DEMOGRAPHIC CHANGES OF NEPAL:
Trends and Policy Implications

Government of Nepal
National Planning Commission

KATHMANDU, NEPAL
MARCH 2017

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Contents

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This timely report about Nepal's changing demography reveals the unique position of the country vis-à-vis its demographic transition. As the population rapidly ages, there will be a higher number of elderly people for each working-age person to support. Nepal's demographic "window of opportunity," in other words the time when the country can reap the demographic dividend before becoming an aged society, is projected to end in around 30 years' time.

This analysis provides robust evidence and convincing arguments for the urgency of investing in children now to ensure that the children of today as well as future generations are far more productive when they enter the workforce. The Government of Nepal is committed to making these investments, particularly in Early Childhood Development (ECD), health and nutrition, and in social protection targeted at children under five years of age, namely the Child Grant.

The message is clear and cannot be ignored. There is a limited time within which to act, for the benefit of today's and tomorrow's children and for society as a whole.

I congratulate the research team of the Population Council, UNICEF, and the Steering Committee members for this insightful and rigorous analysis, the results of which should be widely shared. The Government of Nepal plans to build on the momentum from the launch of this report and the various discussions held on the topic to formulate concrete policies and programmes that will ensure that the window of opportunity is not lost.

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Preface

Nepal has been experiencing very rapid demographic changes in the last few decades as a result of transition from a high-mortality, high-fertility society to a low-mortality, low-fertility society within a relatively short span of time. This transition in itself is an extremely positive outcome of the country's development and something to be really celebrated—an alternative scenario would have been that of a classical "population explosion," i.e. uncontrolled population growth with a persistently high prevalence of poverty and underdevelopment. At the same time, as in the life of an individual human being, achievements in one stage of a country's development often bring new challenges in the next. Looking at Nepal's development in this perspective, there are two major challenges that the country needs to be quickly prepared for: (1) rapid progress of the "ageing" of the society; (2) the duration of the "demographic window of opportunity" period, which is not particularly long compared with other countries that have more advanced economies. This study provides various analyses of these challenges and examines their implications for the country's macro development policies.

Conventionally, an "ageing society" is defined as one where the percentage of people aged 65 years and older (so-called "old-age dependants") accounts for 7 percent or more of the total population. When this proportion doubles (that is, 14 percent or more), the concerned society is called an "aged society." Based on a calculation performed by the Population Council for this study, Nepal will become an ageing society around 2028—another 11 years counting from 2017, and an aged society around 2054—another 37 years counting from 2017. It will therefore take 26 years for Nepal to transit from an ageing society to an aged society. This speed of ageing is very fast and more or less the same as that of Japan, which is one of the fastest ageing societies among the member countries of the Organisation for Economic Co-operation and Development (OECD). Japan went through the same transition process in 24 years between 1970 and 1994. It is also much faster than what today's industrialised

countries had historically experienced: 115 years for France; 85 years for Sweden; 47 years for the UK; and 40 years for Germany. There are many socio-economic implications of this rapid change. One of them is that the onus for working-age people (conventionally defined as those who are between the ages of 15 and 64 years) to support old-age dependants in Nepali society will increase substantially in coming decades. According to the calculations of this study, as of 2015, 11.1 working-age people have been supporting one old-age person in Nepal. By 2050, 5.6 working-age people will need to support one old-age person, which is half of today's ratio in another 33 years counting from 2015. By 2060, this ratio becomes 3.8 working-age people per old-age person—one-third of today's ratio in another 43 years counting from 2015. This will only be possible if children today and subsequent generations to come are raised to become far more productive than today's adults by the time they grow into adults themselves. This in turn necessitates prioritized investments in children today for their healthy and sound growth both physically and mentally.

The "demographic window of opportunity" is a period of time in a nation's demographic evolution when the proportion of the working-age population is particularly prominent. This occurs when the demographic architecture of a population becomes younger and the percentage of people who are able to work reaches its height. Countries that put the right policies in place and necessary investments to back them have been able to effectively take advantage of this opportunity and reap their demographic dividends in the form of accelerated human development and economic growth. That is what today's industrialized countries and "Asian Tiger" economies have historically done. One way to measure the duration of this demographic window of opportunity is to calculate the number of years between (a) the time when the percentage of the working-age population (15 to 64 years of age) vis-a-vis the dependent-age population (0 to 14 years of age, and 65 years and

older) starts to increase (defined as the "start" of the demographic window of opportunity) and (b) the time when the same percentage starts to decrease ("end" of the demographic window of opportunity). According to calculations by the Population Council, by using this measurement the demographic window of opportunity for Nepal will last for 55 years in total. It started around 1992—25 years ago counting from 2017, and will begin to close around 2047—another 30 years counting from 2017. Based on this estimate, the country has so far passed close to half (45 percent) of its demographic window of opportunity period as defined above. The total duration of 55 years for Nepal's demographic window of opportunity is not particularly long compared with those of more affluent economies, such as 60.5 years for Japan, 55 years for Malaysia, 51 years for Taiwan, and 50 years for Hong Kong and South Korea. Together with the above-mentioned analysis of the ageing of the society, this analysis of the demographic window of opportunity also shows the time-sensitive nature of the required policy decisions and actions for Nepal. More specifically, Nepal needs to invest in children on a priority basis now, particularly in such areas as health; nutrition; water, sanitation, and hygiene; education including early childhood development; child protection; and social protection. Doing so is not a matter of charity or adding a "soft" side to economic development, but is fundamental for the country to take maximum advantage of favourable conditions in the remaining period of its demographic window of opportunity and cope with the challenges of the coming ageing and aged society. To be sure, what Nepal requires in this context is not mere "children in number" based on simple pronatalistic policies, but children who are raised to their fullest potential to be able to move the society forward.

Demography is not destiny. At the same time, it does set clear and strong parameters within which countries need to make conscious decisions and take actions in a time-bound manner to make the best of the given situation in one demographic stage and be prepared for opportunities and challenges in the next. Based on the above-mentioned analyses, it is right, justifiable, and necessary to consider the investment in children as an act of "paying forward" to the generations that will support us in our old age and continue to develop our society in the future—just as the concept and practice of old-age benefit has been well accepted by now as a legitimate act of "paying afterward" to those people who have worked hard and supported us in our young age. The result of the analyses in this study shows that this perspective is very much required for the macro development discourse in Nepal today. I would like to take this opportunity to express our sincerest thanks to the National Planning Commission of the Government of Nepal for its very strong and visionary leadership in steering the course of this study, and the Population Council for its superb technical capacity and professionalism.

