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Demography, Environment and Development in Bangladesh

An Analysis of Last Years' Achievements

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Acronyms

ASA: Association for Social Advancement

BRAC: Bangladesh Rehabilitation Assistance Committee

CBR: Child Birth Rate

CDR: Child Death Rate

CIA: Central Intelligence Agency (USA)

CMI: Chr. Michelsen Institute

CPD: Centre for Policy Dialogue

CPR: Contraceptive Prevalence Rate

DHS: Demographic and Health Survey

FAO: United Nations Food and Agriculture Organization

GDP: Gross Domestic Product

GNI: Gross National Income

HDI: Human Development Index

IDA: International Development Association

MDGs: Millennium Development Goals

MoEF: Ministry of Environment and Forests (Bangladesh)

NASA: National Areonautics and Space Administration (USA)

NGO: Non-Governmental Organisation

PPP: Purchasing Power Parity

SEDAC: Socioeconomic Data and Applications Center

SUR: Report on Survey on the Use of Remittance

TFR: Total Fertility Rate

UNDESA: United Nations Department of Economic and Social Affairs

UNDP: United Nations Development Programme

UNEP: United Nations Environment Programme

UNICEF: United Nations Children's Fund

USAID: United States Agency for International Develpment

WFP: World Food Programme

WHO: World Health Organization

Introduction

Over the last decades Bangladesh has experienced great changes that have allowed for a gradual development of the country: the purpose of this work is to consider the major demographic and environmental issues at the basis of last years' achievements, as a starting point for future improvements.

The relationship between demographic behaviours and development has been one of the greatest and latest concerns: such an interest has regarded particularly developing countries, which in the last decades have experienced fast population growth, and variable economic outcomes. Studies have been directed at understanding demographic and economic mechanisms as interrelated, and for centuries scholars have attempted to give a universal reading of these phenomena. One of the major disputes has unfolded among neo-Malthusians and Boserupians. The formers sustain the necessity to restrain population growth to fight against poverty, for resources are finite and cannot be reproduced as fast as population; the latter instead suggest that technological innovation and economic advancement are propelled by population growth, and possible threats that population growth poses are counterbalanced by these positive implications. Many have tried to give a comprehensive reading of such phenomena, but no agreement has been reached so far.

Indeed, demographic behaviours have received no single explanation, nor has their relationship with the context in which they unfold: theories

regarding the demographic transition, which implies changes mainly in mortality and fertility levels, have been (often alternatively) connected to social, economic, and cultural causes, and many studies have also suggested the relevance of the various implications it entails. For the purpose of this work a valid framework of change proposed by Reher (2011) has been of great help. Within it, the demographic transition unfolds, paralleled by many other social and economic changes.

Regarding development, there have been many attempts to give a comprehensive reading of the processes contributing to it, yet only recently studies have fully acknowledged the relevance of the environment in development. Dasgupta has evidenced the necessity to consider the conditions of natural resources as fundamental for a long-lasting development, and has included the environment in a framework of comprehensive growth, that can only be achieved if sustainable measures are taken, and natural resources are constantly respected and protected.

In this light, the case of Bangladesh is particularly relevant for its demographic and environmental conditions: in 2013 the country had a population of more than 156 million people, an average population density of 1,203 people/km^2 (World Bank, 2015a), and a very high exposure to both environmental risk and degradation. Since the second half of the twentieth century, Bangladesh has been through a rapid population growth, changes in the demographic pattern, poverty reduction, and fast urbanisation. Also, there have been improvements in health and education, gender equality has slightly increased, and overall the country has experienced economic growth, sustained by the expansion of industrial and service sectors. At the same time, Bangladesh has suffered from environmental degradation, natural disasters have been increasingly frequent, and climate change has started affecting people's lives.

These factors, together with many others, have been more or less sustained by special policies, and have contributed to the recent development

the country has experienced, as well as to the overall improvement in the life quality of the Bangladeshis. Nonetheless, life conditions are still among the worst in the world, and environmental degradation constitutes possibly the greatest threat to last years' achievements, and to the country's attempts to overcome poverty and hardship for good.

In this analysis special attention has been given to the changes of the last twenty-five years in demographic behaviours and environmental conditions, always as bound to the main social and economic changes. Among the sources that have been most used to collect data on Bangladesh there are the reports of the Demographic and Health Survey programme, on which we have relied to analyse recent demographic and social changes. In parallel, the World Bank database has been of great help mainly for economic issues, and reports published by international organisations such as the Food and Agriculture Organisation of the United Nations have been the basis for the analysis of issues related to the environment.

The work is divided into six chapters beside this introduction: Chapter 1 is dedicated to theoretical issues relevant to the analysis, specifically concerning the relationship between demography, environment and development; Chapter 2 is a brief introduction to the regional context of Bangladesh, and to the country as a whole, with some general indications regarding its history and the current geographical, social, and economic characteristics.

Chapter 3 has been written with the help of the *Demographic and Health Survey* data, and presents the main demographic and socio-economic changes that have taken place in Bangladesh since its independence in 1971; Chapter 4 focuses on the relationship between population and the local environment, and particularly provides data on the country's environmental conditions and major threats; Chapter 5 focuses on the interactions between demography, environment and development in Bangladesh, and hints at the main distribution and equality issues the country has to face. Chapter 6, the

Conclusion, sums up the main findings, proposes a framework to synthesise the major interactions evidenced in this work, and looks at the future challenges Bangladesh will have to face.

1. Theory Issues: Interactions among Population, Development and Environment

1.1 Population, Demographic Transition and Development

The earth has never been as populated as today: on a total area of 510 million km^2, and a land area of almost 149 million km^2, there are now more than seven billion people. Over time, world population has remained more or less stable, and reached one billion people only at the beginning of the nineteenth century, following an overall decrease in death rates, a general improvement in life quality, health services, and the persistence of a high fertility rate. Population kept increasing constantly thenceforth to three billions in 1960, doubling to six billion people in only forty years, and keeping growing at a fast pace during the first years of the twenty-first century. According to medium projections, by 2050 there will be 9.6 billion people, and almost eleven billions about the end of the century (United Nations, Department of Economic and Social Affairs, 2013).

Such an impressive growth has provoked throughout the years a wide concern regarding the possible consequences it could have, and indeed many are the implications coming with population growth. It is usually associated with a need to produce more resources, redistribute those already existing, as well as with a need to manage them differently, possibly developing newer and

more effective production and management technologies. An increasing population pressure can have enormous consequences, particularly in contexts like developing countries, where poverty is widespread and economic growth seems difficult to be primed.

Back in 1798, Malthus dealt with this problem, and stated that high fertility rates and population growth would lead to a decrease in consumption even below the subsistence level, and therefore to the diffusion of poverty. Indeed, the so-called "Malthusian trap" implies that resources do not grow with the same pace of population, so that their limited availability would curtail an excessive increase in population.

On the other hand, Boserup suggests that a rapid population growth can be the propelling force for innovation in production technologies, therefore allowing for a more productive use of resources, and avoiding the risk of poverty in the long term (Boserup, 1981). Boserup's optimistic analysis is relevant for another aspect as well: not only does she consider population growth as a factor determining technological advancement, but she does also include another important element in the framework: land. Precisely, when considering the availability of resources, she concentrates on the relationship between land and labour force, the latter rising together with population. She sustains that a shift in factor proportions, with excessive labour abundance and land scarcity, is accompanied by technological improvements, which permit the absorption of labour outside agriculture (Boserup, 1981). Besides, her model is sustained by various analyses that have considered the overall positive outcome of the last two centuries' world demographic history. It is in the *creation of knowledge* that lays the key to escape from the Malthusian trap (Lam, 2011).

At the same time, it cannot be denied that population, poverty and resources are directly connected, and an increase in population could have a negative impact on capital accumulation: according to scholars holding this

position, usually referred to as *population pessimists*, a population growth could reduce the chances for technological progress to take place (Malaney, 1999).

In any case, the relevance of such an issue resulted in a predictable and increasing interest in population growth, and in all the demographic patterns that could be related to it, like fertility, mortality, life expectancy, and so on. This concern brought to associating the analysis of demographic phenomena with that of social development, economic growth, and environmental changes.

Regarding the demographic aspect of the issue, one of the first questions faced arose from the willingness to understand the processes that Europe and its Western offshoot underwent in the nineteenth and early twentieth century, in an attempt to foresee the possible forthcoming trends in the rest of the world. Such an assumption may seem an oversimplification: first of all, because it presupposes that the processes developed countries have undergone, as depending on *Westernisation* according to some, on *modernisation* according to others, will inevitably take place in the less-developed countries on their path toward development. This would imply that despite differences, there is one single way in which demographic processes and development unfold, like a recipe that has to be followed, despite some variations. If Westernisation was to be considered the propelling force for changing demographic patterns and development, the adoption of Western attitudes and preferences would be needed to trigger these changes; instead, placing modernisation at the basis of such phenomena would mean identifying their cause in economic development, but evidence has not confirmed this causal connection.

Secondly, assuming that what happened in Western countries will necessarily occur in the rest of the world, may lead to neglect the specificity of the context in which such processes take place each time, and to deny the importance of a whole set of contingencies that could have in each case a different role in determining the accomplishment of those phenomena. It is

precisely under this light that research has been pursued, in an attempt to contextualise demographic processes, and to link them to parallel contextual conditions, more than to theoretical generalisations.

Although generalisations are misleading in many ways, many of the last decades' studies on demographic processes have been based on an attempt to generalise, because it can help identify the common threads allowing for demographic changes to happen. The generalisation at issue, which has influenced the work of the whole scientific community, is usually addressed as "demographic transition theory".

During the first part of the twentieth century, studies were conducted to classify populations according to their fertility and mortality patterns, such as Warren Thompson's *Population* (1929). Still, the definition of a demographic transition theory is usually ascribed to Frank Notestein in his article *Population: The long view*, written in 1945: interestingly, he did not address it directly as a transition, but he did give a complete analysis of it. It had been Adolphe Landry the first to designate this process as a transition, in his 1934 book *La Révolution Démographique* (Kirk, 1996, p. 361). In any case, since then the demographic transition theory has attracted the attention of many.

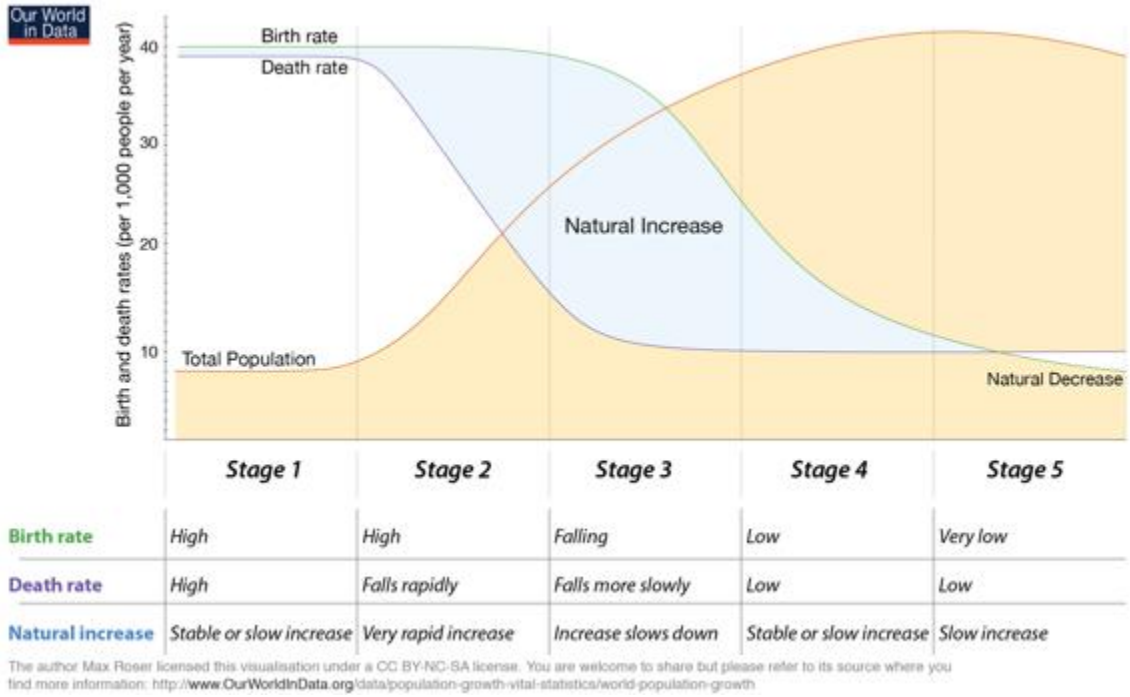
The basic assumption of this theory consists in recognising the existence of two main demographic patterns. First, a traditional situation with high birth and child death rates, in which women have to bear many children in order to substitute the high number of those dying before reaching the reproductive age. This pattern has been the norm for centuries all over the world, primarily due to low living standards and subsequent high child mortality. Secondly, a modern and more recent pattern is characterised by both low mortality and fertility, determined by a situation in which fewer children die, and families need not have many, to reach the replacement level (this does not imply that reaching replacement level is what families wish).

