,388	11,387,683
2047	369,305,216	186,772,208	182,533,008	5,845,603	3,008,082	2,837,521	188,611,572	94,902,429	93,709,143	87,256,296	44,573,865	42,682,431	63,740,338	32,040,466	31,699,872	23,851,407	12,247,366	11,604,041
2048	374,100,412	189,094,078	185,006,334	6,050,674	3,110,851	2,939,823	190,633,739	95,865,505	94,768,234	88,541,263	45,200,907	43,340,356	64,599,987	32,458,584	32,141,403	24,274,749	12,458,231	11,816,518
2049	378,717,563	191,325,743	187,391,820	6,259,575	3,215,465	3,044,110	192,552,819	96,776,491	95,776,328	89,787,981	45,808,342	43,979,639	65,428,541	32,861,126	32,567,415	24,688,647	12,664,319	12,024,328
2050	383,152,677	193,465,077	189,687,600	6,472,946	3,322,242	3,150,704	194,366,379	97,634,102	96,732,277	90,994,969	46,395,395	44,599,574	66,225,822	33,247,953	32,977,869	25,092,561	12,865,385	12,227,176

Table C2: Pakistan Regional Population Forecast: Integrated Education, Health, and Labor Force Cohorts (2023–2050), Decline Due to Family Planning