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Introduction

THE RELEVANCE OF DEMOGRAPHIC CHANGE FOR DEVELOPMENT

The Demographic Transition and the Demographic Dividend

It has long been recognised that size and age structure of populations can have profound implications for societal processes along multiple dimensions, and ultimately for the overall economic and social development of a country. Observed regularities across societies in trends of fertility and mortality decline have been articulated in theories of demographic transition.[i] When the demographic transition follows a swift fertility decline, age structural changes can lead to a specific set of circumstances whereby the relative size and age structure of the population may offer opportunities for breakthroughs in economic development. This is referred to as the demographic dividend.[ii]

The potential for realizing economic benefits from a favourable age structure is typically time-bound and described as a "demographic window of opportunity." Simply stated, the potential for deriving positive economic benefits from a demographic dividend is created as large birth cohorts enter prime earning years while dependency burdens remain relatively small and dependent age groups, both young and old, are smaller relative to the working-age population. Combined with increased investments in savings and human capital, this favourable dependency burden scenario presents a moment of opportunity for investing in the future. If the right investments are made, demographic processes can transform economic prospects for individuals and societies. However, favourable population age structures and the resulting moment of opportunity do not automatically result in demographic dividends and are sensitive to the correct investments. Specifically, strategic and well-timed investments in health, nutrition, water, sanitation and hygiene, education, child protection, and social protection contribute to making essential links that can translate the potential of a favourable age structure to promote human capital and increased savings so that the benefits gained can be invested in the future.

Prominent examples of countries that were able to take advantage of their demographic windows of opportunity to reap significant economic and societal benefits can be observed in East Asia. Patterns of social sector investments combined with a favourable sequence of fertility and mortality decline contributed to the considerable growth of East Asian economies in the 1970s and 1980s.[iii] Early examples include Taiwan, Hong Kong, and Singapore, while Thailand and Malaysia are also counted among countries that invested strategically in education, health, and labour market opportunities for women, which led to dramatic economic growth.

The relative speed of fertility and mortality transitions contributes to how long this window of opportunity lasts. Whereas in developed countries, typical transitions occurred over a relatively long period (over 100 years), demographic transitions in the contemporary developing world are considerably shorter. Declines in fertility and mortality have occurred from historically high to stable low levels over a much shorter period of a few decades. This pattern was evident in the East Asian countries starting in the 1950s and in the countries of South Asia in the 1970s and 1980s. When the appropriate investments are not in place, one cannot expect additional economic growth to result from demographic transitions. Rather, when large cohorts of young people are frustrated because of the absence of opportunities, impoverished nations can not only miss out on the window of opportunity, but they may run the risk of political unrest and conflict associated with high levels of frustration among young people.

Population Ageing and the Ageing Transition

Another regularity of demographic processes is that fertility and mortality transitions are followed by an ageing transition. The speed at which a population ages also has important implications for a country's development. Rapid ageing of populations has the potential to change dependency burdens of populations at paces that cannot be sustained by working segments of the population unless the right investments are made at the right time to increase the productivity of the population. A commonly used metric for quantifying the duration of an ageing transition measures the time taken for populations to go from having percentages over age 65 from 7 to 14 percent, termed as ageing and aged populations, respectively. The time that populations take to go through this ageing transition varies considerably and is influenced by a host of factors such as the pace of demographic transition, rates of in- and out-migration, as well as fertility and mortality trends. It is also important to recognise population ageing as a critical element of the window of opportunity, with implications that are sensitive to social arrangements regarding old-age security as well as institutional mechanisms of saving and investments that allow the working generation to save and invest in their own future. More critically, the investment in the education and health of children towards the goal of increasing their economic potential and ability to save is likely to have long-term implications for processes related to ageing.

NEPAL'S UNIQUE DEMOGRAPHIC TRANSITION

The analysis of Nepal's demographic data over the last several decades indicates that it has not only already experienced the onset of its demographic transition, but that in fact it is experiencing rapid demographic change as a result of positive socioeconomic developments. Within a few decades, Nepal has achieved significant declines in mortality rates, fertility rates, and population growth rates, while experiencing rapid improvements in life expectancy. These are significant development achievements in their own right, as the alternative scenario could have been that of the classical "population explosion" with uncontrolled population growth and persistence of mass poverty. As Nepal has made this rapid transition, achievements along certain development dimensions have also brought about challenges in other dimensions.

Traditional demographic transition theory suggests that demographic changes occur in a certain sequence and in distinct phases. However, due to the nontraditional transition Nepal is undergoing, different aspects of Nepal's demographic changes have occurred simultaneously and outside of traditional transition theory parameters. In addition, Nepal is also experiencing these rapid demographic changes at relatively much lower levels of development. Although Nepal's fertility and mortality declines have reached levels comparable to many middle-income countries, Nepal continues to rank among the least developed countries in the world in contemporary development classifications, with gross national income per capita of US$730 as of 2014. As Nepal considers its policy and investment options to take advantage of its limited demographic window of opportunity, the country needs to make conscious decisions regarding adequate, strategic, and timely investments to reap a demographic dividend, and the stakes for appropriate resource mobilization are significant. Preliminary data suggest that Nepal's demographic window of opportunity would have a total duration similar to that experienced by Japan, Malaysia, Indonesia, and Taiwan, all around 50 years. Similarly, in terms of an ageing transition, from ageing to aged, Nepal's duration is projected to be closer to that of Japan's, which at 26 years is among the fastest ageing transitions in the world.[iv] The similarities of Nepal's demographic transition to Japan and these other countries is striking as they faced critical transitions at much more advanced stages of their socioeconomic development, and thus were significantly more well-resourced and prepared to make the strategic investments needed to catalyze economic growth and social development.

RATIONALE FOR THIS ANALYSIS

It is clear that demographic changes have profound impacts on the society, economy, and people of a country and its development. For Nepal, where demographic changes have occurred under unique circumstances, the need to understand its demographic transition within both a historical context as well as a contemporary and comparative perspective against other countries that have experienced, or are experiencing, similar transitions is critical for informing its own strategies and courses of action as it charts its path for development in the future.

As a result, in September 2016, the UNICEF Nepal Country Office, in collaboration with the Nepal Planning Commission, Government of Nepal,

commissioned the Population Council to conduct a rigorous study on demographic changes in Nepal and its implications for policies and programmes for national development. This study aimed to validate preliminary analyses conducted internally by the UNICEF Nepal Country Office in 2015[v] and to generate up-to-date and methodologically sound estimates of three critical aspects of change in Nepal's population processes: Nepal's demographic transition, the speed of ageing of Nepalese society, and the estimation of the length of Nepal's demographic window of opportunity to reap a demographic dividend.

It is well recognised that a key feature of the analysis of demographic changes and processes is that they are relatively more accurately predictable than many other socioeconomic trends. Demographic estimates and population projections have thus widely been used by governments and policymakers as a policy and planning tool. With the rigorous tools of analysis available that allow for reasonably sound variability, the science of demography can be a remarkably useful tool for development planning. This study is thus also motivated to ensure the inclusion of demographic analysis and evidence as part of the broader development discourse in Nepal.

Beyond its utility for development practitioners and policymakers, an important motivation of this study is to enable access to and to communicate widely the rigorously generated evidence of Nepal's demographic transition, its interpretations, and its implications for Nepal's future to broader civil society. Ultimately, as these transitions and its implications for how Nepal must move forward to achieve its development goals are understood and internalized by all stakeholders, this study aims to put forth policy recommendations that can be considered by the Government of Nepal, development actors, and broader civil society to inform various actions, programmes, and policies that can ensure that Nepal makes optimal gains in its rapid demographic transition.