Recent human history has seen a general shift toward the second pattern, and between the second half of the nineteenth, and the first half of the

twentieth century most Western countries experienced this transition. This happened almost always starting with a progressive decline in mortality, then moving at a second stage to a period of decreasing fertility.

To clarify, it is useful to go through the phases of the demographic transition briefly. Figure 1.1 clearly shows the different stages the process goes through. At stage one, both death and birth rates are high, so that population is kept at a low level; the first factor to decline is mortality, and only in a second moment fertility starts going down as well. Once the death rate starts going down, population begins to grow accordingly, depending on the time lag before the onset of the fertility transition. This is why during the past few decades there has been a great increase in Asian population: in some of those countries, the relative length of the period during which mortality had already decreased but fertility did not seem to be moving caused population to grow at an astonishingly fast pace, getting to levels that had never been reached before.

Figure 1.1 The Demographic Transition Model



Source: Roser, 2015

Even when fertility reaches replacement level - which happens when total fertility rate is about 2.1 -, population keeps growing for some time. This is a trend that will be inverted, or at least will be stopped, only once the generations who were born when the birth rate was still high (stage three in Figure 1.1) get old, and do not bear any more children. Stage four represents the moment when the demographic transition is completed. Evidently, through these four stages the population age structure changes: the closer to the completion of the demographic transition, the older the population gets, until the possible moment when, at constant birth rates, all the people born in stage three die, and presumably population starts decreasing.

As we have seen, the model seems to be applicable every time the demographic transition takes place, despite differences in the timing of the various stages, or the speed with which birth and death rates decrease. In relation to this, back in 1929 Thompson had already classified countries into three main groups (Kirk, 1996): the first one comprised those where both fertility and mortality had decreased almost together, so that population was no longer growing; in the second group death and birth rates had declined as well, but the slower pace at which fertility had gone down, was causing population growth; finally, the third group of countries was defined as Malthusian, for they were in a pre-transitional condition, in which both birth and death rates were still high. Seventy-five years after, Reher presented almost the same distinction, classifying countries according to the period during which each of them had undergone (or was undergoing) the demographic transition (Reher, 2004). More specifically, he identified four groups, distinguishing between forerunners, trailers, followers, and latecomers, with the last ones facing a decline in fertility only during the second half of the twentieth century. This parallel between those two authors is just to show the relevance of the demographic transition theory: despite being a generalisation, it finds its greatest strength in the evidence that it has already been completed, or has at least started happening in every country. So

far, a brief description of the demographic transition has been given, yet it would be interesting to identify the causes and consequences the process has, in order to gain a deeper understanding of its relationship with development.

Mortality decline is ascribed to improvements in sanitary and health conditions, better nutrition levels, lower morbidity rates, greater access to potable water and to resources more generally; it is also determined by an increasing and better knowledge of behaviours that can improve hygienic conditions: in the end, it is linked to an improvement in the quality of life (Livi Bacci, 2005). Also, such a decrease in death rates is generally recognised as the trigger of the whole demographic transition process, and as the first step of the transition, without which fertility rates do not go down. At the same time, no causal relationship has been proved between the decline in mortality and a decreasing fertility rate, so that no real forecast on fertility can be made, if mortality decline alone is considered (Galor, 2011).

Scholars have tried to identify the causes of the demographic transition starting from the presupposition that mortality decline is just a consequence of a change in a wider social and economic pattern. Overall, among the causes of the mortality and fertility decline particular attention has been drawn to economic development, culture, industrialisation, technological progress, and so forth.

Economic gain has been identified as one of the motivations justifying people's demographic behaviours (Caldwell, 1976). Specifically, looking at the flow of wealth between children and their parents, societies in which fertility was high experienced a general net wealth flow from children to parents; instead, an opposite trend – namely lower fertility - was identified in contexts in which the wealth flow benefited children (Caldwell, 1976 and 2006). As a consequence, in the first situation bearing many children is perceived as economically rational, since more numerous offspring corresponds to greater chances for parents to be economically secure when they get old, and for the family as a whole to improve its economic status. On the contrary, when

educated children are worth more for, once working, they will probably be better off than their uneducated counterpart, fertility restriction becomes economically rational instead, and the second part of the demographic transition is finally triggered.

Overall, this viewpoint is based on a strong connection between demographic and economic factors, but at the same time it needs the help of different factors from the social and political sphere to justify experiences that do not support it. For example, in Asian countries like Bangladesh, not only mortality, but also fertility decline started in low development contexts, where most of the population live in poverty: in this case Caldwell (1976 and 2006), who sustains the idea of a direct connection between economic rationality and demographic behaviours, attributes an allegedly premature demographic transition to the massive family planning programmes developed by governments and non governmental organisations in that area (Caldwell, 2006). This interesting standpoint has to do with social changes related to the relationship among family members, which are at the same time tied to their economic implications and to the process usually addressed to as *modernisation*. This, despite not being necessary for the beginning of the demographic transition, has often represented an easy reference point to predict the moment when it would set off.

Quite in line with this perspective, fertility decline has been attributed more specifically to the need for better human capital, and the consequent necessity to assure children both better education and health has justified parents' preference for fewer children (Snowdon, 2008 and Galor, 2011). In this sense, Oded Galor's unified theory of economic growth comes in handy: according to the author, there is a strong relationship between the demographic transition, economic growth and social development. His suggestion that a decrease in death rates does not have a relevant role in triggering the decline of fertility, leads to surpassing the assumed causality between the two phenomena, and helps including the demographic transition

into a wider context of economic development. The start of such a process - and in particular the fertility decline – is therefore associated with the acceleration in the rate of technological progress that countries face once undertaking economic growth. Such a viewpoint supports the importance of the demographic transition when analysing the relationship between population growth and development – the latter considered both from an economic and social perspective.

Nevertheless, the demographic transition has been linked not just to economic and social convenience, but to culture as well. This does not mean excluding the economy from the framework, but indeed it leads to interpreting the demographic transition in the light of cultural preferences as well. The main idea is that demographic processes, and most of all fertility behaviours are conditioned by culture, and are paralleled by the development of individualism, secularism, and materialism (Lesthaeghe, 1983).

The attribution of such a relevance to culture - considered in its widest sense, including religious beliefs - concurs with the idea that it determines social behaviours, which are necessarily related to economic preferences. In this way, material needs are defined by tastes bolstered by the reference culture, and fertility restriction becomes just one of the economically rational behaviours, intertwined with and defined by social, economic and cultural preferences. To stress the importance of culture in this context, suffice it to remember that son preference leads to larger family size, so that the desire to have at least one son stimulates women to bear children until preferences are met, and therefore it curbs fertility decline (Buvinic et al., 2009, p. 352).

This rapid analysis seems to endorse the impossibility to define and apply a constant pattern. The most feasible and complete framework seems to be one in which various elements are taken into account to justify the triggering of the demographic transition and the possible population growth that comes with it. Specifically, a conclusion that one can easily agree with is that of Karen Oppenheim Mason, who states that: "It is time to stop fighting

about an either-or scenario and recognize that there is likely to be a complex interplay among several factors involved in any fertility decline - with a different mix involved in each decline" (Mason, 1992, p. 12).

Thence, there seem to be no constant and only factor causing demographic transitions. Instead, if an important role is to be attributed to behavioural economic rationality, but also to cultural preferences, the most feasible pattern is allegedly one in which economic, social, cultural, religious, and even psychological aspects intertwine: in this way, all these elements inevitably contribute first to mortality and then to fertility transitions (Kirk, 1996), but more generally to demographic behaviours. Accordingly, it has to be stressed that all these factors always vary, and no single model can be drawn nor applied to the various situations in which the demographic transition has taken place: in fact, research has found no single factor triggering fertility decline, which does not seem to take place steadily, neither with the same pace, nor after a constant time interval.

So far, we have given a brief description of the phases of the demographic transition, and we have taken into account the main questions that have emerged regarding the factors underlying it. Yet, if one agrees with the idea that many can be the causes both triggering and helping the completion of the demographic transition, and more importantly of the fertility decline (Kirk, 1996), one cannot underestimate how the intertwining of many factors might hide another important issue. If it is true that economic, social, cultural elements determine the demographic path of a country, it is also clear that a relevant process like the demographic transition has inevitably great implications, at various levels.

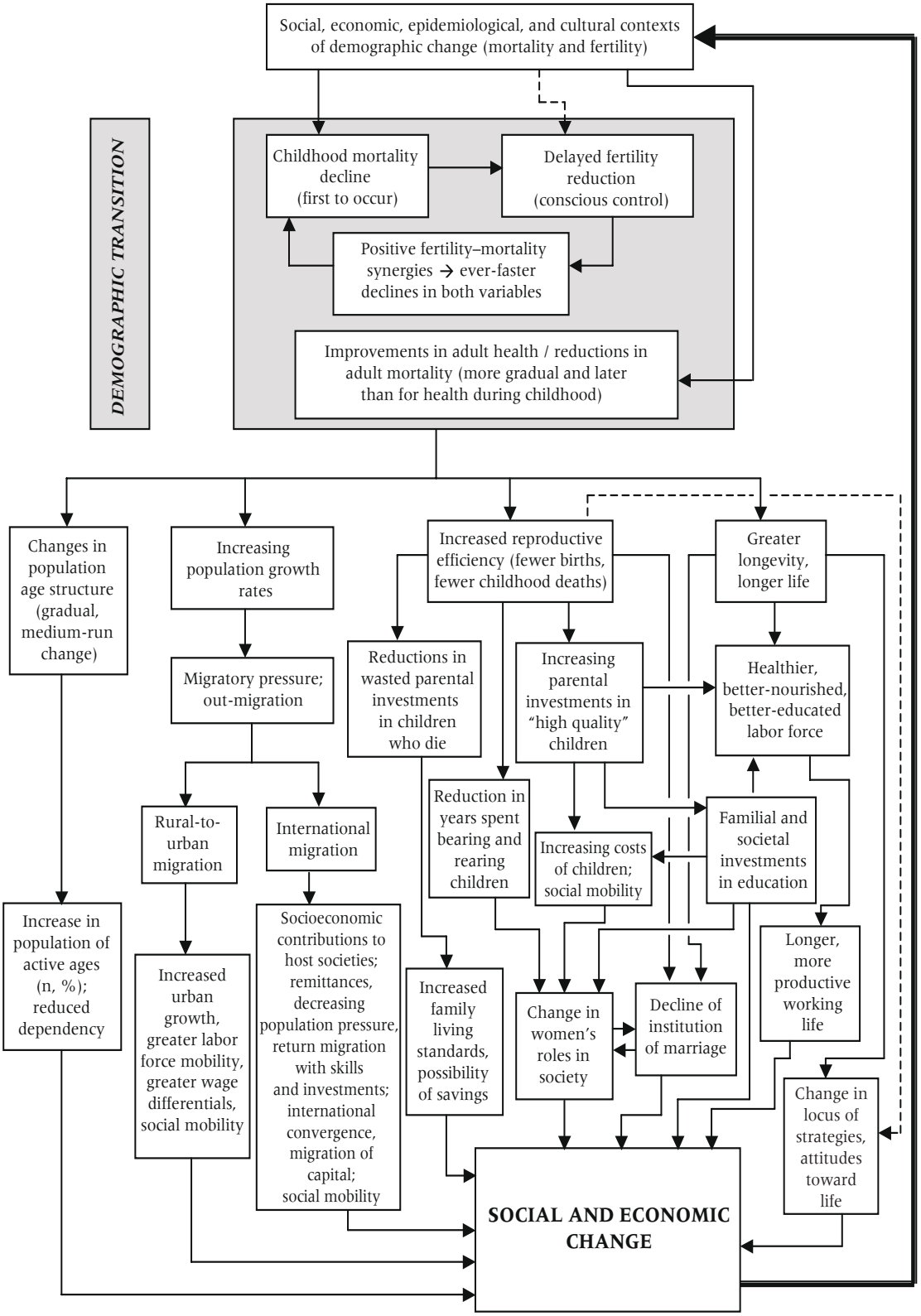
To understand the interconnection of such elements David S. Reher's article *Economic and Social Implications of the Demographic Transition* (2011) is to be recalled. The title itself gives a rapid idea of the reasoning advanced by the author: he underlines how demographic changes - and specifically the demographic transition – have a huge impact on population, both at a social

and at an economical level. In our brief description of the phases of the transition, we have already presented some of the implications it has, namely the changes occurring in the population age structure, paralleling the unfolding of the transition.

This means that it is certainly useful to distinguish between causes and implications of such a process yet, the border dividing the formers from the latters might be somehow blunt. In line with the idea that people's behaviour is usually economically rational, Reher shows the impossibility to separate multiple levels of analysis, addressing demographic, social and economic phenomena all together, and synthesising them in a helpful diagram hereby presented (see Figure 1.2).

In the scheme, the demographic transition is inserted into a framework of social and economic change (see the big box at the bottom, with an arrow going back to the top of the diagram): evidently, the specific characteristics of the context at a social, economic, cultural, and even epidemiological level are the propelling forces for the demographic transition to happen. At the same time, all the phenomena that stem from the process contribute further to those very changes that had triggered it. The several implications inserted into the intricate net of Reher's diagram, constitute the process of human capital formation, which has been previously identified as one of the processes contributing to the decline in fertility. Significantly, human capital is to be intended in the broadest sense of the expression, to highlight the unavoidable link between the formation of a human capital capable of coping with the contemporary and progressing technologies, and always-higher levels of both education and health (Snowdon, 2008). Moreover, technological improvements cause the reduction of fertility, and at the same time demographic transition sustains technological progress, creating the conditions for economic growth (Galor, 2011).

