Chapter 8
The Developing World's Fertility Transition: 2000–2020

8.1 Introduction

In Chap. 1 we identified three phases in the developing world's aggregate fertility transition: a 1950–1970 pre-transition phase, a 1970–2000 rapid decline phase, and a 2000–2020 slow decline phase with low fertility. In the pre-transition phase, the developing world's fertility was high with an average TFR of about six throughout the period (Fig. 1.1); only a small number of developing countries began their fertility transitions prior to 1970 (Fig. 2.1). During the period from 1970 to 2000 most countries began their fertility transitions, with diverse starting times and transition trajectories (Fig. 2.4). After 2000 the countries of the developing world no longer possessed a common fertility trend or fertility level. In 2020 the TFRs of the 97 developing countries we examined in detail in Chap. 2 ranged from a high of 6.7 (Niger) to a low of 1.1 (South Korea), and the aggregate (weighted) TFR of all countries, 2.6, was only slightly lower than its turn-of-the-century level, 2.9. In the midst of this diversity, telling a single fertility story for the period 2000–2020 that encompasses all developing countries is impossible.

Dividing the 97 developing countries with population above 1 million[1] into three fertility groups based on their 2020 fertility levels permits a more accurate representation of the contemporary situation (Table 8.1). Country population sizes within each of the three fertility groups vary greatly. Since our focus is on understanding how conditions vary across the populations within the three fertility groups, all data for regions in this chapter will be weighted by population size. For example, when the 2020 TFR of the high fertility group is reported as 4.9 in Table 8.1, it is the average TFR of the entire population living in all high fertility countries. Since over 70% of the developing world's population now lives in low fertility countries, the "All 97 Countries" data tracks closely to the low fertility group's data.

[1] These 97 countries contain 6.33 billion people which amounts to 97% of the developing world's total population of 6.52 billion.

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Table 8.1 Size and growth of three fertility groups, 2020

TFR level, 2020	Number of countries	Population size 2020 (million)	Average TFR 2020	Rate of pop growth 2015–2020	Percent pop of Dev world	Percent pop of world
Low: below 2.5	42	4,676	2.0	0.9	72	60
Middle: 2.5–4.0	26	702	3.3	2.0	11	9
High: above 4.0	29	953	4.9	2.8	15	12
Total	97	6,331	2.6	1.3	97	81

Sources TFR, UN: POP/DB/WPP/Rev.2019/INT/F01
Population Size, UN: POP/DB/WPP/Rev.2019/SA1/POP/F01-1
Annual Population Growth Rate, 2015–2020, UN: POP/DB/WPP/Rev.2019/SA1/POP/F03

The "low" fertility group consists of 42 countries with TFRs below 2.5; all have completed their fertility transitions. This low fertility population has a 2020 TFR of 2.0 and an annual population growth rate below 0.9%. The "middle" fertility group consists of 26 countries with TFRs between 2.5 and 4 that have made substantial progress traversing their fertility transition. This middle fertility population has a TFR of 3.3 and an annual population growth rate of 2%. The "high" fertility group consists of 29 countries with TFRs greater than 4 that have experienced limited fertility declines from pre-transition levels. The high fertility population has a TFR of 4.9 and a high annual population growth rate of 2.8%. The UN projects that its 2020 population of 953 million will double to 1.9 billion by 2050. The appendix in Chap. 2 lists the countries in each group. These "low," "middle," and "high" fertility groups have very different demographic, geographic, socio-economic, health, and educational characteristics. They also face very different fertility and development challenges. Some have the lowest below-replacement fertility levels ever recorded (Taiwan, South Korea), and desire to increase their fertility, others have very high fertility (Niger, Mali), and seek to lower their fertility. The particular challenges facing each group will be treated separately.

Currently 4.7 billion of the developing world's population have completed their fertility transitions; they represent 72% of the developing world's population, and 60% of the world's population (Table 8.1). The controversies surrounding population control efforts recounted in Chap. 5 have receded as more countries completed their transitions. When many governments perceived rapid population growth to be a significant problem, some implemented antinatalist policies that pressured women to have fewer children than they desired. At the 1994 United Nations Cairo Conference on Population and Development reproductive rights advocates helped to fashion a Program of Action that proscribed the use of incentives, disincentives and quotas to limit births. As a result, high pressure or coercive antinatalist programs are no longer a major threat to women's reproductive health or rights. For example, after reaching below replacement fertility, China recently ended what had been the most egregious

coercive anti-natalist program, its one-child program. Attention is still needed in China and elsewhere because of the possible future threat of coercive pronatalist programs in response to continued very low, below replacement fertility, population aging and eventual population decline. In contrast, women in the high fertility group (mostly in Africa) face a very different challenges to their reproductive health and rights, ranging from child marriages to high maternal mortality. They also have a significant unmet need for contraception, and unplanned pregnancies and abortion remain common (Fig. 3.6). Each set of challenges will be addressed separately.