Results

In this section, we present the most up-to-date, validated estimates from the Population Council's analysis of Nepal's demographic transition and related processes. The results presented here replicate and validate figures from the preliminary analysis conducted by the UNICEF Nepal Country Office in March 2015.[vi] Our results have been generated and validated utilizing the United Nations Department of Economic and Social Affairs' (UNDESA) World Population Prospects (WPP) 2015, which are the most recent available demographic data. All estimations in this study utilize the Medium Variant estimates. In validating and estimating these results, we confirmed the appropriate data sources, assumptions, and calculations.

NEPAL'S DEMOGRAPHIC TRANSITION

The demographic transition occurs when a country transitions from a largely rural agrarian society with high fertility and high mortality rates to a predominantly urban industrial society with low fertility and low mortality rates. There are four stages of the demographic transition: pretransition; early transition; late transition; and post-transition. The first stage, *pretransition*, is characterized by high birth rates and high death rates. During the *early transition* stage, death rates decline but birth rates remain high, resulting in rapid population growth. Next, during the *late transition*, birth rates also decline and rate of population growth slows. The last stage of *post-transition* is characterized by low birth rates and low death rates; population growth is negligible or begins to decline.

Over the last three decades, Nepal has experienced very rapid demographic changes. Since 1980 Nepal has seen significant declines in its total fertility rate, crude death rates, and population growth, alongside significant improvements in life expectancy.

Total Fertility Rates, 1980–2015

Among the demographic changes that Nepal experienced in the last three decades, the decline in its total fertility rate (TFR) has been the most striking. The total fertility rate is the average number of children women would have by the end of their childbearing years if they survive all years and were subject during their whole lives to the fertility rates of a given period. It is expressed as children per woman.[vii] Figure 1 and Table 1 show the total fertility rates in Nepal from 1980 to 2015. During this time, total fertility rates declined by more than half, from 5.62 children per woman in 1980–85 to 2.32 children per woman in 2010–15.

Figure 1. Total fertility rates 1980–2015
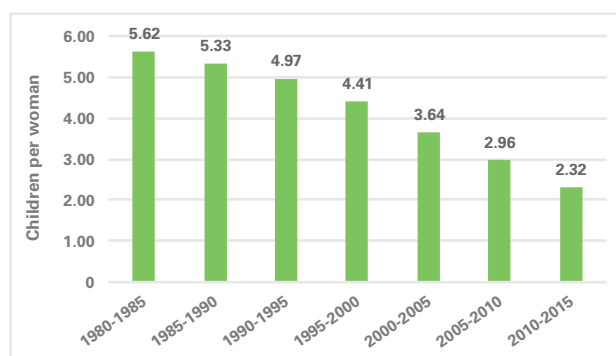
Source: World Population Prospects (WPP) 2015: FERT/4: Total fertility by major area, region and country, 1950-2100 (children per woman).

Crude Death Rates, 1980–2015

Similarly, Nepal saw its crude death rate decline by more than half in the same period. The crude death rate is the average annual number of deaths per 1,000 population over a given time period. Table 1 shows crude death rates in Nepal decreasing from 16.9 deaths per 1,000 in 1980–85 to 6.5 in 2010–15.[viii]

Life Expectancy at Birth, 1980–2015

Another indicator of human development that has seen striking improvement has been life expectancy at birth. Estimates of present life expectancy at birth the average number of years of life expected by individuals assuming mortality rates of a given period remain constant throughout their lives. It is expressed as years. Table 1 shows that for Nepal life expectancies increased between 1980 and 2015[ix] by over 20 years. In 1980–85, life expectancy at birth was 48.34 years. Over the 35-year period, life expectancy increased to 69.01 years by 2010–15.

Table 1. Nepal total fertility rates, crude death rates, life expectancy at birth, 1980–2015

Period	Total fertility rate[1]	Crude death rate[2]	Life expectancy at birth[3]
1980–85	5.62	16.9	48.34
1985–90	5.33	14.3	52.13
1990–95	4.97	11.6	56.44
1995-2000	4.41	9.4	60.51
2000–05	3.64	7.8	64.06
2005–10	2.96	7.0	66.79
2010–15	2.32	6.5	69.01

Sources:
1. WPP 2015: FERT/4: Total fertility by major area, region and country, 1950-2100 (children per woman).
2. WPP 2015 MORT/2: Crude death rate by major area, region and country, 1950-2100 (deaths per 1,000 population).
3. WPP 2015 MORT/7-1: Life expectancy at birth (both sexes combined) by major area, region and country, 1950-2100 (years).

Population Growth and Change, 1980–2010

Nepal's population growth rates, annual population change, births, deaths, and net migrants have also seen significant change in the past three decades and are presented for Nepal for 1980 to 2010 (Table 2). The population growth rate is the average annual exponential rate of population change over a given period.[x] In Nepal, population growth rates have increased then declined since 1980. In 1980–85, the average annual rate of population change was 2.31 percent. This rate increased to 2.64 percent by 1990–95. However, by 2005–10, this growth rate declined to 1.05 percent per year over the time period. Over the past decade, Nepal's growth pattern (average annual rate of 1.11 percent) is relatively lower compared to that of its neighbours in the South Asia region (1.42 percent), and significantly lower than that of the rate for Least Developed Countries (LDCs), estimated at 2.37 percent (Table 3).

Population change or the change in the number of individuals in a region is calculated as the sum of natural population growth (births[xi] *minus* deaths[xii]) and net migration[xiii] (in-migration *minus* out-migration). Over the last 30 years, the annual change in the Nepali population increased then declined (Table 2). In the 2005 to 2010 period, the population change per year was 274,000. Between 1980 and 2000, births increased but deaths declined and outmigration increased leading to comparatively larger increases in the population. Subsequent declines in births and increased outmigration have led to declines in the population change per year.

Table 2. Nepal population growth rate, change, and components of change: 1980-2010

	ANNUAL VALUES (calculated from five-year values)				
Period	Population growth rate[1] (%)	Population change per year (Births per year – Deaths per year) + (Net migration per year) (thousands)	Average number of births per year[2] (thousands)	Average number of deaths per year[3] (thousands)	Average net number of migrants per year[4] (thousands)
1980–85	2.31	365	652	267	-20
1985–90	2.29	405	702	253	-43
1990–95	2.64	530	748	233	15
1995-2000	2.08	470	775	212	-93
2000–05	1.44	353	731	193	-185
2005–10	1.05	274	662	183	-205

Sources:
1. WPP 2015: POP/2: Average annual rate of population change by major area, region, and country, 1950-2100 (percentage).
2. WPP 2015: FERT/1: Births (both sexes combined) by major area, region and country, 1950-2100 (thousands).
3. WPP 2015: MORT/3-1: Deaths (both sexes combined) by major area, region and country, 1950-2100 (thousands).
4. WPP 2015: MIGR/2: Net number of migrants (both sexes combined) by major area, region and country, 1950-2100 (thousands).