Figure 1.2 Demographic Transition, Human Capital Formation, and Social and Economic Change



Source: Reher, 2011, p. 30

In relation to this, Reher attributes these social, economic, and demographic changes to a general improvement in the quality of life: this sustains our assumption that the intertwining of all the phenomena that affect a society leads to the simultaneous changes in demographic behaviours, and in social, economic, and health conditions. As a consequence, causes and implications mingle, up to the point that no single and univocal path of change can be determined. This justifies the widespread belief that in Third World countries "fertility decline is more likely to precede industrialization and to help bring it about than to follow it" (Caldwell, 1976, p. 358). Firstly, it is coherent with the idea that demographic, social and economic transformations take place in parallel; secondly, it explains why there is neither causal nor time succession between fertility decline and any kind of technological improvement (namely, industrialisation).

In the end, this analysis has helped us frame the complexity of such processes, and in the light of our outline it can be said that a concurrent analysis of the context is fundamental, in order to achieve an understanding of the relationship between demographic processes and both social and economic development.

1.2 Population, Development and the Environment

Why are policy-makers so concerned about the demographic transition in developing countries? It is a process that strongly influences population growth and, depending on the stage of the transition, it is associated with either higher or lower population growth rates. This is relevant from a developmental perspective, because economic development is strictly linked to population growth, in the sense that it both influences and is in turn influenced by demographic patterns. For instance, in this regard *Population Growth and Economic Development: Policy Questions*, an interesting work published in 1986 (National Research Council et al.), is significantly divided into sections addressing the main questions arising from an analysis of the relationship

between population growth and economic development. The factors correlated in the book comprise population growth, population density, per capita income and income distribution, availability of both exhaustible and renewable resources, but also per worker output and consumption, technological innovation, health, schooling, and not least pollution and natural environment degradation. How all these factors interact and evolve conditions the development path of a country, and determines the possible actions to be undertaken to support it and improve people's life conditions.

As a consequence, it is useful to take into account the demographic transition, because the more or less rapid unfolding of the mortality and fertility transitions is tightly linked to population growth, poverty, and necessarily to resources allocation and availability. In this sense, no matter what role population growth is attributed in a country's development - whether it is seen as a restraint to economic growth, or as a possibility coming with technological advancement -, the scientific community has considered it useful to analyse the demographic transition. This has been done with the aim to come up with policy suggestions to enhance people's conditions, and to develop effective policies, particularly in those contexts where the situation requires greater efforts.

Referring to Third World countries, attention is often drawn to the *poverty-demography* trap, which implies that a reduction in fertility could contribute to reducing poverty, because resources would be distributed among fewer people and supposedly in a more effective way (Kidane, 2010). Also, another interpretation adds to the *poverty-demography* trap a third element: *energy* (Malaney, 1999). The interaction of demographic behaviours, poverty, and access to energy, either promotes or restrains social and economic development. Precisely, Malaney suggests that the steps to take in order to come out of this trap should be to provide access to education, health, family planning and financial services, especially to the poor and more generally to women.

In this regard, research has shown how great an impact gender inequality has on demographic behaviours and economic growth; Buvinic, Das Gupta and Casabonne summarise it clearly in their work *Gender, Poverty and Demography: An Overview* (2009, p. 3):

> Gender inequalities exacerbate demographic stresses and limit potential gains when demographic conditions improve. In high-fertility settings, gender inequalities slow fertility decline, negatively affecting women's health and life-time earnings and reducing prospects for income growth for current and future generations. In the second scenario, gender inequalities restrict women's participation in productive employment and thereby lower the potential economic growth dividend.

Gender equality and women empowerment are just another side of human capital improvement. The idea that fertility decline is enhanced by a need for higher human capital quality (Snowdon, 2008 and Galor, 2011) is consistent with the tight bond demography and human capital – including women empowerment – have with economic growth, and with the need to allow universal access to services and resources that can sustain changes in all these elements (Malaney, 1999).

This is linked to the relevance of a more general equal distribution of resources and opportunities, not just between genders, but among all individuals. In addition, poverty is mostly spread in rural areas, hence the necessity to assure resources access in general, but also to focus efforts on land as a relevant factor. In relation to this, it should be noted that rural areas often experience a higher fertility rate in comparison with urban contexts: a numerous offspring is a precious asset for rural families, because it assures a wider labour force, especially useful when children do not cost much and the wealth flow favours parents. Having educated children becomes "tempting" if investment in education involves a higher return: yet, this might be the case

only when children have high chances to survive, or e.g. in the case of rural households when land to be cultivated is not enough, or does not pay sufficient returns.

What has been said so far can be easily chained to Reher's diagram (see Figure 1.2), in which he showed how the demographic transition and the interweaving of its implications take place in a specific context, and cause alterations in it. However, that scheme can be further expanded, because the social, economic and demographic changes taken into account by Reher are affected by other aspects as well: the availability of resources - particularly land, as the demographic transition often takes place in contexts where most of the population still live in rural areas and depend on agriculture - and the environment.

This statement is to be explained. The relevance of resources' availability has already been pointed out, as linked to the *poverty-(energy-)demography* trap; on the other hand, the environment comes into play in a wider sense as well. First of all, as Partha S. Dasgupta has stressed in his works, nature's role in determining economic growth and development has to be acknowledged. According to the author, natural capital should be considered when measuring a country's wealth: when he inserts nature in the wealth account, he refers to "comprehensive wealth". In this regard, he states that there might not be correspondence between the trends of a country's comprehensive wealth and other economic indicators like GDP or even the Human Development Index (HDI)[1], that is so often addressed to as a more complete indicator of people's life conditions (Dasgupta, 2010a, p. 5). This is because appreciating nature's role in economic growth brings into account natural resources, which are often misused, and therefore lose value in time.

[1] The Human Development Index (HDI) is a summary measure of average achievement in key dimensions of human development: a long and healthy life, being knowledgeable and have a decent standard of living. The HDI is the geometric mean of normalized indices for each of the three dimensions (UNDP, 2014).

More specifically, the lack of recognition that ecosystems are capital assets entails that economic gains coming from natural resources overexploitation are overestimated (this could remind us of Hardin's idea of the *tragedy of the commons* that implies that people use the commons selfishly, always trying to pursue self-interest).

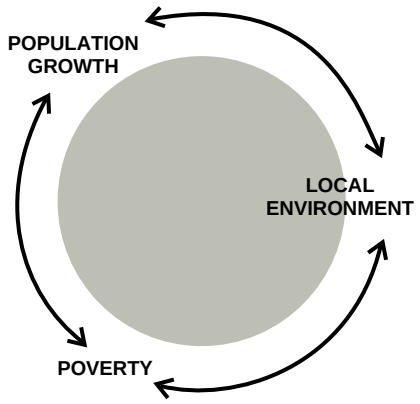
Just to bring an example of how this is tightly bound to what has been said in this chapter, it is useful to look at Dasgupta's brief article *Population, Poverty and the Local Environment* (1995), whose introductory sentence goes: "As forests and rivers recede, a child's labor can become more valuable to parents, spurring a vicious cycle that traps families in poverty" (Dasgupta, 1995). In this sense, our starting assumption that demographic, social and economic changes are affected by resources availability and environmental conditions is consistent with Dasgupta's standpoint, and is also related to Malaney's policy suggestions (Malaney, 1999).

Speaking of the possible backlashes of these interactions, demographic processes, poverty, with the addition of resources' degradation, can fuel one another (Dasgupta, 1995). Indeed, population growth – one of the consequences of the demographic transition – adds to what Dasgupta (1995) calls a vicious cycle: an increase in population does not ease pressure on the environment; instead, it further endangers both people and environmental conditions, widening poverty and causing resources deterioration. At the same time, population growth is in no way restrained; on the contrary it is propelled by environmental depletion and poverty. In poor households living in degraded environments, the net wealth flow favours parents, because children represent essential help to get scarce resources, especially the commons: children spending their time fetching water for the household are an example of the advantage a numerous offspring can bring. Thus, households are induced to have more children, but at a high, not immediately visible cost for their society. Also, high levels of fertility and poverty are linked to lower chances for women to spend time in education, and involve

more of their energies spent on rearing children and fetching necessary resources: they come with a general lower level of empowerment and human capital.

Figure 1.3 gives evidence of the cyclic pattern of interactions existing between population, poverty and environment: both migration and human capital depletion can be included in that framework, as consequences of the coincidence between population pressure, bad local environmental conditions and poverty.

Figure 1.3 The Vicious Cycle Model



Source: Dasgupta, 1995, p. 44

Yet, such a cycle has many more implications than one might expect. For example, the poverty-energy-demography trap is in line with this scheme, since energy scarcity is simply another aspect emerging from the relationship between poverty and environment, as well as one of the causes of the economically rational choice to have a numerous offspring. Furthermore, when considering the depletion of environmental resources, and the way in which population affects the environment, one has to take into account two more elements: pollution and climate change.

Pollution is one of nowadays' major concerns, and a growing population is usually associated with increasing levels of pollution, higher resources degradation and a general higher pressure on the environment. Accordingly, some scholars hold that reducing birth rates can be one of the ways to reduce mankind's ecological footprint (Das Gupta et al., 2011, p. 16). At the same time, following the path of the Environmental Kuznet Curve (Galeotti et al., 2011), pollution is also related to economic growth: it is bound to the level of poverty, as well as to high fertility rates and the related footprint population growth casts on the environment. In accordance with the Environmental Kuznet Curve, the ecological transition, together with economic growth

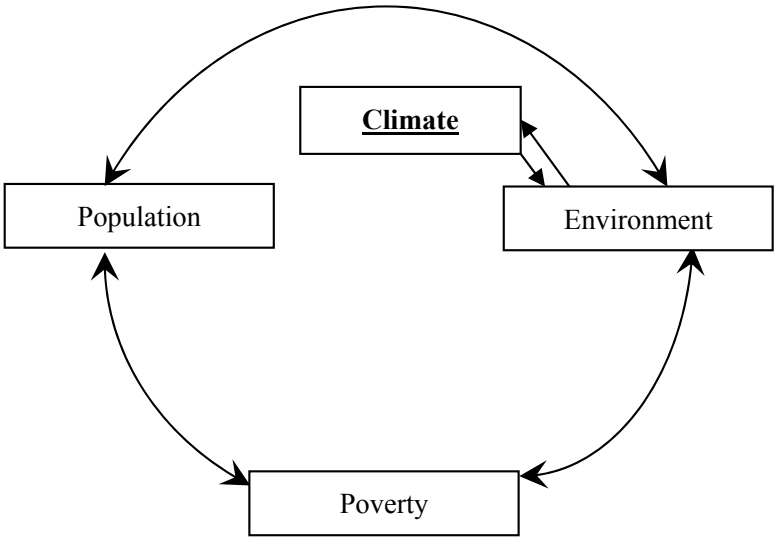
follows an inverted-U trend: a country that is on its development path pollutes more as people start coming out of poverty, but it gets to a point in which higher (economic) wealth corresponds to lower levels of pollution.

A recent study of the Center for Research on Energy and Environmental Economics and Policy at Bocconi University in Milan, holds that the demographic transition has a strict connection with the *ecological transition*, in the sense that the demographic transition unfolds in parallel with economic development, and so does pollution. Consequently, the authors define an enriched Kuznet curve, stating that demographic transition and pollution levels unfold together, following an inverted-U trend, in accordance with the path of economic growth (Galeotti, et al., 2011). This is of great interest because it implies that poor countries with a belated demographic transition pollute more, and in time they will lose part of their wealth because of environmental degradation. All in all, this enriched version proposed by Galeotti, Lanza and Piccoli (2011) recognises the connection between demographic processes, economic growth, pollution and environmental degradation levels: basically the same circle proposed in Figure 1.3.

Regarding climate change, Figure 1.4 highlights the presence of this other branch of the circle at issue. Climate change can be considered as both a cause and a consequence of such a vicious cycle. The change in livelihood strategies (among which high fertility and migration have a central role) and environmental changes fuel one another; also, climate change affect environmental conditions, and further contributes to that vicious cycle that prompts greater poverty and population growth (Bremner et al., 2010).

Beside this, the environment often affects social and demographic processes: just to name a few, mortality and morbidity might be linked to environmental causes, and even land use evidently depends on population density and growth: for example, the latter has been said to have a correlation with shortened period of fallow (Entwisle and Stern, 2005).

Figure 1.4 Climate Change and the Vicious Cycle



Source: Bremner et al., 2010, p. 115

What is more, migration is in some cases determined or pushed by environmental issues like natural disasters, land erosion, or more simply by the quality of the environment, and at the same time it can determine ecosystems' degradation in those cases in which it brings to higher population density in some areas. In an interesting work on migration, population and rural environment, Bilsborrow (2002) suggested that in developing countries rural-to-rural migration is a phenomenon at least as important as the abandonment of the countryside to reach towns and cities. Overall, the author connects three main factors: population, environment and migration. He holds that a downward spiral arises from population growth, environmental degradation, and migratory flows. A high population pressure has a negative influence on rural environment, especially in poor settings (Bilsborrow, 2002). This causes environmental degradation, which induces people to abandon depleted areas, and to move to other rural regions.