8.2 Characteristics of the Three Fertility Groups

Demographic and health differences among the three fertility groups are significant and consistently document the more challenging conditions experienced by high fertility populations (Table 8.2). Some of these contrasting conditions flow directly from fertility differences. For example, in the high fertility group of countries the median age of the population is low because each woman on average gives birth to four or more children. With such high fertility, the younger generation always will be significantly larger that the parental generation, often half the population will be under 18, and parents will be tasked with the care of many children. In contrast, in the low fertility population with a TFR of 2.0, mothers have just two children each, resulting in a higher median age. The connection between fertility decline and a rising median age are evident in the case of China, whose fertility transition from high to low is shown on Fig. 1.2. In the decade of the 1960s China's TFR was 6.3, by 1980–1985 it fell to 2.5, by 1990–1995 it fell to 1.6, where it has remained. China's median age was 19.3 in 1970 and rose steadily to 38.4 in 2020. As China's fertility went from high to low, changes in its median age mirror those found on Table 8.2 among the three fertility groups.

China's fertility decline also illustrates the dynamic that produces change in the total dependency ratio. This ratio is defined as the number of dependent-aged persons (aged 0 to 14 and 65 and older) that 100 active-aged persons (aged 15 to 64) support. The 1960–1970 birth cohort, born when the TFR was 6.3, was China's last relatively large birth cohort. In 1970 the total dependency ratio was 79.1. As the relatively smaller 1970–1980 birth cohort replaced that large cohort with the new 0–10 population during the 1970s, China's total dependency ratio fell to 68.4 by 1980. Additional smaller birth cohorts entered the population over the next decades leading the total dependency ratio to fall to 52.0 in 1990, 46.2 in 2000, and 36.5 in 2010, but then in 2020 it increased to 42.2. By 2020 the 1960–1970 birth cohort, China's last relatively large cohort, was aged 50 to 60. Over the next decade it will join the survivors of other older large cohorts in the dependent-aged 65 and older group. As the small cohorts generated from declining fertility enter the ranks of the 15 to 64 population, the total dependency ratio can expect to continue to increase, especially since China's fertility has remained well below replacement level. A stable TFR of 1.6 will continually produce offspring who are fewer in number than their parents.

Table 8.2 Demographic and health characteristics of three fertility groups

TFR lvel 2020	Median age 2020	Total dependency ratio, 2020	Life expectancy at birth, 2019	Infant mortality rate, 2018	Maternal mortality ratio, 2017
Low: below 2.5	32.4	46.2	73.7	17.7	85.7
Middle: 2.5–4.0	22.9	65.6	69.0	36.3	153.2
High: above 4.0	18.0	86.3	60.9	55.4	574.0
All 97 Countries: (Weighted TFR: 2.56)	29.2	54.3	71.3	25.2	163.6

Sources TFR, UN: POP/DB/WPP/Rev.2019/INT/F01
Median Age, UN: POP/DB/WPP/Rev.2019/SA1/POP/F05
Total Dependency Rate, UN: POP/DB/WPP/Rev.2019/SA1/POP/F11-A
Life Expectancy and Infant Mortality Rate, UN: POP/DB/WPP/Rev.2019/INT/F01
Maternal Mortality: www.who.int/reproductivehealth/publications/maternal-mortality-2000-2017

The UN (2019) projects that by 2060 China's total dependency ratio again will be in the high 70s, about its 1970 level. Its dependent population in 2060, however, will be composed of many more older than younger individuals.

China's 1970–2020 total dependency ratio changes mirror those found on Table 8.2 among the three fertility groups. It also illustrates several points that were made in Chap. 5. At present, the low fertility population (Table 8.2) is still in the middle of its first demographic dividend: 100 active-aged 15- to 64-year-olds only need to provide for 46 dependent-aged individuals. This contrasts with 100 active-aged individuals in the high fertility population needing to provide for 86 dependent-aged individuals, a much greater burden for a population with significantly fewer resources (Table 8.3). China's experience has lessons for both populations. The high fertility population can observe the benefits that accompany lower fertility and a decline in its dependency burden. The lesson for the low fertility population concerns the temporary nature of the first demographic dividend. The present is the time for its active-aged individuals to save and accumulate assets to help provide for their old age. Today's action, or inaction, will determine the size and longevity of its second demographic dividend.

The three measures of health in Table 8.2—life expectancy, infant mortality, and maternal mortality—all are highly correlated with a population's fertility level. The maternal mortality ratio, maternal deaths per 100,000 live births, clearly illustrates this relationship. It is nearly seven times higher for the high fertility population (574) than for the low fertility one (85.7) largely because of the different resources of the two population. Maternal deaths generally result from severe bleeding after childbirth, infections, untreated high blood pressure during pregnancy, and complications from delivery. It can be significantly reduced by high quality care in pregnancy, and during and after childbirth. Each of these, however, requires resources that are scarce in