Table 3. Nepal population growth rate by decade: 2000-2015

| | Annual population growth rate | |
Region	2000–10	2005–15
Least developed countries	2.43%	2.37%
South Asia	1.59%	1.42%
Nepal	1.24%	1.11%

Sources:
Population Council calculation of annual growth rate using total population estimates. WPP 2015 POP/8-1: Total population (both sexes combined) by broad age group, major area, region and country, 1950-2100 (thousands) 2020-2070 uses medium variant.

The rapid demographic changes observed are noteworthy as these changes have occurred at an impressive pace and will make significant contributions to the achievement of Nepal's development goals. At the same time, they present unique challenges for Nepal as it strives to achieve its development goals in the future. The impact of these rapid demographic changes will manifest itself in several forms, as described below. The impacts of each of these changes must be understood by policymakers and stakeholders, and conscious decisions and actions must be taken on the basis of the evidence around these changes as Nepal plans its development agenda moving forward.

Changing Age Structure

Population age pyramids: 1980, 2015, 2050

One key impact of the rapid demographic changes in Nepal is that its population structure will experience dramatic changes as well. Population age pyramids show the distribution of a population by sex and age group as a percentage of the total population.[xiv] Figure 2 shows the expected trajectory of the population distribution for Nepal from 1980 to 2050. In 1980, the pyramid shows Nepal with a young and growing population—large proportions of young people and smaller proportions in older age groups. The shape of this population age structure pyramid is still that of a classical "population pyramid," in which the youngest segment of the population is also its largest segment. As of 2015, the Nepal's population pyramid has begun to experience change. The population pyramid, now with a "dent" at the bottom, indicates that the population is beginning to experience a decline in the population of children under the age of 10. The population pyramid shows that it is still young, with the largest segment between the ages of 10 and 14, but that it is experiencing slower growth. However, by 2050, population estimates predict Nepal's population age structure will experience dramatic change. By 2050, Nepal will have transitioned to an ageing population with large proportions in older age groups. The two largest segments of the Nepali population in 2050 will be in the 45–49 and 50–54 age groups. Nepal will have made this dramatic transition in just 33 years
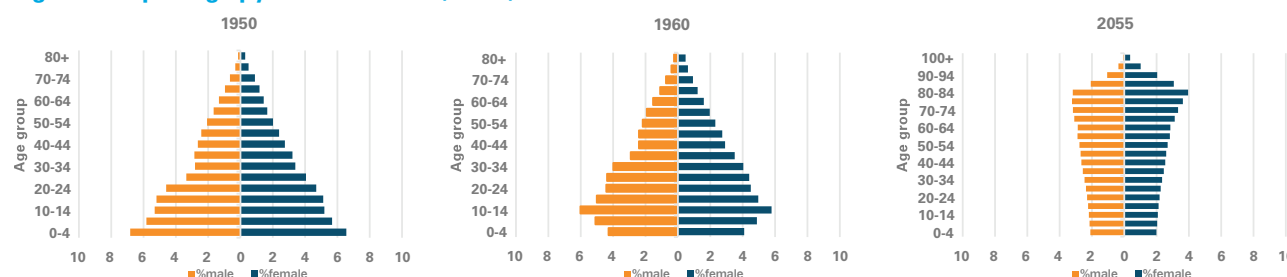
Figure 2. Nepal age pyramids for 1980, 2015, and 2050
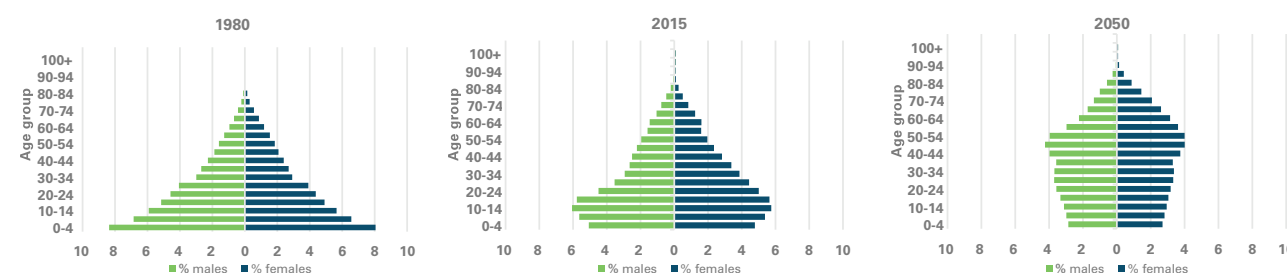
Sources:
1. WPP 2015, POP/7-2: Male population by five-year age group, major area, region and country, 1950-2100 (thousands).
2. WPP 2015, POP/7-3: Female population by five-year age group, major area, region and country, 1950-2100 (thousands).

Figure 3. Japan age pyramids for 1950, 1960, and 2055

Sources:
1. WPP 2015, POP/7-2: Male population by five-year age group, major area, region and country, 1950-2100 (thousands).
2. WPP 2015, POP/7-3: Female population by five-year age group, major area, region and country, 1950-2100 (thousands).

from now. The population age structure changes that Nepal is expected to make are similar to the changes that Japan has experienced since 1950. The transition in Japan, referred to by The Economist as the "Pyramid to Kite" transition, shown in Figure 3, shows that the largest segments of the Japanese population in 2055 are projected to be in their 70s and 80s in age. The similarity in the projected transitions between Nepal and Japan, just several decades apart, attests to the speed at which Nepal's population is changing.

Transition from Ageing and Aged Population in Nepal, 1950–2100

One commonly used international standard for measuring the speed at which a society ages is the estimation of the duration of time it takes for a population to transition from an ageing to aged society based on when the proportion of the population aged 65 years and over transitions from accounting for 7 percent of the total population (ageing society) to 14 percent of the total population (aged society).[xv] The timing of Nepal's transition from an ageing to an aged society under this operationalisation is shown in Figure 4. Based on the most up-to-date projections, Nepal will transition to an "ageing society" in 2028, just 11 years from now and into an "aged society" by 2054, making the transition from "ageing" to "aged" in just 26 years.

Ageing and Aged Population in Nepal Compared to Other Countries

When compared to a number of countries in Asia, Nepal has a similar expected length of transition from ageing to aged.[xvi,xviii] Nepal's transition from ageing to aged, which is projected to take 26 years, is similar to

the transition made by Japan from 1970 to 1994 (24 years). Many of the East Asian and some Southeast Asian countries that have comparable projected lengths of this ageing transition are already in their transition periods (Table 4) and are making their transitions at significantly more advanced stages in their development. However, compared to western industrialized European countries such as France, Germany, Sweden, and the UK, that have already completed their ageing transitions, Nepal has a significantly shorter length of transition (Figure 5).