It is worth pointing out that the choice to abandon degraded regions is linked to poverty, which determines the impossibility for poor people to invest on environment protection and improvements: hence the necessity to

migrate and find resources somewhere else. On the one hand, this kind of migration reduces the backlashes of population pressure in the abandoned areas; on the other, it causes a stress on destination settings, and propels further environmental degradation.

Thus, population growth, the demographic transition and the environment are part of a complex system in which all the factors influence one another. In this regard, it is interesting to quote a sentence from *Population, poverty, environment, and climate dynamics in the developing world*: "Research has demonstrated across multiple scales that population-environment-poverty synergies tend to be non-linear, ecosystem specific, and involve multiple pathways among population and environmental change, population and poverty, and poverty and environmental change" (Bremner et al., 2010, p. 122).

From this perspective, a few conclusions can be drawn. All these interactions, and Dasgupta's vicious cycle directly recall the idea that comprehensive and long-lasting development can only be achieved keeping in mind the fundamental role nature has in people's lives (2010b). Dasgupta (2010a, p. 10) defines as "seriously harmful" those development policies that do not take into account how much population and the whole economy rely on natural capital. In this light, it is easier to understand policy outcomes, to choose the most effective path towards development, and to identify probable future changes.

This comes with an implication. Although social, economic and demographic positive changes can fuel one another, the path towards long-lasting development and comprehensively improved life conditions passes through social, economic, demographic, *and environmental* changes. The chances to turn a vicious circle into a real and stable virtuous circle can only be taken if all these aspects are accounted. Countervailing actions will be effective if tailored to the specificities of each case, and in this way it will be possible to shift the balance towards continuous and faster improvements.

This is why scholars and policy-makers are more and more concerned with these interactions, and particularly with the effects of faster or slower population growth in countries where poverty is widespread and population density is high. Moreover, states and institutions in general are often preoccupied with conflict situations that can be generated by demographic, economic, environmental, social and political pressures, thus they are interested in understanding these complex interactions.

To conclude, one of the aims of this work shall be that of recognising the challenges the demographic transition and population growth issue, evidently in relation to context-specific factors: hence, the willingness to consider demographic processes as phenomena that are part of wider and more complex systems, in which factors influence one another. Social, economic, demographic, environmental changes are indeed interconnected, but in ways that are never constant, always context-specific, and that therefore require a special analysis each time.

2. Bangladesh: an Introduction

2.1 The Regional Context

Before considering the case of Bangladesh, an introduction is owed. First of all, *countries* are the referent units of our analysis, but a series of issues are to be kept in mind. First of all, a country is a political unit: from many points of view – e.g. from a geographical, cultural, religious, but even social and economical perspective – its borders can be hardly representative of a definite distinction among peoples. It is a unit that includes a wide variety of cases and experiences from all perspectives, it is not an impermeable unit, and many factors affecting people's lives and the development of a country cut through its borders, and can create distinctions within and between countries alike. Therefore, the decision to address this unit has been made keeping in mind the relevance of such a condition.

Secondly, the case of Bangladesh is to be contextualised. As already noticed, during the last century there has been an impressive world population growth, and much of the increase has taken place in Asia. In the 1950s and 1960s, due to a rapid fall in mortality rate, Asian population started growing at an unprecedented pace. Table 2.1 shows that in 1960 Asian countries were following the same pattern as African and Latin American poor countries, with an average rate of natural increase of 2.4% among less developed countries (Zaman, 1980, p. 550).

Table 2.1 Changes in World Vital Rates

Region	*CBR*[1]	*1960 CDR*[2]	*RNI*[3] (%)	*CBR*	*1977 CDR*	*RNI* (%)	*1960-77 CBR decline (%)*
Developed Countries	21	9	1·2	16	9	0·7	24
Less Developed Countries	43	19	2·4	37	15	2·2	14
Asian LDCs (excluding China)	43	20	2·3	36	16	2·0	16
China	37	16	2·1	26	10	1·6	30
African LDCs	48	24	2·4	46	18	2·8	4
Latin American LDCs	41	12	2·9	34	8	2·6	17

Notes: [1] *Crude Birth Rate: the number of live births, per year, per 1000 population.*
[2] *Crude Death Rate: the number of deaths, per year, per 1000 population.*
[3] *Rate of Natural Increase: the difference between CBR and CDR expressed as a percentage.*
Sources: UN World Population Prospects As Assessed in 1973. *New York: UN 1977; W Mauldin, 'Patterns of Fertility Decline in Developing Countries, 1950-75'.* Studies in Family Planning April 1978; Population Reference Bureau,

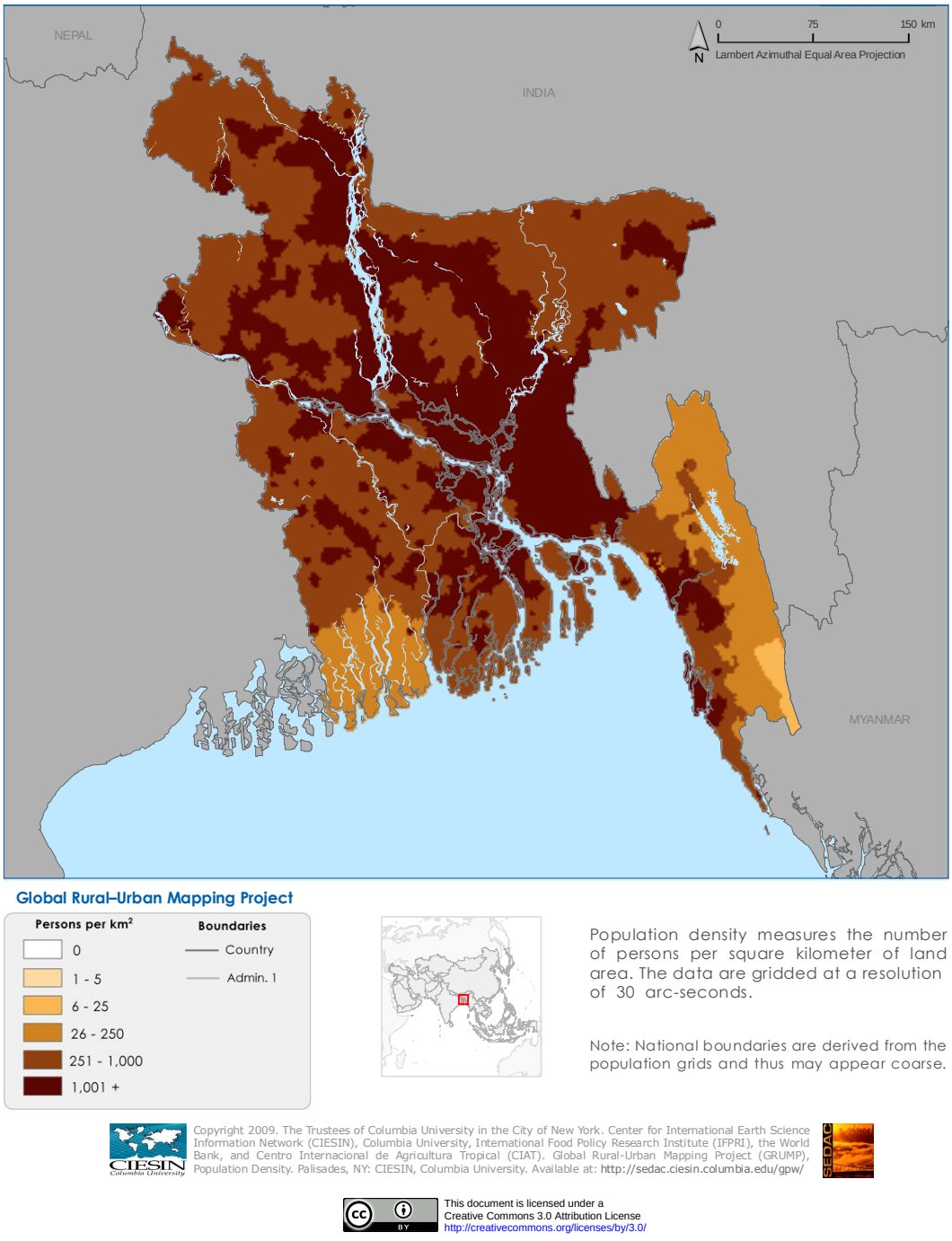
Source: Zaman, 1980, p. 550

Beside this impressively fast growth, Asia has also some of the most densely populated areas in the world. In South Asia the region of the Ganga river and its tributaries is highly populated, and so is Bangladesh, where now population density exceeds 1,200 people/km^2 (Figure 2.1); at the same time, other countries of the region are scarcely populated, like Bhutan that has an average of 14 people/km^2 (Véron, 2008, p. 15). It is far from being a homogeneous region, although it can still be said that some major trends can be recognised in the area.

Jacques Véron (2008) has written an interesting synthesis of the main demographic and socio-economic changes of South Asia, the region on which it is worth focusing to understand the context in which Bangladesh is situated. For our purpose, suffice it to borrow the generally accepted definition of South Asia (Figure 2.2) used in his article, which includes Afghanistan,

Pakistan, India, Nepal, Bhutan, Bangladesh, Sri Lanka and Maldives (Véron, 2008)[2].

Figure 2.1 Population Density in Bangladesh in 2000

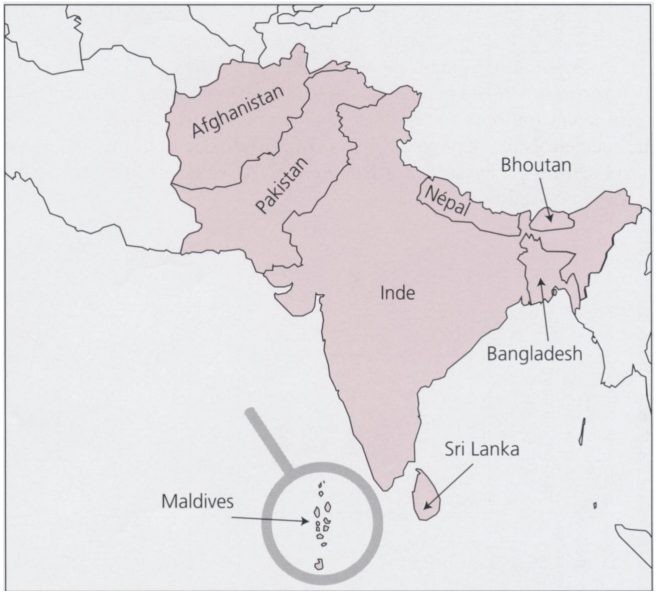


Source: NASA - SEDAC, 2009

[2] This definition of South Asia excludes Myanmar. In this regard, it is enough to know that Myanmar has undergone processes more or less similar to those of South Asia presented in this section.

Population has grown so rapidly in South Asia, that it tripled in fifty-five years, passing from 478 million in 1950, to 1.518 billion people in 2005. This rise in population has not been homogeneous, since each country experienced different trends in growth rates throughout the years; yet, it was especially during the 1980s that rates increased almost everywhere in South Asia, causing a relevant change in population numbers. It was thanks to a general decline in fertility rates, during the last decades of the twentieth century that population growth rates in Asia decreased progressively, so that the recent years' trend will supposedly be reverted.

Figure 2.2 South Asia



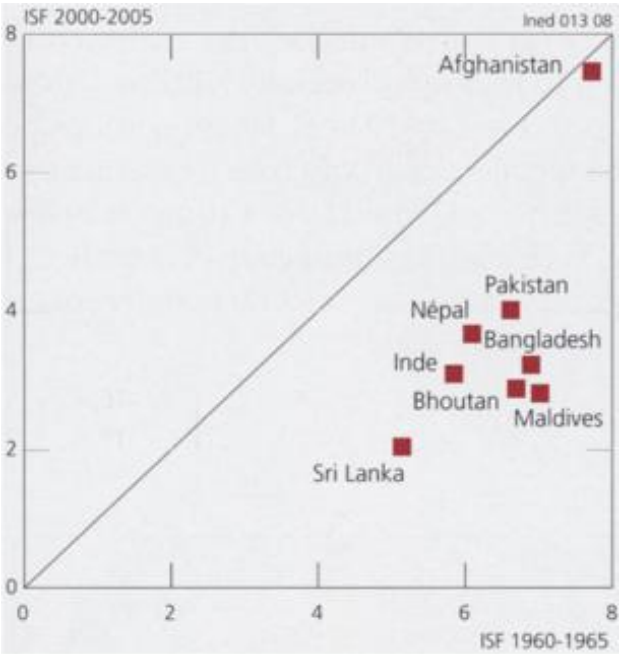
Source: Véron, 2008, p. 12

In general, the South Asian demographic case seems to be characterised by a variety of experiences over time: the two opposite examples of Sri Lanka (with an early demographic transition, completed in the 2000s) (Véron, 2008, p. 23), and Afghanistan (that during the second part of the twentieth century faced a slow decrease in mortality rate, but no significant change in fertility) clearly show the autonomy of the demographic changes in each country. At the same time, apart from these two opposite exceptions, from 1950 to 2000 all the other South Asian countries started undergoing their demographic transition, though proceeding in each case at different paces. Figure 2.3 represents the changes in total fertility rate that took place between 1960 and 2005: with the two exceptions of Sri Lanka and Afghanistan, the rest of the

countries underwent an interesting and quite homogeneous shift to lower levels of fertility (Véron, 2008, p. 33). Still, differences can be detected: for instance, Bangladesh case is considerable, because it experienced one of the steepest declines, with a TFR of 6.9 in 1970, an incredibly low value of 2.6 in 2005 (only after 35 years), and an even lower 2.2 in 2013 (Gapminder, 2015).