Table 8.3 Socio-economic characteristics of three fertility groups

TFR level, 2020	GNI per capita Atlas Method, 2020	Percent employed in agriculture, 2019	Percent urban 2019	Mean years of schooling, 2019	HDI 2019
Low: below 2.5	$6,529	29.4	53.6	7.8	0.719
Middle: 2.5–4.0	$2,274	33.4	44.8	6.4	0.613
High: above 4.0	$1,152	53.1	38.9	5.0	0.503
All 97 Countries: (Weighted TFR: 2.56)	$5,248	33.3	50.4	7.2	0.675

Sources TFR, UN: POP/DB/WPP/Rev.2019/INT/F01
GNI per capita, Atlas method (current US$): https://data.worldbank.org/indicator/NY.GNP.PCAP.PP.CD
Percent Employed in Agriculture: ILO (2020). ILOSTAT database https://ilostat.ilo.org/data/
Percent Urban: World Urbanization Prospects: The 2018 Revision. New York. https://esa.un.org/unpd/wup/
Mean Years of Schooling: UNESCO Institute for Statistics (2020), Barro and Lee (2018), ICF Macro Demographic and Health Surveys, UNICEF Multiple Indicator Cluster Surveys and OECD (2019)
HDI: HDRO calculations based on data from UNDESA (2019), UNESCO Institute for Statistics (2020), United Nations Statistics Division (2020), World Bank (2020), Barro and Lee (2018) and IMF (2020)

countries with low incomes and are difficult to provide to more rural populations. The infant mortality rate, deaths to infants under one per 1,000 births, is a little more than three times as high in the high fertility population (55.4) than in the low fertility population (17.7). In sub-Saharan Africa, the home of most of the world's high fertility population, the IMR was 107.6 as recently as 1990, but has since declined to 52.5 as efforts to strengthen a range of public health measures continue. Life expectancy in sub-Saharan Africa, which stagnated at 50 during the decade of the 1990s as HIV infections spread, has since increased to 61.5 as antiretroviral treatment became more available and as infant mortality declined. It still, however, is nearly 13 years shorter than that of the low fertility population.

The correlation, across multiple dimensions, between low fertility and different indicators of development is evident in Table 8.3. Compared to the developing world's high fertility population, its low fertility population has a five and one-half times greater per capita income, 56% more schooling, lower rates of agricultural employment, and higher rates of urban residence. Its Human Development Index (HDI), a composite development measure based on life expectancy, income, and schooling, is 43% higher. These differences are reminiscent of those existing between the developed world and the developing world at mid-twentieth century. At that time the entire

developing world was the high fertility group (TFR of 6.2), and the developed world was the low fertility population (TFR of 2.8). The contrasting development indicators back then were dramatic: life expectancy of 40.5 versus 63.4, infant mortality rate of 164.5 versus 66.7, percent living in cities of 54.8% versus 17.7%. What is just as dramatic, however, is how far the low fertility portion of the developing world's population has come over the last seventy years. It now has a TFR of 2, a life expectancy of 73.7, an infant mortality rate of 17.7, a Gross National Income of $6,529 per capita in current US$, and an average of nearly 8 years of schooling. Its life expectancy is 16% higher than the developed world's 1950 life expectancy, and its infant mortality is 73% lower.

The fact that 72% of the developing world's population was able to complete their fertility transition and attain such significant development advances does provide the remaining 28% of the developing world with an achievable goal. In the mid-twentieth century, debates raged over whether substantial fertility declines and development were attainable goals for the world's "less developed regions" (Chap. 5). There is no such debate now concerning the potential for advancement of the middle and high fertility populations. The evidence reviewed in Chap. 4 indicates that some of the correlations between development indicators and fertility are not causal. In particular, GDP per capita and urbanization have little or no impact on reproductive behavior. Instead, improvements in the education of women, child survival and family planning programs have been the main drivers of fertility transitions. This is welcome news for contemporary poor countries because large increases in GDP per capita are difficult to realize quickly, while improvements in human development can be achieved in relatively short period of time and at lower costs. Poor countries that have emphasized investments in education, public health and family planning programs have seen rapid declines in fertility and benefited from the demographic dividend.

8.3 Characteristics of Geographic Groups

The high fertility group (TFR > 4) has the closest association with a particular geographic region. Twenty-seven of the 29 countries in that fertility group are located in West, Middle, and East Africa, including every country in the Sahel (see appendix to Chap. 2). The two additional high fertility countries are Sudan, which technically is a North African country, and Afghanistan. There are six additional West, Middle, and East African countries that are in the middle fertility group (Madagascar, Eritrea, Rwanda, Ghana, Zimbabwe, and Kenya), but four of them have TFRs that are very close to 4. So, there is a remarkable overlap between the high fertility population and the West, Middle, and East African countries. Both are about 1 billion people in size with nearly identical TFRs (4.9 vs. 4.8). The demographic and socioeconomic characteristics of the "high fertility group" in Tables 8.2 and 8.3 are all similar to those of the West, Middle, East Africa region on Tables 8.4 and 8.5. In 2020 "high fertility" has a very specific geographic locus.