Year	Region	5-9'	5-14'	5-24'	5-16'	15-29	<30	15-49 WRA	18-60	0-14	15-64	65+	0-18	15-24
2023	Pakistan	32464842	61425240	106307208	71680610	62951802	161065454	56824535	116169719	98113652	135167421	8580885	117885553	44881968
2023	Islamabad	250040	502201	926947	594551	617154	1358057	580380	1271360	740903	1454830	98971	920417	424746
2023	Punjab	15696164	30516894	54057404	35784776	33408189	82336578	30907826	63904190	48928389	73974529	5122382	59095065	23540510
2023	Sindh	7971985	14601455	24878417	16960819	14358480	37737723	12767077	26587575	23379243	30859681	1714694	27944108	10276962
2023	Khyber Pakhtunkhwa	6111746	11394110	19187361	13236062	10749830	28537624	9492222	18507141	17787794	21811066	1335027	21317734	7793251
2023	Balochistan	2434907	4410580	7257079	5104402	3818149	11095472	3077030	5899453	7277323	7067315	309811	8608229	2846499
2025	Pakistan	35718136	66006674	114002445	77067326	66953443	166421272	60232210	122988262	99467829	143399958	9201462	120764758	47995771
2025	Islamabad	272717	539895	1006876	643740	673576	1458821	637066	1396399	785245	1601749	113061	986255	466981
2025	Punjab	17230730	32376490	57344943	38099409	35262555	85154698	32600971	67160472	49892143	77999389	5488848	60874000	24968453
2025	Sindh	8819785	15960536	26962779	18467483	15295074	38921008	13535510	28244912	23625934	32817214	1842305	28491576	11002243
2025	Khyber Pakhtunkhwa	6607890	12209911	20640635	14196384	11540843	29513057	10120875	19748364	17972214	23293821	1417726	21788848	8430724
2025	Balochistan	2787014	4919842	8047212	5660310	4181395	11373688	3337788	6438115	7192293	7687785	339522	8624079	3127370
2030	Pakistan	33226306	68842417	125039159	81230458	77950501	179267331	69302658	142544769	101316830	165827293	10912718	125710938	56196742
2030	Islamabad	277916	588219	1172896	708275	833854	1731449	795167	17711493	897595	2020645	154664	1140326	584677
2030	Punjab	17395557	34580492	63078251	40628815	39940156	91626715	36839697	76651806	51686559	88496055	6459671	63796397	28497759
2030	Sindh	7649907	16479717	29609137	19498712	18140294	41840493	15731834	32819225	23700199	38374991	2240696	29525468	13129420
2030	Khyber Pakhtunkhwa	5665818	12190702	22319464	14494461	13824365	31941263	11859304	23347542	18116898	27467778	1635447	22605800	10128762
2030	Balochistan	2237108	5003287	8859411	5900195	5211832	12127411	4076656	7954703	6915579	9467824	422240	8642947	3856124
2035	Pakistan	32267557	65414628	130980139	81044943	91453221	191014260	79860359	164005327	99561039	192368820	12941395	128786394	65565511
2035	Islamabad	350788	667076	1365060	815934	1016837	2040115	972659	2203944	1023278	2514688	208708	1309624	697984
2035	Punjab	16998124	34351274	66517981	41928635	45497611	97255871	41469374	86283787	51758260	100430001	7527022	65867123	32166707
2035	Sindh	7207856	14868169	30847002	18737951	21963006	44639309	18518213	38326987	22676303	45274276	2783202	29946925	15978833
2035	Khyber Pakhtunkhwa	5830348	11426667	23307791	14216320	16412227	34208005	13852161	27418548	17795778	32347896	1896993	23073183	11881124
2035	Balochistan	1880441	4101442	8942305	5346103	6563540	12870960	5047952	9772061	6307420	11801959	525470	8589539	4840863
2040	Pakistan	33952148	66157448	134586241	78616331	98360334	200303953	88412394	190662382	101943619	215081615	15335955	126908815	68428793
2040	Islamabad	404122	803421	1564251	963819	1152686	2368515	1150278	2711220	1215829	3040279	281659	1491930	768030
2040	Punjab	17307519	34266849	68637207	40960642	49330781	101180148	45735915	98495407	51849367	111825690	8747831	65153080	34370358
2040	Sindh	7798817	15018039	31523306	17775208	23648868	47165319	20592684	45149546	23516451	50676922	3412358	29204204	16505267
2040	Khyber Pakhtunkhwa	6270276	12030365	23897890	14209062	17227636	36015701	15212245	32099849	18788065	36035482	2239213	22925153	11867525
2040	Balochistan	2171414	4038774	8963587	4707600	7000363	13574270	5721272	12206360	6573907	13503242	654894	8134448	4924813
2045	Pakistan	35608993	69505567	134592089	82562505	100320784	206112134	95736602	206940874	105791350	234982357	18498578	131633023	65086522
2045	Islamabad	468174	928267	1791559	1110295	1318882	2709856	1372389	3221022	1390974	3670687	386240	1754549	863292
2045	Punjab	17492263	34763156	68916880	41574361	51144474	103259989	49383855	106947720	52115515	121816636	10375461	65677709	34153724
2045	Sindh	8493112	16305804	31204817	19259552	23741004	48936129	22315815	48766600	25195125	55179135	4220896	31017688	14899013
2045	Khyber Pakhtunkhwa	6657381	12853524	23984894	15187511	17382190	37055871	16491441	34826452	19673681	39581524	2684043	24261220	11131370
2045	Balochistan	2498063	4654816	8693939	5430786	6734234	14150289	6173102	13179080	7416055	14734375	831938	8921857	4039123
2050	Pakistan	36135000	71697803	137586993	85467867	98728507	204884225	102936013	224305198	106155718	254392716	22604243	133375404	65889190
2050	Islamabad	525569	1058685	2098854	1269629	1504907	3066975	1631784	3838736	1562068	4376196	534682	1981818	1040169
2050	Punjab	17273185	34731190	68815789	41665833	51252059	102165872	52716282	115424536	50913813	130968389	12484177	64725899	34084599
2050	Sindh	8888890	17398752	32456147	20612672	22733628	48733287	24078018	52799373	25999659	59778521	5216789	32311476	15057395
2050	Khyber Pakhtunkhwa	6723306	13303428	25029983	15816807	17092031	36865540	17837687	37919816	19773509	43158591	3293722	24710392	11726555
2050	Balochistan	2724050	5205748	9186220	6102926	6145882	14052551	6672242	14322737	7906669	16111019	1074873	9645819	3980472

TECHNICAL NOTE

A: Age-Sex Population Smoothing- Carrier–Farrag Smoothing Method

The Carrier–Farrag method is a demographic graduation (smoothing) technique used to adjust irregularities in age-specific population distributions reported in 5-year age groups. Census and survey data often exhibit distortions due to age misreporting, digit preference (e.g., preference for ages ending in 0 or 5), and age heaping. The Carrier–Farrag method corrects these inconsistencies by applying a weighted moving average across adjacent age groups.