Also, most of South Asia is characterised by an early and almost universal nuptiality pattern, especially among women (again, Sri Lanka is an exception under many points of view, and nuptiality makes no difference); however, during the past decades a slight increase of the age at first marriage has been detected everywhere, in parallel with the unfolding of the demographic transition and an increase in life expectancy.

Figure 2.3 Fertility in South Asia, between 1960-1965 and 2000-2005



Source: Véron, 2008, p. 33

South Asia has also experienced an overall improvement in education; yet, apart from Maldives and Sri Lanka, all South Asian countries still have low levels of literacy, with better conditions in India and Bangladesh (respectively 48% and 41% of the population was alphabetised during the 2000s). Gender inequalities are still widespread, and educational attainment has been generally lower among women, though from this perspective too, some improvements have been made throughout the years.

From a cultural point of view, the region is not uniform. South Asia's cultural history is among the most ancient and diverse, in a constant effort to fulfil integration among people. Coherently with the idea that culture affects demographic behaviours (Lesthaeghe, 1983), in an interesting article Alaka

Malwade Basu and Sajeda Amin analysed the case of East and West Bengal, and showed how culture, identity and language are particularly relevant when it comes to the spread of social and demographic behaviours (Basu and Amin, 2000). They pointed out that in the case of East and West Bengal, sharing a common culture - specifically speaking the same language, and having the same set of traditions - had determined the unfolding of a really similar demographic pattern, with a particularly rapid fertility decline. This supports the necessity to address countries in relation to their wider context.

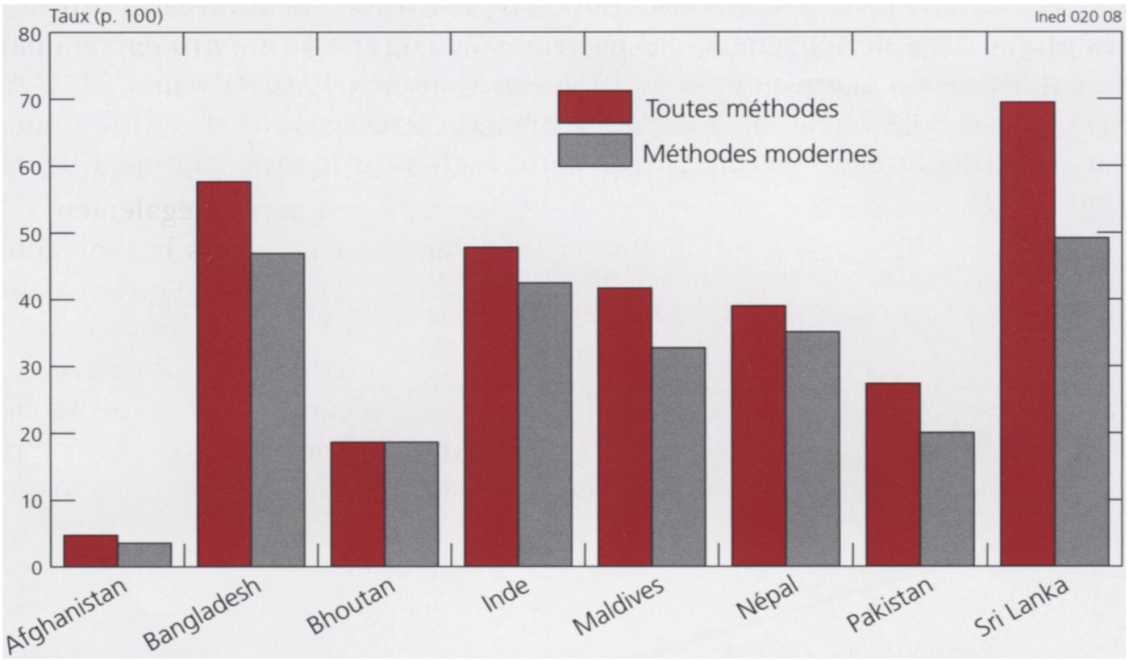
Looking at the differences emerging from a comparison within South Asia, cultural, linguistic diversities are bound to religious differences, with Muslim and Hindus people constituting most of the regions' population; to give evidence of the relevance of these differences, suffice it to remember the case of Pakistan, Bangladesh and India independences, and the troubles due to the coexistence of Hindus and Muslims in the area. Although this lack of religious uniformity could be related to different demographic preferences, in a work on Asian fertility transition John C. Caldwell (Caldwell and Sathar, 1996) seems to exclude the relevance of religion in determining fertility patterns, underlining instead the importance of family planning policies when it comes to accelerating demographic processes.

This leads to the importance institutional interventions have had in affecting South Asian demographic behaviours. It is useful to report once again a graph (Figure 2.4) Véron had already borrowed from the United Nations, in which the prevalence of contraception methods in South Asia, during the 2000s, is represented.

Not unexpectedly, contraceptive systems are most spread in Sri Lanka, where the demographic transition has been completed, whereas Afghanistan - whose belated demographic transition had just started in the 2000s - is characterised by a really low rate of contraception use. In Bangladesh contraceptive methods are widely used, and this is largely acknowledged to be the result of successful family planning policies. These were implemented in

other countries as well, yet in none of the other cases the decline in fertility has been so rapid, which confirms the success of Bangladesh's family planning strategies.

Figure 2.4 Contraceptive Prevalence Rates in South Asian Countries in the 2000s



Source : Nations unies, 2005.

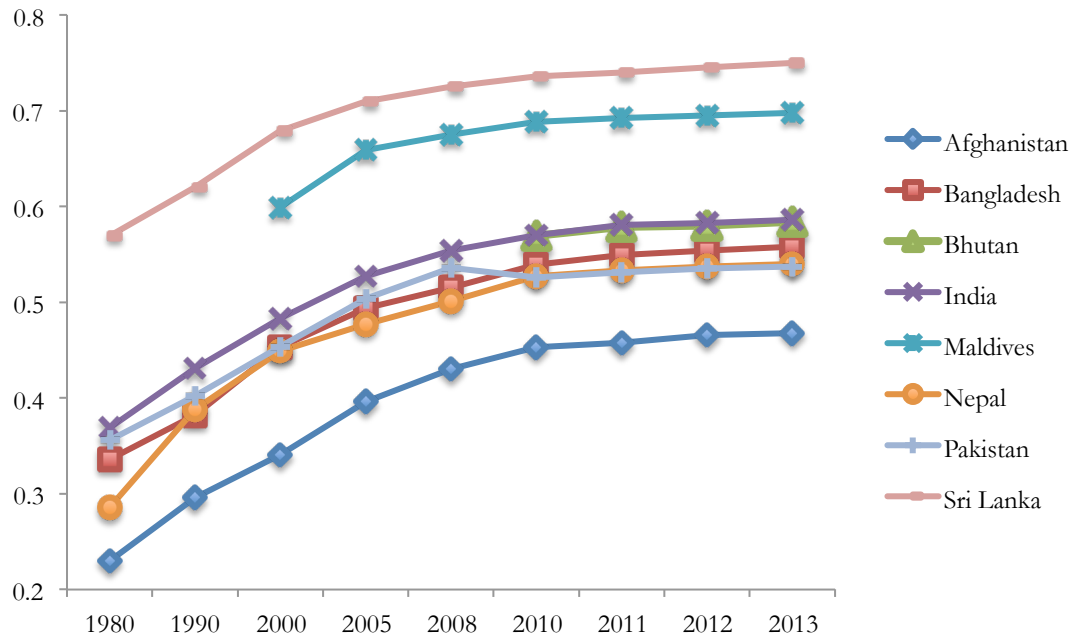
Source: Véron, 2008, p. 47

To close this brief outline, it is worth reporting a few other elements. In accordance with what has already been said, excluding Sri Lanka and the Maldives, South Asian countries still have low levels of human development, with most of the countries not reaching 0.60 in HDI – although it has to be acknowledged that it has increased significantly everywhere (Figure 2.5).

Also, GDP per capita is low in the area (Figure 2.6), but a lower level of GDP does not coincide with a later demographic transition. For example, over time Pakistan has always had a higher GDP per capita in comparison with Bangladesh; notwithstanding, the latter has experienced a more rapid fertility decline, getting to a TFR of about 2.2 by 2013, well below Pakistan's TFR of 3.2 (World Bank, 2015b). This is in line with the assumption presented in the first chapter, namely the impossibility to detect a causal

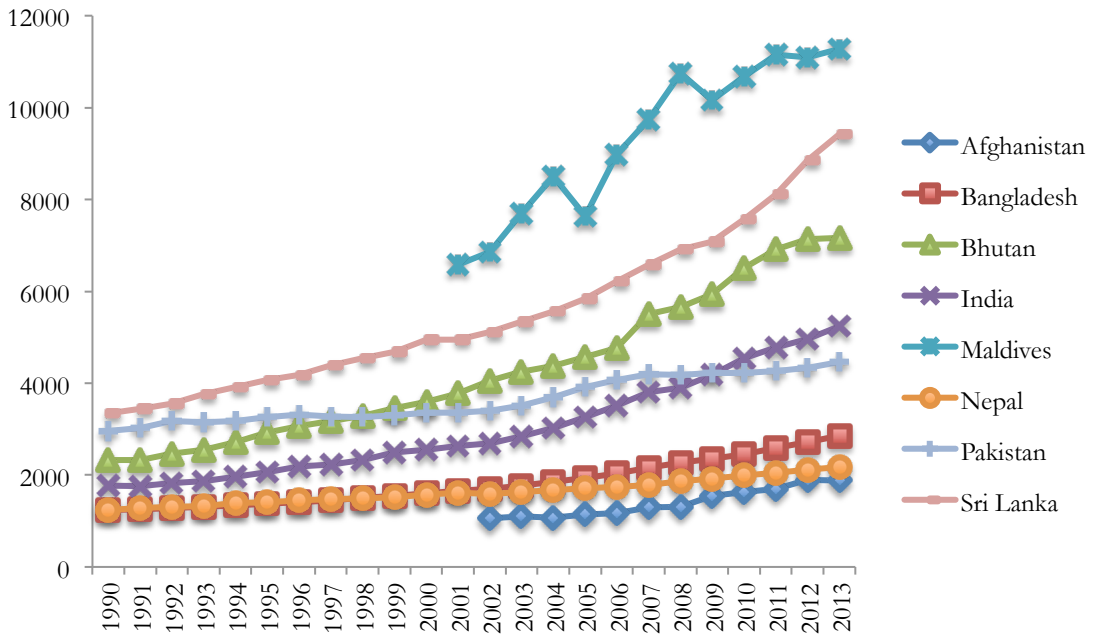
relationship between economic growth and fertility decline, and instead the suggestion of a simultaneous change in the two dimensions, and their reciprocal influence on one another.