Table 8.4 Demographic characteristics of geographic groups

Geographic area	Pop 2020 (millions)	TFR 2020	Rate of pop growth 2015–2020	Total dependency ratio, 2020	Life expectancy 2019	Infant mortality rate, 2018
Africa: all	1,327	4.4	2.5	79.3	63.6	46.1
Africa: W, M, E	1,015	4.8	2.7	84.9	61.3	53.0
Africa: N, S	312	3.0	1.8	60.9	70.8	24.0
Asia	4,431	2.1	1.0	47.6	73.1	20.5
LA & Caribbean	564	2.0	1.1	48.7	75.5	14.4
All 96 Countries:	6,322	2.6	1.29	54.3	71.3	25.2

Note Data for Papua New Guinea, a developing country in Oceania, is not included in this table
Population Size, UN: POP/DB/WPP/Rev.2019/SA1/POP/F01-1
Annual Population Growth Rate, 2015–2020, UN: POP/DB/WPP/Rev.2019/SA1/POP/F03
Other Data: See Table 8.3 sources

Table 8.5 Socio-economic characteristics of geographic groups

Geographic area	GNI per capita Atlas method 2020	Percent employed in agriculture, 2019	Percent urban, 2019	Mean years of schooling, 2019	HDI 2019
Africa: all	$1,762	46.2	42.9	5.8	0.554
Africa: W, M, E	$1,258	54.0	39.2	5.3	0.514
Africa: N, S	$3,401	21.2	55.0	7.3	0.683
Asia	$6,088	31.8	49.0	7.5	0.701
LA & Caribbean	$6,892	14.7	79.9	8.4	0.756
All 96 Countries:	$5,252	33.3	50.5	7.2	0.675

Note Data for Papua New Guinea, a developing country in Oceania, is not included in this table
Data See Table 8.4 sources

The middle fertility group (TFR 2.5–4.0) and the low fertility group (TFR < 2.5) contain countries from a mix of regions. Four North and Southern African countries are in the middle fertility group (Namibia, Egypt, Lesotho, and Algeria) and five are in the low fertility group (Morocco, Libya, Tunisia, South Africa and Mauritius). On Tables 8.4 and 8.5 African data are presented separately for West, Middle, and East Africa and for North and Southern Africa because these two regions have distinct demographic and socio-economic patterns. Most large Asian and Latin American countries are among the 42 countries in the low fertility group. With 70% of the developing world's population living in Asia, the data for "All 96 Countries" closely tracks Asian trends; and with 76% of Africa's population living in West, Middle, and East Africa, that region closely tracks "Africa: all" trends. Data from Papua New Guinea, the sole country from Oceania, is not included in Tables 8.4 and 8.5.

West, Middle, and East Africa, with over one billion people, has made noticeably less headway traversing the fertility transition than other geographic regions. Its TFR of 4.8 is 1.8 births higher than that of North and Southern Africa, and 2.8 births higher than that of Asia and Latin America. Its health conditions are also noticeably poorer. Life expectancy is 9.5 years lower than in North and Southern Africa, 11.8 years lower than in Asia, and 14.2 years lower than Latin America. Its infant mortality rate is about four times that of Latin America, two and one-half times that of Asia and more than twice that of North and Southern Africa. Its dependency burden is substantially higher: one hundred 15- to 64-year-olds need to provide for 85 dependent-aged persons, compared to 48 in Asia and Latin America. Its very high annual population growth rate (2.74%) implies a short population doubling time; the UN projects that by 2050 its population will double to over two billion. Its first demographic dividend will be limited in the near future unless there is a sizable fertility decline soon.

Unsurprisingly, the West, Middle, East Africa region has notable poor socio-economic conditions (Table 8.5). Its per capita Gross National Income is 37% that of North and Southern Africa, 21% that of Asia, and 18% that of Latin America. Most of its workforce still is employed in the agricultural sector and less than 40% of the population resides in cities. Its population has two years fewer schooling than that of North and Southern Africa, 2.2 years fewer than that of Asia, and 3.1 years fewer than that of Latin America. The United Nations Development Programme places its Human Development Index (0.514) in the "low human development" category while that of North and Southern Africa and of Asia is in the "medium human development" category, and that of Latin America is in the "high human development" category. The Latin America and Caribbean region has somewhat better socio-economic and health characteristics than Asia, although it has similar fertility, population growth, and dependency measures.

Understanding the challenges faced by the world's 2020 high fertility population requires an understanding of the relationship between fertility and development in West, Middle, and East Africa, a relationship that has been affected by the region's history, culture, politics, economics and physical environment. The challenges faced by the developing world's middle fertility population and its low fertility population, both widely dispersed among countries in different geographic areas, are less likely to flow from a particular region and are more likely to be related to a particular stage in the transition process.