Table 4. Transition from aging to aged society

| | Year | | |
	7%	14%	Length
Vietnam	2016	2034	18
South Korea	1999	2017	18
Singapore	1998	2018	20
Thailand	2002	2022	20
China	2002	2024	22
Taiwan	1994	2017	23
Japan	1970	1994	24
Malaysia	2020	2044	24
Indonesia	2027	2053	26
Nepal	2028	2054	26
Hong Kong	1983	2012	29
Philippines	2031	2071	40

Source:
1. WPP 2015 POP/8-1: Total population (both sexes combined) by broad age group, major area, region and country, 1950-2100 (thousands); 2020-2070 uses medium variant.
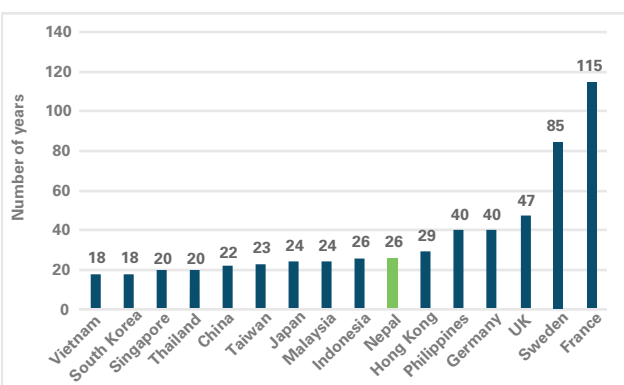
Figure 4. Nepal proportion of population aged 65 and older, 1950–2100
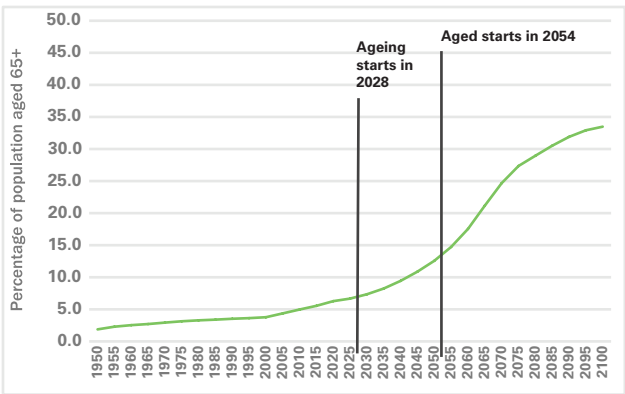
Source:
1. WPP 2015 POP/8-1: Total population (both sexes combined) by broad age group, major area, region and country, 1950-2100 (thousands); 2020-2070 uses medium variant.

Figure 5. Length of transition from ageing to aged populations–Nepal and other countries

Source:
WPP 2015 POP/8-1: Total population (both sexes combined) by broad age group, major area, region and country, 1950-2100 (thousands); 2020-2070 uses medium variant and Oizumi (2013).

Changing Potential Support Ratio, 1980–2100

As the population of Nepal is expected to age rapidly, the number of elderly persons to be supported by working-age people will also continue to increase over time. This figure can be presented in the form of a potential support ratio, which is the ratio of people aged 15–64 years per one person aged 65 years and older in the population.[xviii] Simply put, this is the number of working-age people required to support one elderly person. Figure 6 shows the potential support ratio for Nepal between 1980 and 2100. In 1980, when the population was relatively young, there were 16.8 working-age people per one old-age adult. However, as the population ages, the ratio of working-age people to old-age dependants is on the decline. By 2015, the potential support ratio has declined to 11.6 working-age people per one elderly person, a reduction of 33 percent in 35 years. This ratio is projected to decline at even faster rates. By 2050, this figure is projected to be 5.6 working-age people per one elderly person, half of today's ratio in another 33 years. Most strikingly, this ratio is projected to decline to 3.8 and 1.6 by 2060 and 2100 respectively, a third and a tenth of today's ratio in just 43 years and 83 years, respectively.

DEMOGRAPHIC DIVIDEND AND WINDOW OF OPPORTUNITY

Although Nepal is projected to age at rapid rates, projections of Nepal's population age structure also suggest that it will remain a relatively young country for a number of years into the future. As a country progresses through the demographic transition, shifts in the age structure cause the working-age population

to increase relative to the dependent children and elderly populations. This results in the potential for a demographic dividend, which is the accelerated economic growth that may result from this favourable demographic scenario. This demographic dividend, as noted above, however is not guaranteed. Only when combined with strategic and timely investments in human capital and savings, can this favourable demographic scenario transform the economic prospects of individuals and societies.

More important, as demographic changes are dynamic, the time period within which a country can reap a demographic dividend is finite, and is called the "demographic window of opportunity." With fewer births each year, dependency ratios change as a country's dependent population (14 and younger and 65 and older) declines in relation to the working-age population (15 to 64). When a country has fewer people to support, there is a window of opportunity for rapid economic growth if the needs of young people are prioritized. The window of opportunity occurs when the dependency ratio is about 60 dependants for every 100 working-age adults. For Nepal, population estimates suggest that this window of opportunity is not particularly long when compared with other countries. Below, we present changes in three key population age groups that determine the demographic window of opportunity, presenting relative comparisons, growth rates, and projections to estimate the length of the demographic window of opportunity for Nepal.

Population of Children, 1980–2070

The first segment of the population of salience to the demographic dividend is the population of children. As observed in the population pyramids above,
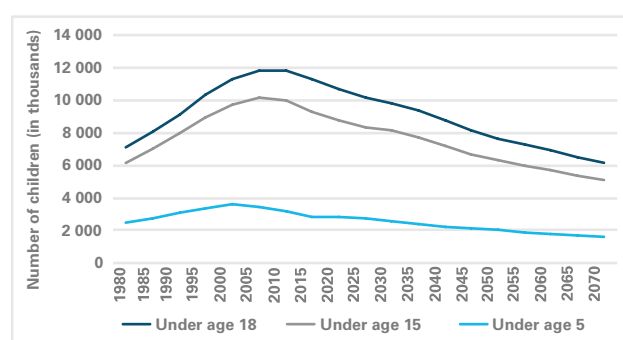
Figure 6. Nepal potential support ratio: 1980-2100
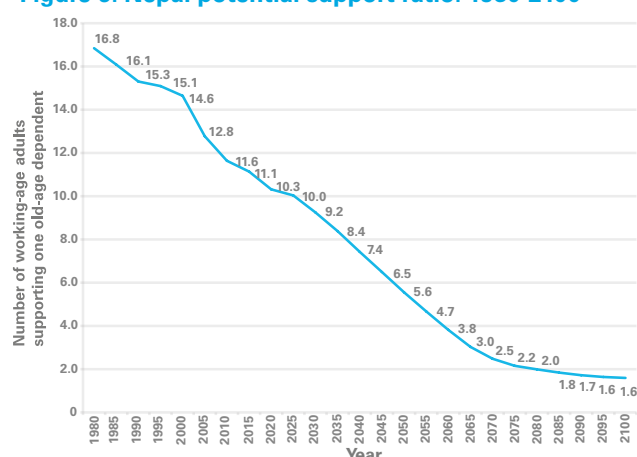
Source:
WPP 2015: POP/14-A: Potential support ratio (15–64/65+) by major area, region and country, 1950-2100 (ratio of population 15–64 per population 65+).