Figure 2.5 Human Development Index (HDI)



Source: UNDP, 2014

Figure 2.6 GDP per Capita, PPP (constant 2011) International $



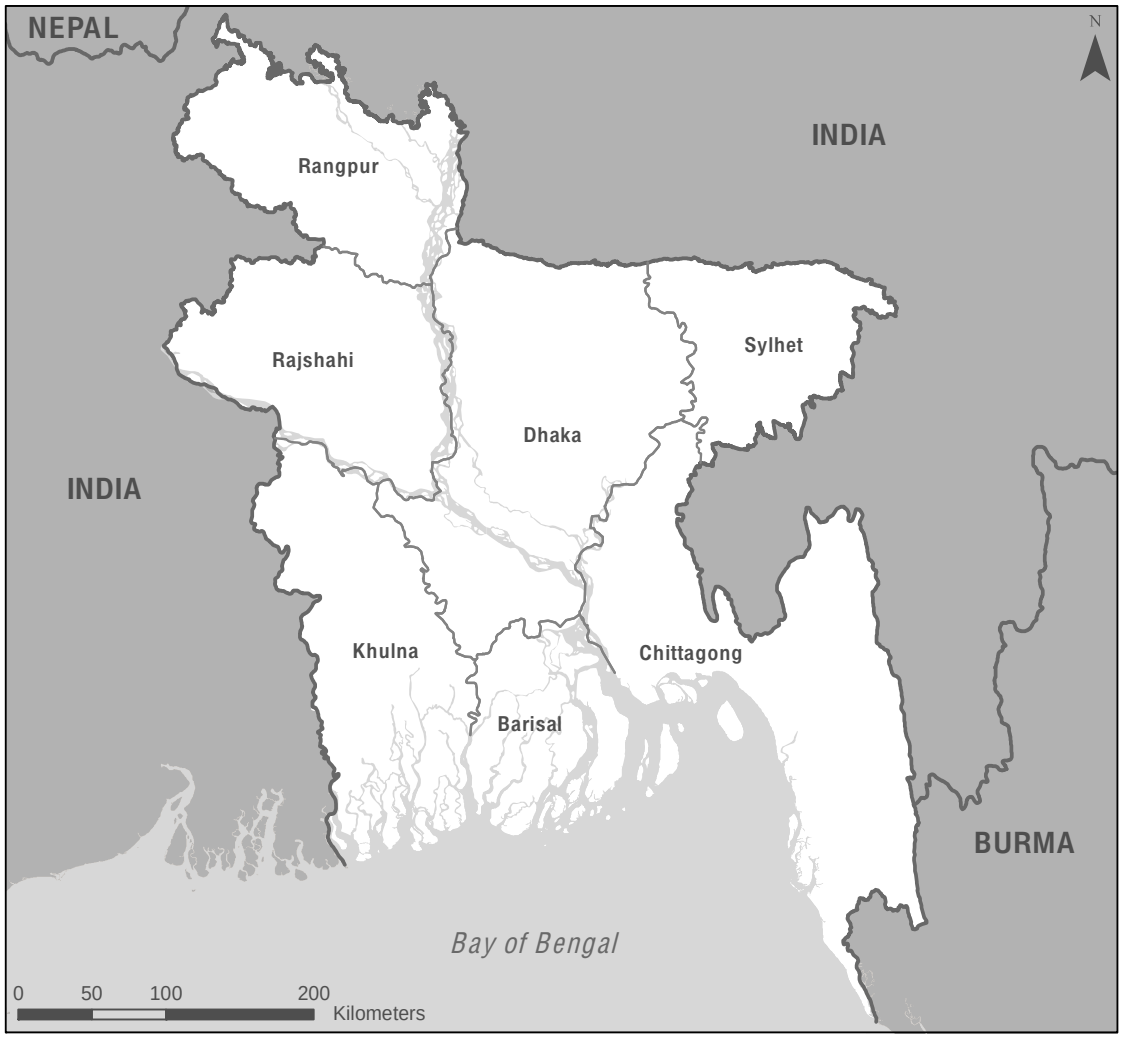
Source: World Bank, 2015b

These data are to be considered in a wider context. Historically, South Asia has undergone a great series of population movements, and over time many civilisations have flourished in the region. Just to name a few, Indus and Dravidian peoples, the Mauryan and the Guptas empires prospered throughout the centuries; in the sixteenth century the Mongols' age started, and simultaneously Europeans began to increase their trade with South Asia (Véron, 2008, pp. 20-23). Since the nineteenth century, the British crown exerted its influence all over the area, and controlled all but Afghanistan. It was only after World War II, that the region gained its independence and the current states were established. Yet, Bangladesh had to wait 1971 to gain complete independence: for more than twenty years, since 1947, it had formed part of Pakistan.

All demographic phenomena and historical events have taken place in an area characterised by three main geographical zones: the mountain ranges, comprising Hindu Kush, Karakorum and Himalayas, the Indo-Gangetic plain and the Deccan plateau. The South Asian climate goes from arctic on the mountains, to temperate in hilly areas, and tropical in the plain, invested by monsoons every year. The Indo-Gangetic plain, formed by Indus, Ganges, and Brahmaputra rivers together with their tributaries, is an alluvial plain, and particularly in the areas closest to the rivers' delta populations are often at risk: more or less disastrous floods are frequent, and as a consequence, agricultural land is often submerged. Moreover, the high population density that characterises the area causes pressure on land, especially on coastal zones where population is most concentrated and disaster risk is higher. Worse still, high population density paired with natural disasters involve greater risk at a sanitary level, therefore aggravating further life conditions of those who are already poor and have scarce access to basic resources and services. These are just some of the problems South Asian countries have to face constantly, together with environmental issues like soil erosion, water pollution, and many more.

2.2 Bangladesh

Figure 2.7 Bangladesh Map



Source: DHS, 2013

A land of rivers and swamps, Bengal was always extremely difficult to travel in, but the land was always fertile, and agriculture probably has more than a three-thousand-year history there. (Rutherford, 2009, p. 8).

2.2.1 Geography

Bangladesh occupies a gross area of 147,570 km^2 in the North-Eastern part of South Asia, borders India and Myanmar, and overlooks the Indian Ocean. It is located in the Ganges-Brahmaputra river delta, formed by the Ganges, Brahmaputra and Meghna rivers with their tributaries, all of which empty in the Bay of Bengal, bordering Bangladesh on its South for about 700 km. It consists of flood plains representing the 79.1% of the country, with terraces and hilly areas covering the remaining part and hardly reaching an elevation of 1,000 metres in the Chittagong division. Much of the territory is no more than twelve metres above sea level, and did climate change cause an increase in sea level by one metre, about half of the land would be probably flooded and millions of people would be in danger, displaced, and they would lose their houses and land (Garibay et al., 2010, p. 2).

The country enjoys generally a sub-tropical monsoon climate, with three main seasons: winter, monsoon, and summer. As already recalled for South Asia, floods are frequent at the beginning of the monsoon and, due to its geographical setting, Bangladesh is among the most disaster-prone countries in the world. River erosion is one of the problems daily faced by Bangladesh people, and it has even affected national borders, with thousands of hectares already lost in favour of Myanmar and India. Overall, between 1990 and 2007 it faced many disasters (Table 2.2), and in 1998 it suffered from the worst flooding of modern world history.

Table 2.2 Frequency of Disasters During 1990-2007

Cyclones	Earthquakes	Floods	Land Slides	Tornados	Wind Storms
10	2	28	2	6	26

Source: Garibay et al., 2010, p. 2

2.2.2 History and Society

The People's Republic of Bangladesh had to deal with these troubles since it gained its independence from Pakistan in 1971, after twenty-four years of Pakistani rule, and a nine-month war. Thenceforth, Bangladesh has gone through three main periods of political regimes: an elected civilian regime from 1972 to 1975; a military or quasi-military phase from 1975 to 1990; democratic civilian governance established in 1991 (*CPD-CMI Paper 5*, p. 6).

The first independent government of Bangladesh was ruled by President Sheikh Mujib (Shrestha, 2002), during which the country had to face difficult years: millions of people were displaced, and a famine killed about 1.5 million people in 1974. Soon after, in 1975 a coup d'état overthrew Mujib's rule, and General Ziaur Rahman (called Zia) became first the head of a martial-law system, and in 1977 the president of Bangladesh. After his assassination in 1981 at the hands of military officers, General Hussain Muhammad Ershad came to power and ruled until 1990, when he was forced to resign and new elections were indicted. In 1991 Begum Zia became the first woman to be prime minister in Bangladesh, and since then civilian governments have ruled in the country. It should be noted that oppositions, protests and accusations of widespread corruption were directed to all the ruling governments, hence the acknowledgement of the severity of the problem and the great difficulty doing away with such high levels of corruption (Shrestha, 2002).

Nowadays, Bangladesh consists of 7 divisions, 64 districts and 545 upazilas (sub-districts), and is the most densely-populated country in the world, apart from city-states: it has a population density of 1,203 inhabitants/km^2 (World Bank, 2015a), accounting for more than 156 million people, almost 90% of which are Muslims and 9% Hindus (other religions constituting the remaining part). Bangla or Bengali is the official language of the country, and since its independence Bangladesh institutions have tried to use it extensively, although the heritage of English still has an important role.

Overall, as already reminded by Basu and Amin (2000), both in East and West Bengal – the former being Bangladesh -, there is a strong and widespread sense of identity due to common roots, common traditions, and reinforced by a common language understood by all, and valued by the institutions. Regarding social classes, hierarchies are present among Muslims, but they are quite fluid and open, and allow for mobility among social strata. Hindus instead, unlike in neighbouring countries, all belong to the same caste, which makes them a really uniform group in Bangladesh (Shrestha, 2002, p. 245).

Although urbanisation is proceeding rapidly, most of Bangladeshi people still live in rural areas. Shrestha outlines the social system of Bangladesh, and writes: "The basic social unit both in rural and urban areas is the family (paribar, or gushti). A family generally consists of several members who live together in a homestead (bari [composed of more than two houses]) and share the same kitchen (chula)" (Shrestha, 2002, pp. 243-244). In rural areas, baris are at the basis of communities and villages, whereas in urban contexts links among families tend to be weaker. All in all, family and kinship are very important in Bangladesh society, and they constitute the core of social life. As a consequence, marriage is a fundamental event in both men's and women's lives, and only recently the practice of choosing a partner has become common, albeit always preceded by negotiations between the families of the partners (Shrestha, 2002, p. 244). In relation to this, patrilineal kin ties are the most important, and women status is still low: as shown in Table 2.3, the percentage of females with at least some secondary school is almost 10% lower than among males, only the 57.3% of women participate in the labour force and adolescent birth rates are still high. Nonetheless, throughout the years improvements have been made, as the country has been ruled by women over the past twenty years, and both political and social women empowerment has been pushed for. For instance, law provides for equal rights between men and women (Shrestha, 2002, p. 262) and access to

education has been boosted in many ways, among which the Female Secondary School Assistance Project has been providing a stipend to girls going to secondary school (Schurmann, 2009).

Notwithstanding, women's status is still low, and much is to be done: women still suffer worse life conditions, scarcer access to resources, financial services, education, health, sanitation facilities and due to the practice of purdah (basically involving the exclusion of women from males' public spaces), many of their activities are confined to the domestic context (Shrestha, 2002, pp. 262-264).

Table 2.3 Gender

Gender Inequality Index	0.529
Maternal mortality ratio (deaths per 100,000 live births)	240
Adolescent birth rate (births per 1,000 women aged 15-19)	80.589
Share of seats in parliament (% held by women)	19.714
Population with at least some secondary education, female (% aged 25 and above)	30.8
Population with at least some secondary education, male (% aged 25 and above)	39.26
Labour force participation rate, female (% of ages 15 and older)	57.3
Labour force participation rate, male (% of ages 15 and older)	84.1
Gender-related development index: female to male ratio of HDI	0.908
HDI, female	0.528
HDI, male	0.582

Source: UNDP, 2013

2.2.3 Economy

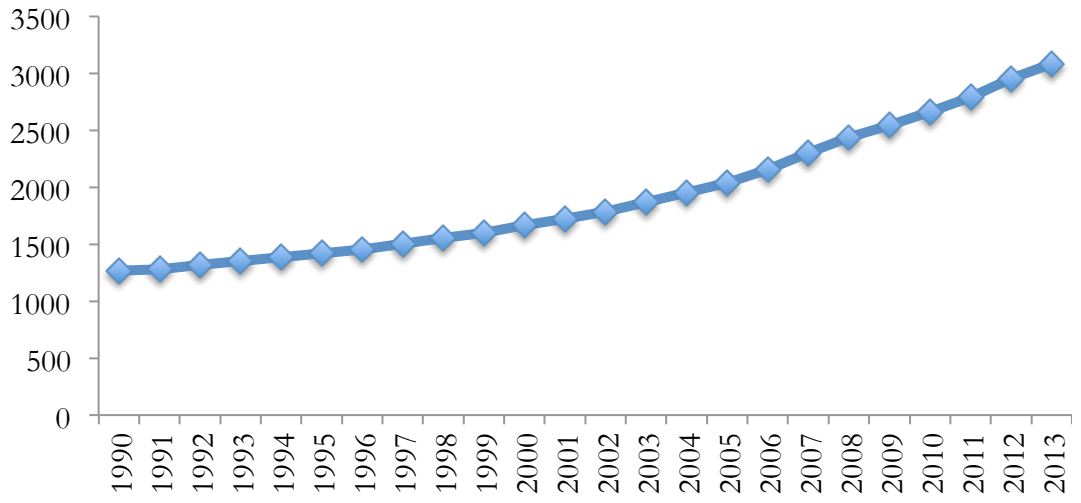
From an economic point of view, despite still being a low-income country, Bangladesh has undergone dramatic changes since its independence. This is what CIA (2014) writes about it in its yearly factbook:

> Bangladesh's economy has grown roughly 6% per year since 1996 despite political instability, poor infrastructure, corruption, insufficient power supplies, slow implementation of economic reforms, and the 2008-09 global financial crisis and recession. Although more than half of GDP is generated through the service sector, almost half of Bangladeshis are employed in the agriculture sector with rice as the single-most-important product. Garment exports, [are] the backbone of Bangladesh's industrial sector and 80% of total exports.

Industry has recently expanded and in 2011 it became the largest sector of the economy, producing about 30% of the GDP (DHS, 2013, p. 1). Most of Bangladesh population lives in rural areas and more than 40% works in agriculture, which now accounts for about 20% of the annual GDP, but that has always had a relevant role in the region.

Despite a first period of ups and downs in Bangladesh's independent history, the income per person has been growing since 1975 and GNI per capita PPP (constant 2011 international $) passed from 1,268 $ in 1990, to 3,082 $ in 2013 (Figure 2.8) (World Bank, 2015a).