8.4 The Challenges Facing the Developing World's High Fertility Population

When examining the fertility transition of geographic regions in Chap. 2, we noted (Table 2.1) something unusual about the experience of sub-Saharan African countries. Their transition started later than those of Asian and Latin American countries

(1990 vs. 1972), their pre-transition fertility was higher (7.1 vs. 6.8), in the first decade of their transitions their rate of fertility decline was slower (13% vs. 23%), and their 2020 TFR level was higher (4.4 vs. 2.3). We labeled this the "Africa effect." Bongaarts (2017) analyzed the association between fertility decline and a variety of measures of development (GDP per capita, schooling, life expectancy, and urbanization) and uncovered possible reasons for these effects. Unlike in Asia and Latin America, in sub-Saharan Africa GDP per capita temporarily slumped in the 1980s and 1990s, not rising above the 1970 level until after 2000. Likewise, instead of experiencing a normal continuous rise in life expectancy, the AIDS pandemic struck sub-Saharan Africa especially hard, and life expectancy stalled at 50 from the mid-1980s through the 1990s. These stalls likely delayed the onset of its fertility transition. Once it started, the pace of improvement in development indicators was relatively slow, as was the rate of fertility decline. These "Africa effects," therefore, had conventional developmental roots. Bongaarts also uncovered one unique effect: at a given level of development, sub-Saharan fertility was higher, its desired family size was higher, and its contraceptive use was lower. This cluster of differences suggests elements in sub-Saharan Africa's culture and social structure that foster high fertility.

The above analysis looks at sub-Saharan Africa, a grouping that includes the more advanced countries of Southern Africa. The high fertility population (2020 TFR > 4) described in Tables 8.2 and 8.3 is a subset of this population that includes only the 27 highest fertility countries of West, Middle, and East Africa along with Sudan and Afghanistan. And all the "Africa effects" described above are heightened within this subgroup. In Fig. 2.1 the 1950–2020 fertility trends of these 29 countries appear as red lines. Their fertility transitions began later than 1990, their fertility declines were slower than in "middle fertility" countries (blue lines), and much slower than in "low fertility" countries (green lines). In fact, between 1950 and 2000 there was very little change in the high fertility population's TFR, just a 2.6% decline from 6.6 to 6.3, while its population increased 3.5-fold from 153 to 539 million. This half-century of near constant fertility coexisted with some significant socioeconomic and health changes: urbanization increased from 8% in 1950 to 29% in 2000, life expectancy increased from 34 to 50 years, and infant mortality fell from 195 to 99.

That these non-trivial changes had so little effect on fertility suggests that cultural and social structural factors common to West, Middle, and East African societies were fostering high fertility (Caldwell et al., 1992: 214–215): a religion that stressed the importance of ancestry and descent; a family system in which the father made reproductive decisions but the mother and her dependent children bore the childrearing costs; and a communal land tenure system in which large families could demand a greater share of the land. Some data on schooling and adolescent fertility illustrates how these factors might influence fertility. There is male and female schooling data for twenty of the high fertility countries for the year 2000: males averaged 3.8 years of school and females 2.0 years. The overall low level of schooling and 47% sex differential indicate that few girls were attending school long enough to achieve literacy. The age-specific birth rate for ages 15–19 in 2000 was 139.5, meaning that about 70% of girls were likely to give birth before reaching age 20. Early female entry into

partnerships and childbearing in a largely agricultural setting is a traditional start to very large families.

The high fertility population did begin its fertility transition in the mid-1990s, with its fertility falling from 6.3 to 4.9 by 2020, ending with a half-birth greater TFR than that of all sub-Saharan Africa (4.4). Although there currently is a low baseline of development with respect to GNI per capita, life expectancy, urbanization, and schooling (Tables 8.2 and 8.3), significant change did occur between 2000 and 2020: urbanization went from 29 to 39%, life expectancy added 11.5 years to 61.3, infant mortality was cut in half again to 49.9, males added two years to their schooling (6.1 years) as did females (4.0 years), adolescent fertility fell from 139.5 to 102.8, and several countries implemented family planning programs. These changes were accompanied by a 1.4 birth decline in TFR. The major challenge facing the high fertility group is how to invest further in education, health and family planning programs so that this population of 953 million can steadily move out of poverty and enhance its health. Currently their high fertility is slowing their development, and their poor health and low socio-economic conditions are thwarting persistent fertility decline.

Progress will not come easily. The World Bank estimates that West and Middle Africa experienced a decline in real GDP of 0.8% during the Covid induced recession of 2020, and predicts a rebound in real GDP of 3.2% in 2021 and 3.6% in 2022 (Zeufack et al., 2021: 36). But since the population growth rate of this region is 2.7%, the real GDP per capita actually declined by 3.5% in 2020, and is projected to experience a very modest rebound of 0.5% in 2021 and 0.9% in 2022, making up only half the GDP per capita lost in 2020. High fertility and rapid population growth magnify the economic impact of a downturn and dampen the economic benefits of an upturn. Climate change, although a global phenomenon, is having a particularly powerful effect on the high fertility population. Every country in the Sahel is a member of the high fertility population, and every Sahel country has recently experienced an increase in the number and severity of droughts. The World Bank (Zeufack et al., 2021: 69, 51) finds that one in four households in the Sahel "is vulnerable to repeated climate shocks" that contribute to maternal and child malnutrition, trigger school dropout, and induce poor households to sell productive assets. They also find that deforestation, non-sustainable agriculture, and overgrazing are challenging the livelihoods of farmers and herders throughout the region, leading to an increase in "civil conflict and political stability" as farming and herding ethnic groups fight over access to land for their still burgeoning populations.