Carrier Farag’s Formula:

The Carrier-Farrag method is a **demographic smoothing technique** applied to age-specific population data arranged in **5-year age groups**. It is primarily used to correct irregularities and smooth inconsistencies due to misreporting, digit preference, or age heaping in census or survey data.

Applicability

Suitable for population data in 5-year age intervals (e.g., 0–4, 5–9, ..., 80+). Applied **independently by sex**, if sex-disaggregated data are available. Used for intermediate age groups; not applicable to the **first two** and **last two** age groups¹.

Formula

Let P_x denote the population in the age group beginning at age x , then the smoothed value P_x is calculated as:

- $P_x^* = 1/16(-P_{x-10} + 4P_{x-5} + 10P_x + 4P_{x+5} - P_{x+10})$
- P_{x-10} and P_{x+10} : These are the populations two intervals below and above age group x . Their coefficients are negative, reducing the influence of outlier values at the edges.
- P_{x-5} and P_{x+5} : These are the populations in the immediately adjacent age groups. They are given moderate weight (coefficient 4) to smooth the distribution based on nearby age groups.
- P_x : The original population in the age group being smoothed. It receives the highest weight (coefficient 10), retaining the central tendency of the distribution.
- Denominator (16): Ensures the result is a weighted average of the five age groups used.

B. United Nations Age–Sex Accuracy Index

1. Purpose

The United Nations (UN) Age–Sex Accuracy Index is a composite measure used to evaluate the quality of reported age and sex data in censuses and surveys. It assesses the extent of:

- Age heaping (preference for ages ending in 0 or 5)
- Age misreporting

¹ For any age group to be smoothed, you must have data for two age groups before and two after.

- Irregularities in sex ratios across age groups
- Inconsistencies in age structure

The index provides a quantitative summary of the reliability of age–sex population distributions before demographic analysis or projection.

Index Value	Interpretation	Data Quality
< 20	Accurate	Age–sex data are reliable and internally consistent
20–40	Moderately inaccurate	Noticeable age misreporting; smoothing recommended
> 40	Highly inaccurate	Severe distortions; substantial correction required

C. Fertility Modelling Approaches

To project and analyses fertility trends, three complementary modelling approaches are employed:

- Logistic Model (Deterministic)
 - Bayesian TFR Model (Probabilistic – UN approach)
 - Bongaarts Proximate Determinants Model (Structural)
- The logistic model is well-suited for bounded demographic processes because it is mathematically designed to handle data that has an **upper and lower limit**, preventing the projection from accidentally suggesting a "zero" or "negative" birth rate, which would be impossible. (**Logistic Regression:** One fixed S-shaped curve. It tells you "This is the path.").
 - BysinTFR (Probabilistic approach of UN Population Division): A probabilistic method to estimate TFR. The **Bayesian approach** is scientific about uncertainty: **Thousands of Trajectories:** It runs the math 10,000+ times. Each time, it adds a bit of "random noise" (since the real world is messy). There is an 80% chance that the fertility in this country/province will be between 1.5 and 2.3 by the year 2050.
 - The Bongaarts model is a demographic model that explains how various factors affect fertility rates. Developed by John Bongaarts, it identifies seven proximate determinants that directly influence fertility: marriage, contraception, abortion, lactational amenorrhea, fecundability, sterility, and sexual intercourse. The model estimates the impact of each factor on reducing fertility, helping policymakers understand how changes in these factors affect population growth. For example, increased contraceptive use can reduce fertility rates, while shorter breastfeeding durations can increase fertility.

These models capture different dimensions of fertility dynamics: trend, uncertainty, and behavioral determinants.

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