Figure 2.8 Bangladesh, GNI per Capita, PPP (Constant International $)



Source : World Bank, 2015a

Moreover, the Human Development Index has passed from 0.33 in 1980, to 0.55 in 2013. It is interesting to see how, apart from India, neighbouring countries have a lower HDI in comparison with Bangladesh (see Figure 2.5), that has gained four positions in only two years, now ranking 142 and leaving the group of low human development countries to join the medium human development one.

Life expectancy has grown steadily as well, even surpassing other South Asian countries like India and Pakistan, that have a higher GDP and are considered to be generally richer. The Economist's table (Table 2.4) presents some interesting data, highlighting how much the quality of life has improved in Bangladesh, despite poverty. For example, life expectancy at birth was only 59 years in 1990, and in 2010 it reached 69 years, increasing of 10 years in only two decades (Table 2.4).

From an economic point of view, agriculture has been enhanced: irrigation systems have been improved, and the country is now almost self-sufficient in rice production. Also, a major problem during the last decades has been the poisonous presence of arsenic in water used by the population daily, but fortunately in the past few years there have been improvements in the access of water with acceptable levels of arsenic (Huq et al., 1998). Beside this, the proportion of population using improved sanitation facilities has increased, especially among the poor, where the problem is substantial.

Table 2.4 Poor but Impressive

		Bangladesh	India	Pakistan
Income per person, $PPP*	*1990*	540	874	1,200
	2011	1,909	3,663	2,786
Life expectancy at birth, years	*1990*	59	58	61
	2010	69	65	65
Infant (aged <1) deaths per 1,000 live births	*1990*	97	81	95
	2011	37	47	59
Child (aged <5) deaths per 1,000 live births	*1990*	139	114	122
	2011	46	61	72
Maternal deaths per 100,000 live births	*1990*	800	600	490
	2010	194†	200	260
Infant immunisation rate, %	*1990*	64	59	48
	2008	94	66	80
Female (aged 15-24) literacy rate, %	*1991*	38	49	*na*
	2009	77	74	61
Underweight children, % of total	*1990*	62	60	39
	2007	36†	44	31

Sources: World Bank; UNICEF; WHO; national statistics

*Purchasing-power parity †2011

Source: The Economist, 2012

Overall, poverty has dropped consistently both in rural and urban areas, though it should be reminded that about one in three people are still living below the poverty line, and many others could fall back into poverty, were they hit by natural disasters – unfortunately so recurrent - or did they lose their jobs. In relation to this, inequitable distribution of land is another major problem, for in rural areas land property is for families an important prerequisite for economic and social stability (USAID, 2010). Specifically, according to the preliminary report of the 2008 Agricultural Census, 11.4% of the total rural households is landless, meaning that 3.26 million rural households have no land (Garibay et al., 2010, p. 51). Moreover, even when households do own some land, this is not equally distributed, for most of landowners own less than 2.5 acres. Throughout the years, governments have developed mechanisms to redistribute *khas land* (state-owned land), yet corruption and the lack of reforms' enforcement have prevented the success of such policies, and due to environmental phenomena like river erosion landlessness has been on the rise. In addition to this, back in 1994 Dietmar Herbon had already identified another important alternative to land ownership: sharecropping (Herbon, 1994, pp. 149-153). This kind of arrangement was and is still adopted by most of those households owning small portions or no land, yet usually it is not associated with long-term investment, because sharecroppers often cannot, or have no interest in investing in modern and more productive technologies. This prevents the economic advancement of sharecroppers, and get them stuck in poverty. Furthermore, the persistence of gender inequality has prevented women from having equal property rights, so that rarely do women hold title to land, and exert their influence on land management.

Thus, although poverty is mostly a rural phenomenon, there is evidence that rapid urbanisation does not help reduce the number of poor people: on the contrary it contributes to their increase, and people becoming landless often migrate to urban areas, in search for better chances.

Despite this, within the Millennium Development Goals (MDGs) framework, the target of halving the portion of population living below the poverty line was achieved in 2012 in Bangladesh, three years before the target, and with an eye on the important changes that have taken place so far, the country keeps trying to follow this path, aiming at becoming a middle-income country by 2021.

Thus, when considering how much people's quality of life has improved during the last few decades, Bangladesh has been accounted to be one of the best examples of development among developing countries. Indeed, the country has achieved many goals, and has benefited from the support obtained throughout the years from international banks (among which the International Bank for Reconstruction and Development and the International Development Agency had a major role). In fact, since its independence IDA has committed more than 19 billion US$ to support Bangladesh's development (World Bank, 2015a).

Besides receiving conspicuous loans, the government has not been alone in trying to implement activities aimed at enhancing people's lives. Several international organisations and non-governmental organisations have developed projects all over the country to address relevant issues such as access to sanitation facilities, food and potable water, education, infrastructures, microcredit and protection from natural calamities that endanger rural people and their access to land above all.

The World Bank, the Food and Agriculture Organisation, the United Nations Development Programme, the World Health Organisation, the World Food Programme are some of the international agencies that have been implementing projects in Bangladesh, together with hundreds of NGOs which constantly work in the country. The latters are especially free to work in Bangladesh, for governments have recognised the importance of such interventions, and policies have been aimed at favouring and supporting NGOs' activities. The Association for Social Advancement (ASA) is just one

of the hundreds of NGOs working in Bangladesh, and together with the Bangladesh Rehabilitation Assistance Committee (BRAC) it is certainly one of those that most strived to support poor Bangladeshi people.

2.2.4 Goals and Challenges

On the whole, Bangladesh is promoting its economic and social development approaching it from various standpoints. Some of the most urgent issues are related to the environment and to population growth. The geography of the country, with hundreds of interconnected rivers originating and streaming in other countries as well, and lowlands often endangered by floods, droughts, and climate change, causes at times politically motivated conflicts: withdrawal of water causing droughts, and upstream deforestation increasing possible floods' damage, are just some of the troubles the country has to face. It has already been seen that Bangladesh is one of the most disaster-prone countries in the world: it suffered 170 large-scale disasters only between 1970 and 1998, and expectations are that the frequency and intensity of floods will increase. In this regard, the terrible 1998 flood affected about thirty million people and submerged about two thirds of the country's land (Garibay et al., 2010, p. 46). Moreover, Bangladesh is particularly land-erosion-prone, and this is regarded as a major problem, because of which many people lose their land, their houses and, more dramatically, are obliged to move to further land-erosion-prone areas every year.

From another viewpoint, going back to the poverty-energy-demography trap (Malaney, 1999) we should remember that population growth requires a higher energy supply, improved communication and transport services, and it also involves the necessity to create jobs for a growing labour force. These add to the numerous challenges Bangladesh has been facing, deriving from the interaction of demography, economy, society, culture, and environment; notwithstanding, it has kept striving to overcome difficulties, so as to enhance

people's livelihoods and to come out of the possible traps a poor country runs into.

Once told what so far seems to be a success story that could reach its "happy ending", it is interesting to understand how the demographic transition unfolded over the past decades, and how it interacted with the context and all the phenomena that invested Bangladesh and its people. Most of all, in the light of what has been said, and considering the impact of population growth, the triggering and the completion of the demographic transition is of great interest to the country: it has received the attention not just of scholars, but more importantly of policy-makers, aiming to act on demographic processes and mould them according to development necessities.

3. Demographic and Socio-Economic Changes in Bangladesh

3.1 Family Planning Policies and Demographic, Social, and Economic Interactions

The interaction between social, economic, demographic, cultural, environmental factors conditions the development path of a country. This is especially so in a case like Bangladesh, where population density is high, and pressure exerted on the environment endangers future possibilities of development. In such a case, first understanding and then moulding demographic processes becomes of great importance.

For the first of these two steps, Reher's diagram (Figure 1.2) comes in handy: mortality and fertility decline happen in a context of social, economic, epidemiological and cultural change, in which both child and adult health is generally improved, and mortality and fertility transitions allow for further improvements in life quality. A reduction in mortality – and necessarily in morbidity – is the result of an increase in people's health conditions, and accordingly fertility decline causes an improvement in the quality of life for women and families as a whole. When both mortality and fertility are lower parents' energies are more efficiently distributed and higher investment on living offspring is feasible, both because the risk of wasted resources within the household is reduced, and also because they have to be divided among fewer children. This further allows for healthier and more educated offspring,

with higher chances to improve their economic conditions, and to develop different attitudes toward life, newer goals and higher expectations.

All these mechanisms engender a virtuous circle that further propels faster changes at all levels. Once understood the conditions of the country's population, and the way all these levels intertwine, the second step involves the implementation of actions with the aim to make improvements in all sectors where they are required.

From a demographic perspective, shaping couples' fertility behaviours is necessary to push for more rapid fertility declines. On this purpose, family planning had already been introduced by the Pakistani government in the early 1950s, and then reinforced with a government programme in 1965. After the independence in 1971 the need to develop policies on the matter was reaffirmed, and the First Five-Year Plan for 1973-1978 stated "the necessity of immediate adoption of drastic steps to slow down the population growth" (DHS, 1994, p. 3). However, it was especially since 1978 that population pressure was recognised as the principal problem of the country (Bairagi and Kumar Datta, 2001), and family planning started being possibly the greatest concern of the government of Bangladesh. This has made a special effort to control population growth, particularly with contraception campaigns, and collaborating with private and international bodies. At that time the demographic transition had already started, but institutional intervention and government commitment have been of primary importance to quicken the process.

In this work, the focus shall be on the last twenty-five years or so, for two main reasons. First of all, a greater attention to the recent changes in the demographic pattern allows gaining a better understanding of the challenges the country will have to face in the next years, because recent-past phenomena will have consequences in the near future. Secondly, the last twenty-five years are much more documented, and in the light of the availability of such a relevant quantity of data, it is possible to draw a more complete analysis.

Specifically, this part has been developed with the help of the *Demographic and Health Survey* reports, which cover extensively the period between 1993 and 2011 with six works on Bangladesh, drawn on the basis of data collected in the years 1993-1994, 1996-1997, 1999-2000, 2004, 2007 and 2011. *Bangladesh Demographic and Health Surveys* present data that are limited to the sample of the interviews conducted for the DHS programme, and therefore do not represent a complete analysis of the whole population of Bangladesh; nevertheless, they involve a sample that well represents the structure of Bangladesh's society, and they are very useful to detect the pattern that has characterised the country so far. Especially the surveys of 1993-94, 1999-00, and 2011 have been of great help, together with World Bank data, UNDP reports, and many other sources. Despite our decision to concentrate on the last two decades or so, an introduction of how demographic processes evolved during the second part of the twentieth century is needed.

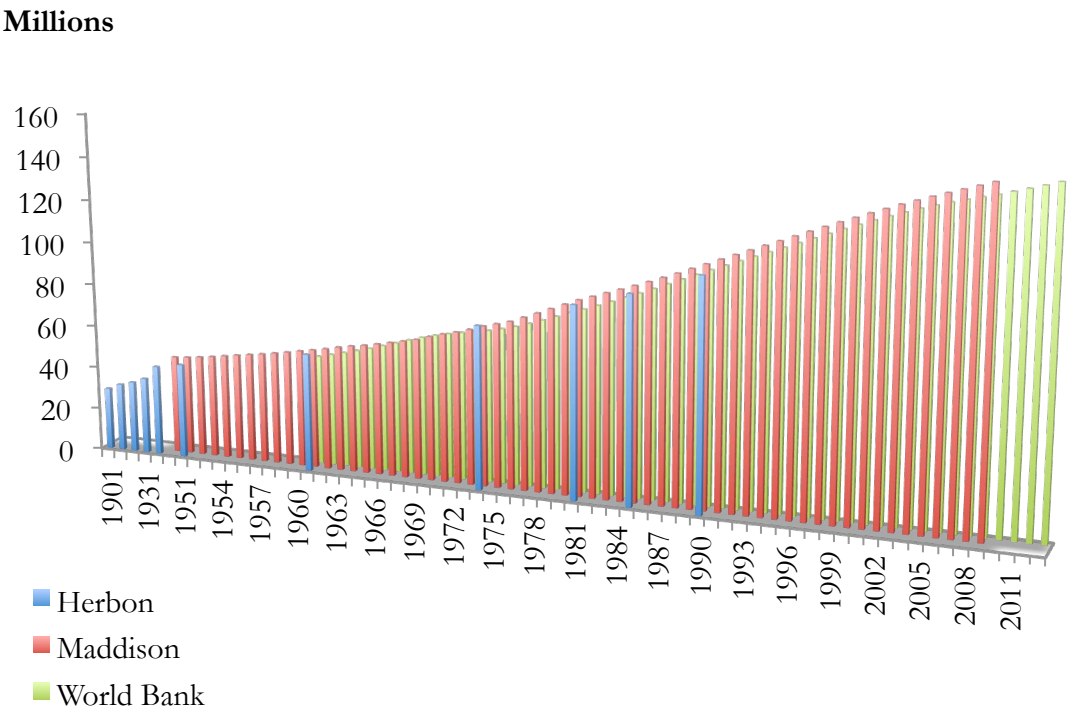
3.2 The Start of the Demographic Transition

> Of the world's 20 poorest countries, Bangladesh is the most populous and was the first to enter the demographic transition. Although the operational design of the program is unique to the institutional circumstances of Bangladesh, elements of Bangladesh success story may suggest ways in which service operations can be configured appropriately for constrained settings (Phillips et al., 1996, p. 214).