In time, living conditions are likely to alter in ways that will highlight the benefits of a smaller family. The UN projects that by 2050 57% of the high fertility population will live in cities. In an urban environment the requirements for starting a family are likely to become more challenging for larger numbers of young people, and parents are likely to view education in a new light for both their sons and daughters. Schooling, not early partnerships and childbearing, will be the key to security and to lower fertility and desired family size. But about 60% of high fertility countries are "non-resource rich" countries according to the World Bank (Zeufack et al., 2021: 60), without appreciable amounts of oil, minerals, or metals to trade on world markets.

This set of countries might need significant international developmental aid to acquire the basic infrastructure needed for a viable non-agricultural economy.

Given the low levels of development that prevail in the high fertility population it is urgent that governments reduce the obstacles created by adverse demographic conditions, in particular high fertility, rapid population growth and high dependency ratio. Some policy makers believe that nothing can be done about these trends, because desired family size is high. This view ignores the clear evidence that voluntary family planning programs have been successful in a number of poor countries where governments have made a significant investment (e.g., Rwanda, Malawi and Ethiopia). This success is in part due the existence of high unmet need for spacing births. In addition, high desired family size has consistently declined after the introduction of well-designed family planning programs. As summarized in the preceding chapter, family planning programs and their information, education, and communication efforts can lead to a decline in desired family size that is independent of development. Increasing contraceptive use and declining fertility bring about a range of socio-economic benefits which make voluntary family planning programs a highly cost-effective development intervention.

8.5 The Challenges Facing the Developing World's Middle Fertility Population

The middle fertility population (2020 TFR 2.5–4) is geographically dispersed, comprised of populations from eleven Asian countries, eleven African countries, three Latin American and Caribbean countries, and Papua New Guinea. A variety of regions within each continent are represented, and the twenty-six countries share few common historical or cultural characteristics. The blue lines on Fig. 2.1 trace their 1950–2020 fertility trends. Their 1950 TFRs ranged from the lowest to the highest among all developing countries, and as a population their fertility transition began in 1980. Countries starting from pretransition fertility levels above 8 (Yemen, Rwanda, Oman) had especially steep early declines. Three countries (Laos, Jordan and Bolivia) now are close to completing their transitions.

Currently the weighted mean TFR of this population of 702 million is 3.3, significantly lower than the 4.9 mean for the high fertility population. Their health and socio-economic measures are also better (Tables 8.2 and 8.3), but their GNI per capita is just $1,122 greater than that of the high fertility population. This implies that large health and general development gains, and a significant drop in fertility, is associated with a relatively modest difference in GNI per capita. This is consistent with the finding of Chap. 4 that GNI per capita is not a statistically significant determinant of fertility decline. A possible reason for this population's more favorable current situation is that it started its fertility transition fifteen years earlier than the high fertility population (1980 vs. 1995). Although in 1950 both middle and high fertility populations had relatively similar life expectancies (38 vs. 34), infant mortality rates

(234 vs 195), and total fertility rates (6.8 vs. 6.6), by the year 2000 these rates had diverged significantly: the middle fertility population had a considerably higher life expectancy (63 vs. 50), lower infant mortality rate (61 vs. 99), and lower total fertility rate (4.5 vs. 6.3). Tables 8.2 and 8.3 document that significant differences in health, development, and demographic characteristics persist today. "Africa effects" also might be playing a role in these differences.

Another important trend is the increase in contraceptive use which is the key driver of fertility decline and the related demographic dividend. Contraceptive use among women in union rose sharply between 2000 and 2020 in both the high fertility population (from 14 to 27%) and in the middle fertility population (from 37 to 49%). These trends are caused by development changes (in particular girl's education and health) and by the expansion of family planning programs. The latter benefitted greatly from international commitments made at the 2012 London Summit on Family Planning FP2020. This global initiative was established in 2012 with the ambitious goal of adding by 2020 120 million users of modern contraceptives to the existing 260 million users in 69 priority countries. Over those eight years, ten developed countries annually contributed about $1.3 billion in bilateral aid to the effort (Scoggins & Bremner, 2021: 40–41). By 2020 an additional 60 million users of modern contraceptives were recorded. While this increase fell well short of the FP2020 goal, it represents about 12 million more users than would have been predicted on the basis of historical rates of growth in contraceptive use in place before the initiative (Stover & Sonneveldt, 2017: 84). A continuation of the initiative, FP2030, is now underway. Both initiatives are indicative of the enhanced priority that the international community has placed on voluntary family planning programs. This is a significant contrast to the fall-off in interest evident at last century's end. Having high quality family planning programs can significantly facilitate fertility decline, especially when desired family size declines (Chap. 7).