Figure 7. Nepal potential support ratio: 1980-2100

Source:
WPP 2015: POP/14-A: Potential support ratio (15–64/65+) by major area, region and country, 1950-2100 (ratio of population 15–64 per population 65+).

the population of children in Nepal has begun to experience decline. In Figure 7, the Nepali population of children by age groups (under ages 5, 15, and 18) is presented as a line graph for 1980 to 2070.[xix] This shows that the population of children reached its peak in 2005 to 2010 and subsequently began to experience decline. Projections show that it will continue to decline over the next 50 years.
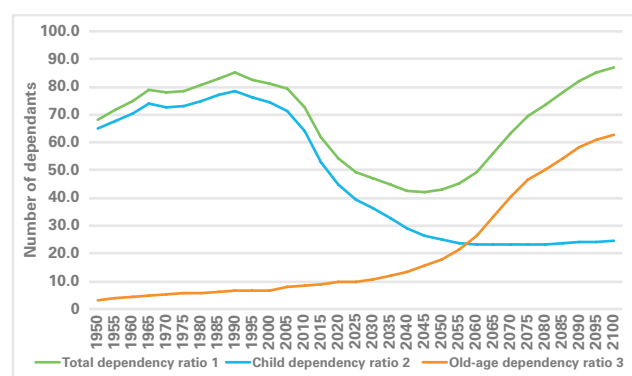
Old-age Dependency Ratio, 1980–2100

The second population of salience is that of the elderly population aged 65 and older. As discussed above, the population of Nepal aged 65 and older is expected to rise consistently in the next 50 years. As the population ages, the old-age dependency ratio, which is the number of people 65 years and over per 100 people 15–64 years will increase as well.[xx,xxi] Table 5 shows the old-age dependency ratio for Nepal from 1980–2100. In this period, this figure is expected to show steady increase, particularly until about 2065. In 1980, there were 5.9 people aged 65 and older per 100 people in the working-age population. By 2100, this figure is projected to rise to 62.7 people aged 65 and older per 100 in the working-age population.

Total, Child, and Old-age Dependency Ratios, 1950–2100

The dynamics of the changes in dependency ratios are key drivers of how long a country's demographic window of opportunity will last. The total dependency ratio is calculated as a ratio of the entire dependent population (children and the elderly) to the working-age population.[xxii] The child dependency ratio is

calculated as a ratio of the child to working-age population.[xxiii] The old-age dependency ratio is calculated as the ratio of the elderly to the working-age population.[xxiv] Figure 8 shows the trajectories of the dependency ratios between 1950 and 2100. The total dependency ratio reached a peak in the 1990s. Since then, the total and child dependency ratios have declined. However, it is projected that from 2055 on, the total dependency ratio will increase as the child dependency ratio remains stable and the old-age dependency ratio increases. This signifies that the window of opportunity for Nepal to take advantage of a favourable dependency ratio is finite.

Table 5. Nepal, old-age dependency ratio for 1980 to 2100

Year	Old-age dependency ratio [1]	% increase every 5 years [2]
1980	5.9	n/a
1985	6.2	5%
1990	6.5	5%
1995	6.6	1%
2000	6.8	3%
2005	7.8	15%
2010	8.6	10%
2015	9.0	4%
2020	9.7	8%
2025	10.0	3%
2030	10.8	9%
2035	11.9	10%
2040	13.5	13%
2045	15.4	14%
2050	18.0	17%
2055	21.4	19%
2060	26.2	22%
2065	33.0	26%
2070	40.3	22%
2075	46.4	15%
2080	50.2	8%
2085	54.3	8%
2090	58.1	7%
2095	61.0	5%
2100	62.7	3%

Figure 8. Number of dependants per 100 people of working age, 1950–2100

Sources:
1. WPP 2015 POP/11-A: Total dependency ratio (<15 & 65+)/(15-64) by major area, region and country, 1950-2100 (ratio of population 0-19 and 65+ per 100 population 15-64).
2. WPP 2015 POP/12-A: Child dependency ratio <15/(15-64) by major area, region and country, 1950-2100 (ratio of population 0-14 per 100 population 15-64).
3. WPP 2015 POP/13-A: Old-age dependency ratio 65+/(15-64) by major area, region and country, 1950-2100 (ratio of population 65+ per 100 population 15-64).

Sources:
1. WPP 2015: POP/13-A: Old-age dependency ratio 65+/(15-64) by major area, region and country, 1950-2100 (ratio of population 65+ per 100 population 15-64).
2. Calculated as the percentage change in old-age dependency ratio every 5 years.

Figure 9. Population growth rates by age group and working status, 1975–2075
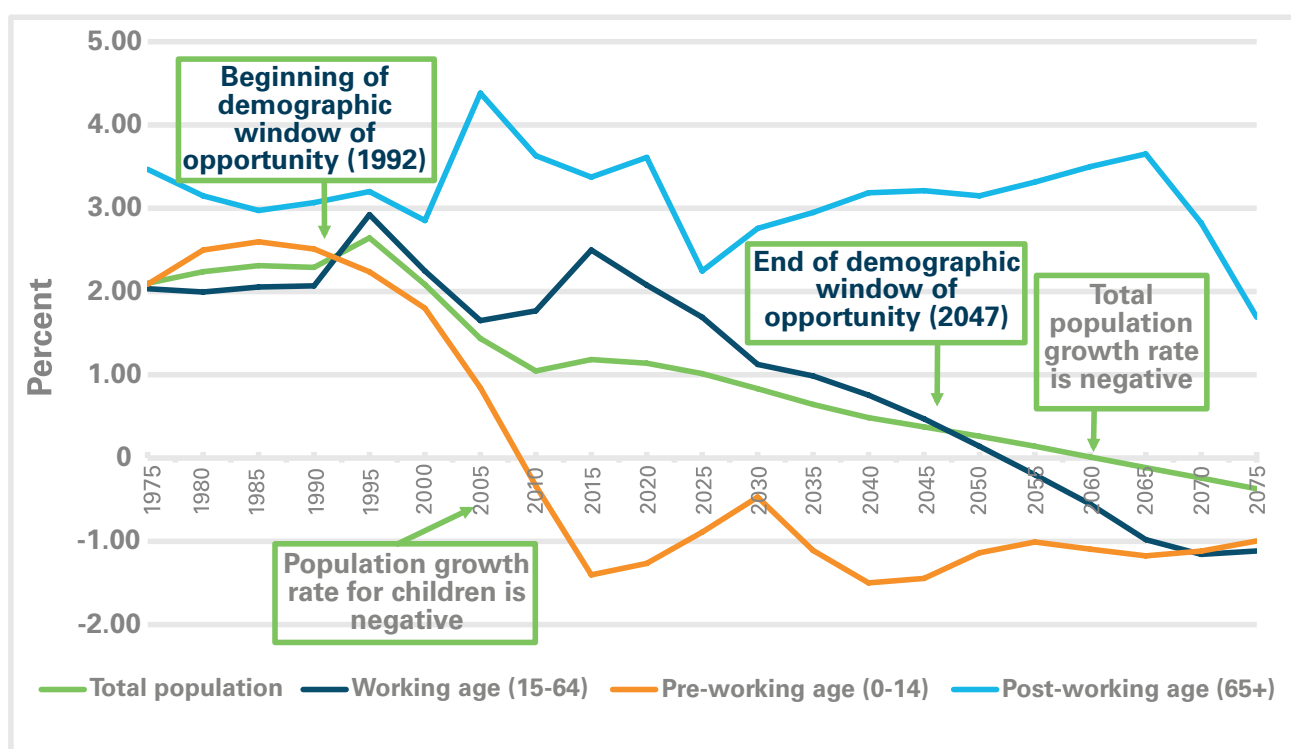