The middle fertility population faces several development challenges. As a population, it is forty-years into an ongoing fertility transition. Its TFR is 3.3, but still about 24% of women of reproductive age who want to stop or delay childbearing are not using a modern method of contraception (United Nations, 2022). Many pregnancies are unwanted or mistimed, and a significant percentage of these are aborted (Fig. 3.9). The on-going challenge for women in the middle fertility population is to learn how to integrate modern contraceptives into the new fertility regime they are adopting. As schooling is becoming more important, establishing partnerships and childbearing are being postponed to later ages and the desired number of children is falling to lower levels. In this new regime women find themselves with an increasing number of years in which they are fecund and sexually active but wanting no additional children. Learning how best to accomplish this new goal will be a continuing challenge, one that can be helped by high quality family planning programs (Chap. 7).

This population also has a major development goal that is related to its stage in the fertility transition: making full use of the economic benefits that come from its falling dependency ratio. When its fertility transition began around 1980, its total dependency ratio had peaked at 94, an 18% rise from its 1950 level of 80. With infant and child mortality declining from 1950 to 1980 while fertility remained at

pre-transition levels, the proportion of the population below the age of 15 increased. With its fertility transition underway after 1980, the total dependency ratio began to decline as the proportion young declined. By 2000 it had fallen to 82, and by 2020 to 66. This population is now experiencing its first demographic dividend. With a high and growing percentage of its population in the active-ages, a significant boost to economic growth will result so long as productive work is readily available (Chap. 6). The UN projects that over the next thirty years the total dependency ratio will decline still further to 53. The challenge for the middle fertility population over this period will be to save more, and use those assets to enhance both human and physical capital. Investing in more schooling and better training will not only raise productivity, but it will also raise the age of household formation and further lower desired family size. If this challenge can be met, a substantial second demographic dividend will be ensured along with sustained prosperity (Chap. 6).

8.6 The Challenges Facing the Developing World's Low Fertility Population

The developing world's low fertility population did not exist until 1974 when Singapore's TFR fell below 2.5. In 1950 all of the 97 developing countries had TFRs well above 5; Singapore's was 6.5. It entered into its fertility transition in 1958 when its TFR fell 5% below its peak level, and completed its transition in 1974 (Fig. 2.4). That year the developing world's entire low fertility population consisted of Singapore's 2.2 million individuals. Taiwan joined the group in 1980, South Korea in 1981, Mauritius in 1982, Thailand in 1986, and China in 1989. In fifteen years, the low fertility population had expanded from 2.2 million to 1.3 billion, 31% of the developing world's population. Since then, 36 additional countries have completed their fertility transitions: 8 in the 1990s, 13 in the 2000s, and 15 in the 2010s. By 2020 the low fertility population reached 4.7 billion, 72% of the developing world's population.

Chronicling the growth in size and proportion of the low fertility population is an efficient way of summarizing the developing world's fertility transition. It also highlights several distinctive characteristics of this transition. It has largely been a one-way fertility trend: downward. Only two countries (Algeria and Mongolia) have ever exited the low fertility population. They both had TFRs that had fallen below 2.5 in the early years of this century, and then fertility increased enough to move back across the 2.5 line. In Chap. 2 we noticed a similar phenomenon in seven sub-Saharan African countries whose downward fertility trends appeared to have "stalled." Since none of the other thirty-five sub-Saharan countries had "stalled" transitions, we considered this an anomaly in need of further examination. Our response reflects our conviction that general development and fertility decline are integrally connected, that if health conditions and general socioeconomic conditions such as the education of women improve, then fertility should fall, especially if voluntary family

planning programs are implemented. To date, this has largely been true. Eighty-five of the 97 countries examined had their lowest ever TFR in 2020, and it coincided with substantially improved health, socio-economic conditions and investments in family planning programs. That is not to say that countries with relatively modest levels of economic development cannot enter the low fertility group. They have already. Nepal, Cambodia, India, Bangladesh, and Honduras have GNIs per capita ranging from $1,200 to $2,200 and TFRs below 2.5. The most likely explanation for their low levels of fertility are investments in female education, public health and family planning programs (see Chaps. 4 and 7). This finding provides hope for poor countries in Africa that fertility decline and its many benefits can be achieved relatively soon.

But fertility transitions can come to end, and when that happens past relationships can change. Not one of the original formulators of transition theory (Chap. 5) predicted the post-WWII baby boom. Their firm belief that fertility decline was a consequence of "modernization," prevented them from envisioning fully modern societies experiencing significant increases in fertility. While there is little evidence of an imminent fertility increase in the developing world, an increasing number of countries have adopted pronatalist policies. The last UN survey of fertility policies was in 2015, and eleven of the 97 countries stated a desire to "raise" their fertility level. These eleven countries had a 2020 TFR of 1.7 and a population of 1.7 billion. As their fertility level declined to low levels, six countries (China, Iran, Mauritius, South Korea, Thailand, and Turkey) sequenced through all the fertility policies options on the UN policy surveys, first adopting a policy to "lower" fertility, then to "maintain" it, and finally to "raise" it. This trend of low fertility countries ending their transitions with below replacement fertility and a pronatalist policy position is likely to continue. Singapore has had a policy to "raise" fertility since 1996 when its TFR fell to 1.6. Countries with the lowest fertility tend to be both pronatalist and highly developed. Singapore, Taiwan, and South Korea all have a GNI per capita of over $30,000 and a TFR of 1.2 or less. There are pronatalist developing countries with somewhat higher TFRs and less exceptional levels of development. Thailand, China, and Turkey have GNIs of between $7,000 and $10,500, and TFRs between 1.5 and 2.0.

The countries that began their fertility transition in the late 1950 and 1960s and completed it by the late 1980s will face, over the next three decades, the challenge of rapidly aging populations. All had very rapid fertility transitions, twenty years or less in duration, and have already experienced several decades of well-below replacement level fertility. The UN projects that their median ages will increase considerably from 2020 to 2050: Singapore from 42.2 to 53.4, Taiwan from 42.5 to 54.2, South Korea from 43.7 to 56.5, Mauritius from 37.5 to 47.7, Thailand from 40.1 to 49.7, and China from 38.4 to 47.6. Their first demographic dividends will all end as their populations rapidly age and their total dependency ratios will increase. Implementing effective pronatalist programs is likely to become an important political priority for an increasing number of low fertility countries. The rapidity of aging is directly related to the rapidity of a country's fertility decline, and historically unprecedented rapid aging is an inevitable part of many low fertility countries' futures. Iran's entire

fertility transition took just eleven years. Its TFR went from above 6 in 1986 to below 2.5 in 1997; extremely rapid aging will be a certainty for Iran in the first half of the twenty-first century.

The challenge for these countries will be to implement pronatalist policies that respect women's reproductive rights and preserve their reproductive health. Since the "problematic" low fertility is commonly accepted to be an expression of the actual fertility desires of women, given their social and economic circumstances, there is great potential for direct conflict between state goals and women's goals. States can induce higher fertility while still respecting the reproductive rights of women, but doing so without coercion requires an authentic state commitment to reproductive rights as well as significant resources. A non-coercive pronatalist program would be one that helps women to more easily participate in the labor force and have children, or that provides them with a significant portion of the costs associated with rearing a child (Sobotka et al., 2019). Any program that limits access to existing methods of birth control or penalizes women who choose to be single, childless or have a single child would be a coercive pronatalist policy. States can undertake, and have undertaken, unilateral changes in fertility and abortion policies that suddenly strip women of access to both contraception and abortion, the most notorious example being Romania's 23-year experiment (1967–1990) in seeking to raise its birth rate (Baban, 1999). It was disastrous for both women and children as unwanted children filled orphanages and women experiencing unsafe illegal abortions filled hospital beds. Obviously, low fertility pronatalist countries with high GNIs per capita are in a better position to bear the costs of implementing non-coercive policies. Countries with a history of coercive anti-natalist programs and with governments that believe that it is proper for the state to drive fertility in a desired direction, will be more challenged when it comes to respecting women's reproductive rights, especially if their resources are limited.

The entire low fertility population faces a second significant challenge: fully exploiting the economic growth potential of their demographic dividends. They need to increase savings and invest more in human and physical capital. This will help weather a period of rapid aging and work to ensure a significant second demographic dividend. Having the current active-aged population save to provide for their own later years will lessen the burden faced by the future parental generations, allowing those parents to focus their available resources more on the young than the old. Such a policy, if effective, can act as an indirect pronatalist policy. Every country in this population has already completed its fertility transition. It knows when its transition started and its duration. This gives each country the ability to plot with some degree of precision the size and duration of its first demographic dividend and the general parameters of its potential second demographic dividend (Chap. 6). The challenge is to acquire this knowledge and use it now.

8.7 Conclusion

In 2020 the "developing world" of 1950 is no more. Over the past seventy years the "low," "middle," and "high" fertility groups have experienced very different demographic and development trajectories. All have entered into the fertility transition, but to substantially different degrees. As a result, they face very different fertility and development challenges.

The situation of today's high fertility population of 953 million echoes in some ways that faced by the mid-century developing world: a high TFR of nearly 5 combined with limited development. But the success of their fellow developing countries in traversing the fertility transition means that there are few doubts about their ultimate fate, although many questions about the speed of their progress. The middle fertility population of 702 million has achieved real progress: a TFR decline to 3.3 with significant health and development improvements. It is reasonable to expect that within thirty years this population will largely have joined the low fertility group. The low fertility population of 4.7 billion constitutes the greatest surprise from a mid-twentieth century perspective. The fact that over 70% of the developing world currently has an average TFR of 2.0, significantly better health conditions than were present in the mid-century developed world, and a substantial level of social and economic development is a remarkable, and largely unforeseen, achievement of great importance.

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