Sources:
1. WPP 2015 POP/2: Average annual rate of population change by major area, region and country, 1950-2100 (percentage).
2. WPP 2015 POP/8-1: Total population (both sexes combined) by broad age group, major area, region and country, 1950-2100 (thousands) 2020-2070 uses medium variant.
3. Calculation of average exponential rate of growth of the population over a given period. It is calculated as ln(Pt/P0)/t where t is the length of the period.

Population Growth Rates by Age Group and Working Status, 1975–2075

For a more precise determination of Nepal's demographic window of opportunity, we take into account growth rates for the total population, working-age population, and dependent populations. The demographic window of opportunity arises during the period of time when the dependency burden is lessened due to the prominence of a large and growing working-age population vis-à-vis the dependent populations. The window occurs as the working population grows while child and old-age dependency ratios remain small. In a typical transition the window opens when the working-age population gains prominence while birth rates fall, thus slowing the growth of the younger dependent population under the age of 15. The window lasts until the elderly population, although growing, is still relatively small.[xxv]

To determine the window of opportunity for Nepal, the figures for the growth rates for these population subgroups are presented for 1975–2075 in Figure

9.[xxvi] The demographic window of opportunity for the demographic dividend occurs when the growth rate of the working-age population (ages 15–64) is greater than the total population growth rate, which encompasses the dynamics of the elderly and young population growth rates vis-à-vis the working-age population.[xxvii] The window closes when the total population growth rate begins to exceed the rate of growth of the working-age population. Figure 9 shows that Nepal is currently within the demographic window of opportunity. The window began in 1992 when the growth rate of the working-age population first exceeded the overall total population growth rate. The window of opportunity is predicted to end in 2047 when the growth of the working-age population will for the first time since 1992 fall below the total population growth rate. Thus, the demographic window of opportunity is projected to be 55 years. It is important to note that according to these calculations, Nepal has already spent 25 years—45 percent of its window of opportunity—and has 30 years remaining to reap this dividend.

Demographic Windows of Opportunity for Nepal and Other Asian Countries

The length of Nepal's window of opportunity is not very different from the windows of opportunity experienced by some of Nepal's East Asian neighbours. A comparison of the length of the demographic windows for Nepal and other Asian countries is shown in Figure 10.[xxviii,xxix] Figure 10 shows that Nepal's demographic window of opportunity, at 55 years, is similar to that of Indonesia, Malaysia, and Taiwan, all of which have either already experienced or are experiencing their windows of opportunities at more advanced stages of their development (Table 6).

Table 6. Demographic window of opportunity for Nepal and other Asian countries

Country	Year		Length
	Start	End	
Thailand	1966	2010	44
China	1968	2012	44
Singapore	1966	2012	46
Hong Kong	1964	2011	47
South Korea	1968	2016	48
Taiwan	1963	2014	51
Indonesia	1973	2025	52
Malaysia	1966	2021	55
Nepal	1992	2047	55
Japan	1930–35	1992	59.5
Philippines	1966	2055	89

Sources:
1. WPP 2015 POP/2: Average annual rate of population change by major area, region and country, 1950-2100 (percentage).
2. WPP 2015 POP/8-1: Total population (both sexes combined) by broad age group, major area, region and country, 1950-2100 (thousands)
2020-2070 uses medium variant.
3. Average exponential rate of growth of the population over a given period is calculated as $\ln(P_t/P_0)/t$ where t is the length of the period.
4. Japan and Taiwan estimates from Oizumi (2013).

Policy Implications

While demography is not destiny, broad population trends set the parameters of expected economic trends of a society and, thus, available and strategic policy options. A historical perspective of the demographic trends themselves show how they are influenced by and sensitive to policy actions of the past. In this section we highlight some strategic investments that can have important implications for the present demographic stage of Nepal. In particular, taking stock of the stage of demographic transition highlights the importance of time-sensitive investments for a better future.

As we have shown, Nepal has experienced rapid declines in birth and death rates over the past three decades, creating favourable conditions with respect to the size of the burden of dependants on the workforce. The investments now that will reap the most benefits in the future are ones that strengthen the workforce of the future. The experience of high-growth economies in East Asia, the so-called "East Asian tigers," that have captured demographic dividends suggest that investing in the early years of life in a timely manner is critical for ensuring a healthy and productive workforce. Similarly, the East Asian tigers also made strategic investments to ensure the engagement of women in the economy to expand the size of the productive workforce by including women who were previously not fully included.

Figure 10. Length of demographic window of opportunity for Nepal and other Asian countries
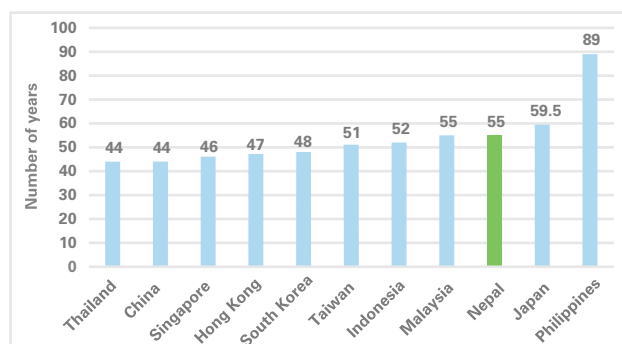
CAPITALIZING ON PAST INVESTMENTS

In addition to the implications of changing dependency burdens of the future, it is important to recognise the historical importance and continued relevance of past investments in order to build upon such investments. Investments in public health resulted in reducing death rates and birth rates. As more children survive and parents have fewer children, they are more motivated to invest in the quality of those children. Parental investments in children's quality require the support of policy through infrastructural support in health and education. Investments in the health, education, and productivity of the future workforce can also reduce dependency burdens by making the dependant (elderly) more self-sufficient in the future. Investments that can enable workers to save productively will similarly promote self-sufficiency when they are no longer able to work. Similarly, as schooling becomes universal and the demands of the workforce and the economy change, investments will need to focus around early childhood education and incomplete primary and secondary education, especially for women and girls.

Lengthening the Window of Opportunity

Unlike the demographic experience of East Asia where age at marriage is traditionally higher, Nepal began the demographic transition while age at marriage and first birth was still low. That presents a new kind of opportunity. There is room for investments in policies to lengthen the demographic window of opportunity through later marriage and later births (Figure 11). These will also call for greater investments in education and health that promote opportunities for girls and women. Here again, the experience of Korea, Taiwan, Indonesia, Malaysia, Vietnam, Thailand, and China, economies that ensured educational opportunities for women and their productive engagement in the workforce, are relevant.[xxx] All these economies had a combination of security, strong local institutions, and a significant role of government ensuring that these investments took place.

Sources:
1. WPP 2015 POP/2: Average annual rate of population change by major area, region and country, 1950-2100 (percentage).
2. WPP 2015 POP/8-1: Total population (both sexes combined) by broad age group, major area, region and country, 1950-2100 (thousands) 2020-2070 uses medium variant.
3. Calculation of average exponential rate of growth of the population over a given period. It is calculated as ln(Pt/P0)/t where t is the length of the period.

DEMOGRAPHIC DIVIDEND AS EDUCATION DIVIDEND

There is a growing body of evidence globally that economic achievements are linked to educational attainment[xxxi,xxxii] not just later in life but also during early childhood.[xxxiii] New analysis of the demographic dividend at the International Institute for Applied Systems Analysis (IIASA) suggests that in most settings the demographic dividend is an education dividend.

Now more than ever, investments in education are critical for economic growth as education is essential for ensuring faster uptake of technology. Policy prescriptions for sustainable development with a view to taking advantage of the demographic dividend need to recognise that Nepal represents a unique case. First, the demographic transition is occurring at a relatively low stage of development; second, fertility decline is well underway with the average TFR at 2.6 births per woman. There is universal primary education, but also every indication of poor educational quality and high levels of school dropout due to the prevalence of early

marriage and low productive opportunities for girls and women. Whereas some of these characteristics are associated with early transitions, fertility levels are similar to late-transition societies.[xxxiv]

Thus, the relevant priorities of Nepal at the current juncture are to improve maternal and child health and nutrition to reduce child mortality, expand education without letting girls fall behind, and prevent early school dropout and delay marriage by expanding educational and work opportunities for young people, especially women.

"Improving the education system, raising the status of women, and reducing child mortality are policy measures that are desirable in their own right. Indeed, most governments already pursue these socially desirable objectives independent of their potential role in lowering the rate of childbearing. The demographic benefits strengthen the rationale for intensifying these social policies."
—John Bongaarts in *Science (1994)*[xxxv]

Investing in Early Childhood Development

Fortunately, there is encouraging evidence to suggest that there are promising territories in terms of cost-effective investments that can allow us to explore strategies of raising more productive future generations. There are opportunities for broad social protection investments in children that have the potential to impact large segments of the population. Nepal has relevant experience: a Child Grant was introduced in 2009/10 to support better nutrition for children under five years of age (see Box 1). In terms of the timing of investment in life, no period will be more cost-effective than childhood. There is increasing evidence, including from the work of Nobel laureate James Heckman, that investment in early childhood development (ECD) is the most cost-effective among all the social investments. The "first years last forever," hence the need to "invest early."[xxxvi] There are also many new frontiers opening up through the development of technologies that Nepal can and has already begun to adapt, such as in alternative energies and information technologies.

BOX 1. INVESTING IN CHILDREN: NEPAL'S CHILD GRANT

Intervention in the early years is crucial to ensuring that children grow up to their full potential. International evidence shows that social protection programmes for children can lead to reductions in stunting, improved health outcomes, and increased school attendance.

The Child Grant was introduced in Nepal in 2009–10 to support better nutrition for children under five years of age. It was initially targeted to all under-fives in the Karnali region and Dalit families across the country. Early evidence on the program shows that it has led to substantial increases in birth registration among the beneficiary population and that households use the grant for food, clothing, and other basic needs.

The Government committed in 2016–17 to gradually expand the program to reach all children under five across the country, which is a major step forward. The rollout of the expansion is starting in three districts: Acham, Bajhang, and Rautahat. It is crucial that the expansion strategy is committed to policy with a long-term financial commitment until it reaches every child in Nepal.

For more information, see: Paying Forward: Benefits of Nepal's Child Grant for current and future generations, UNICEF Policy Brief, November 2016.

Urgent and Time-Sensitive Policy

Finally, it is important to highlight the urgency and time sensitivity of these investments. The window of opportunity is short in a manner that is similar to the historical experience of Japan.

- Nepal's window of opportunity will close as it rapidly progresses through the process of ageing. It is anticipated that in 50 years there will be about 3 working-age people for every elderly person, down from 11 today.
- While these trends are inevitable, in present-day Nepal we can learn from the experience of ageing societies struggling with the maintenance of social security systems to plan for a strategy to ensure old-age support that recognises the critical role of investing in children today.
- Children of today and of future generations need to become far more productive by the time they become adults themselves in order to support the substantially greater number of elderly dependants per working-age person than today and simultaneously continue to develop the country.
- To attain these gains, it is essential for Nepal to invest in children now. First, as shown above, the time left to reap the benefits of the demographic window of opportunity is finite. In 2017, Nepal is close to the halfway mark of a window of demographic opportunity that opened in 1992 and will close by 2047. The window will start to close in another 30 years.

Thus, the relevant priorities of Nepal at the current juncture are to improve maternal and child health and nutrition to reduce child mortality, expand education without letting girls fall behind, and prevent early school dropout and delay marriage by expanding educational and work opportunities for young people, especially women.

Issues for Further Policy Deliberation

The current analysis demonstrates in general ways some of the broad implications of anticipated and known demographic trajectories that can be useful in the policy discourse regarding investments for a better future for Nepal. We have intentionally confined ourselves to discussion of the implications of demographic transitions at the aggregated national level and have highlighted the importance of population trends in broad strokes. There are at least two other specific conversations that need to be a part of any deliberation about Nepal's demographic future: migration and regional disaggregation. Migration

patterns will have profound implications for dependency ratios, productivity and savings, and the importance of regionally disaggregated analysis of demographic trends. Migration to and from regions will have important implications for regional disaggregation within the country, as will patterns of international migration. Regional disaggregation of trends is necessary if not essential for the purposes of local-level planning and program implementation.

CONCLUSION

The analysis presented in this study represents a critical first step in paving the way for demographic analysis and evidence to be included in the development discourse in Nepal. While further analysis, on issues noted above, will strengthen the ability of the evidence to contextualize and tailor policy and programmatic interventions, the national figures on demographic changes in Nepal presented in this study suggest that we have a limited window of time within which we must act. Moreover, our findings suggest that an essential first step is to realize the importance of strategic early investments with a focus on equity and children, not only as a matter of social justice, but also as smart economics.

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