Back in 1901 in Bangladesh there were about 28 million people (Herbon, 1994, p. 310) and both birth and death rates were particularly high, which reduced the possibility for Bangladesh population to change significantly in number. Nonetheless, during the first half of the twentieth century population did grow, and by 1950 between 44 and 45 million people lived in the country (Herbon 1994 and Maddison, 2010) (see Figures 3.1 and 3.2 for

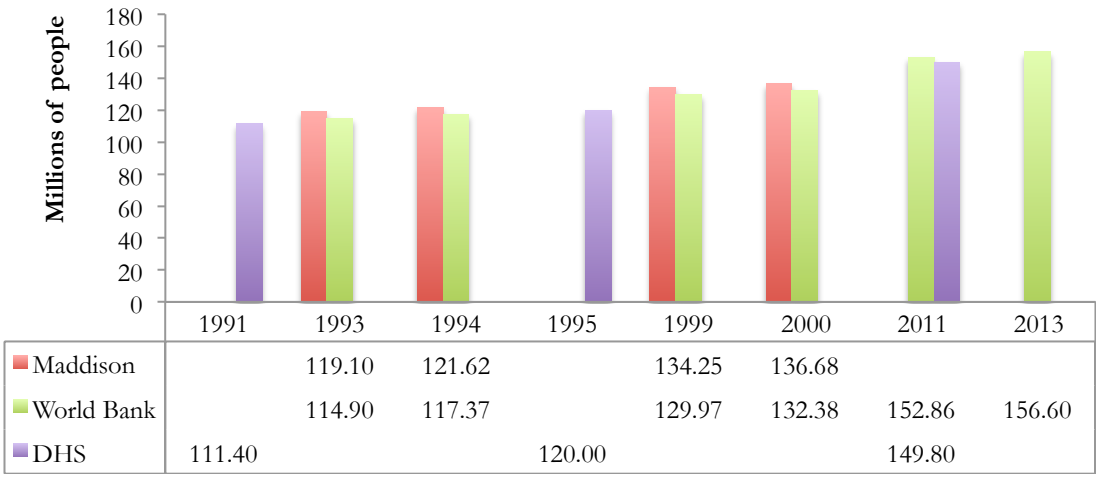
further data on population growth). However, it was during the 1950s that population started growing at an increasingly fast pace, due to the beginning of the mortality decline in these years: the demographic transition had started in Bangladesh.

Figure 3.1 Total Population of Bangladesh



Source: Herbon, 1994; Maddison, 2010; World Bank, 2015a

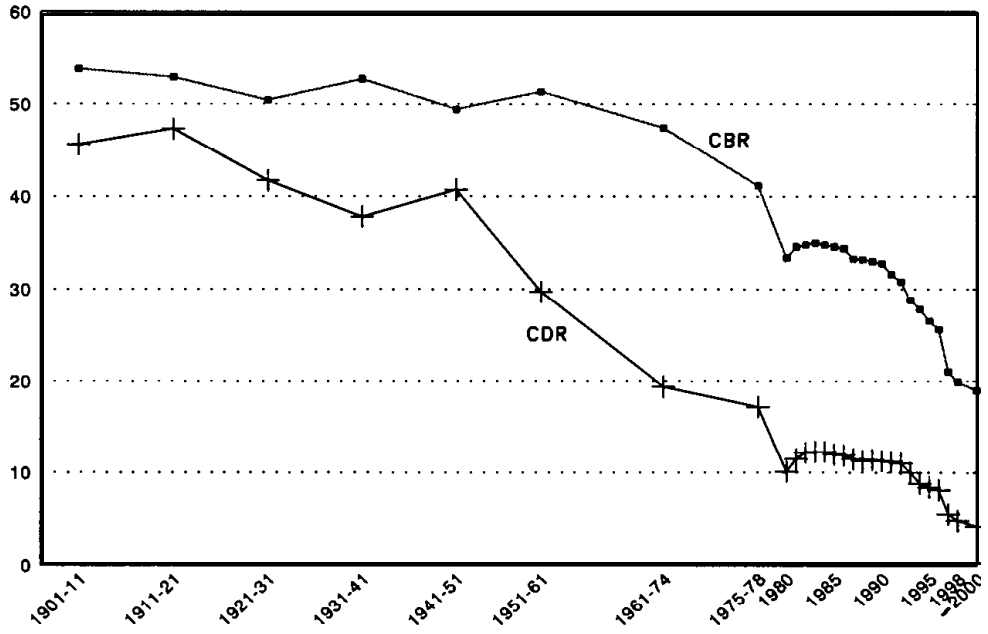
Figure 3.2 Total Population of Bangladesh in Selected Years



Source: Maddison, 2010; World Bank, 2015a; DHS, 1994, 2001, 2013

In Figure 3.3, representing crude birth and death rates in Bangladesh during the twentieth century, the trends of the curves are very much like those presented by Roser (2015) to explain the demographic transition stages, and reported in the first chapter (Figure 1.1). During the first half of the century there had been a slight decrease in the death rate, but a more significant and sudden drop took place only during the 1950s. In twenty-five years the crude death rate dropped from 40 to 20, and in another twenty-five years (namely from 1975 to 2000) it went down quite as much (see Figure 3.3). This decline is the result of the improvements in health and life conditions, which affect the number of people dying, no matter the age.

Figure 3.3 Crude Birth Rate (CBR) and Crude Death Rate (CDR) in Bangladesh, 1901-2000



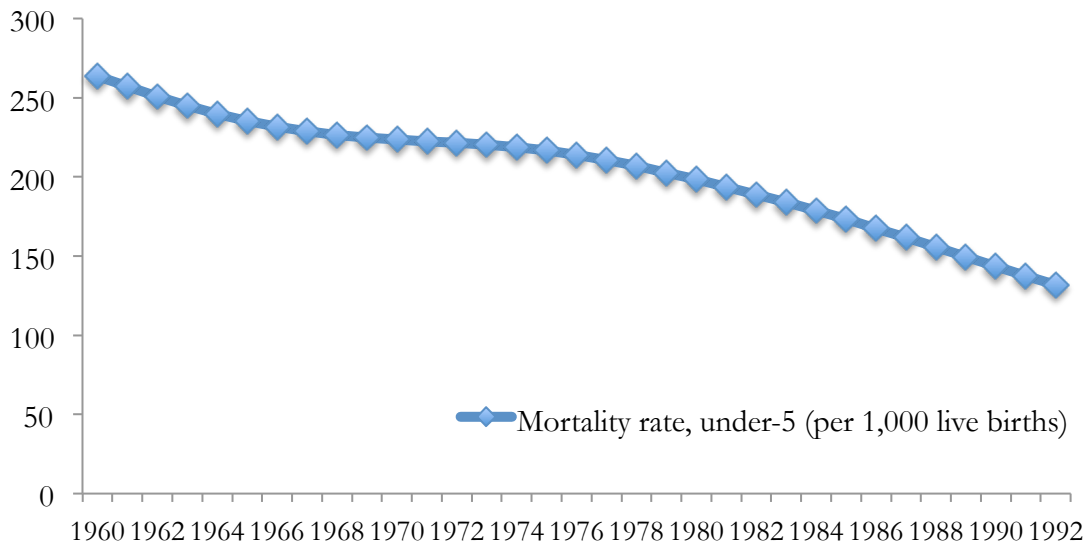
Source: Bairagi and Kumar Datta, 2001, p. 4

However, to understand population growth in Bangladesh, it is more useful to look at the children death rate. For this purpose, the World Bank offers data starting from 1960, which are consistent with the crude death rate, and give

evidence of how an overall mortality decline was in large part due to a decrease in the number of deaths among children less than five years of age.

Back in 1950 under-five child mortality was 352 per 1,000 live births (Gapminder, 2015), and presumably it had not changed much during the previous decades; later, during the second part of the century, the percentage of children who died before their fifth birthday halved in about thirty years, passing from 26.38% in 1960, to 13.17% in 1992 (see Figure 3.4).

Figure 3.4 Mortality Rate, under-5 (per 1,000 live births)

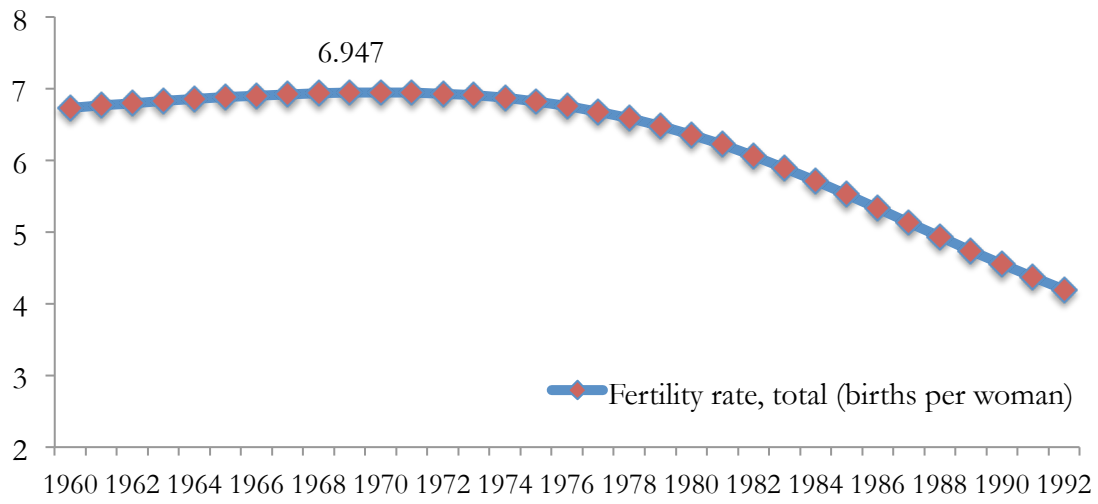


Source: World Bank, 2015a

Interestingly, *Demographic and Health Survey* data suggest that during the time interval 1979-1993 (DHS, 1994, p. 92) trends in childhood mortality showed a decrease in all three of the standard indicators: infant mortality, child mortality and under-five mortality (namely, the probability of dying before the first birthday, between the first and fifth birthday, and between birth and the fifth birthday). This suggests that not only did life quality improve during those years, but also access to health facilities improved, and so did the knowledge of correct health behaviours that could easily save the lives of young children (e.g. water treatment can reduce the risk of diarrhoea and other diseases).

Looking at the various stages of the demographic transition (Figure 1.1), childhood mortality is usually followed by a fertility reduction, evident in the scheme reported in Figure 3.3. The greater width between the two curves of the graph corresponds to a major speed in population increase, registering at the end of the 1960s the highest growth rate: more than 3% per year (World Bank, 2015a). In fact, during the first part of the century fertility had remained high, compensated by high mortality; the highest total fertility rate was registered in 1970, with 6.9 children born per woman, and it was only after that year that fertility started declining (see Figure 3.5).

Figure 3.5 Fertility



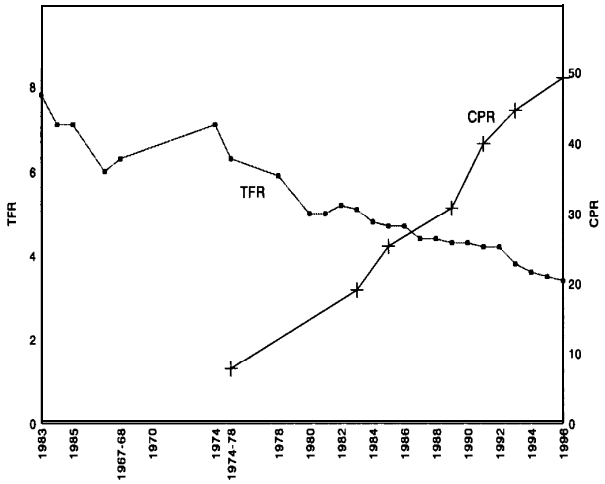
Source: World Bank, 2015a

This was thrust by the already-mentioned focus on family planning from the Government, and went hand in hand with an increase in contraception use. Precisely, among all the kinds of intervention conducted in Bangladesh by public and private, national and international institutions, the launch of a National Family Planning programme was deemed to be the most effective operation. It consisted in the training of thousands of fieldworkers – especially women -, who would visit families especially in rural and isolated areas, and provide them with free contraceptive devices and advice (DHS,

1994, p. 4). Also, this outreach programme was successful because of its continuity and duration over time: actually, it is still ongoing in the areas in most need.

Phillips (1996) explains how Bangladesh's policies to control population growth can be regarded as a model for countries facing similar conditions, and underlines the relevance family planning - and particularly the outreach programme - had in diminishing fertility levels. Figure 3.6, on contraceptive prevalence rate (CPR) and total fertility rate (TFR), shows the resulting increase in contraception use, and a parallel decrease in fertility. The curves are steeper at the beginning, for an increase in contraception use can only have a role in spacing childbearing or in cutting undesired pregnancies. It cannot act upon wanted fertility rate, which can only be affected by changes in people's fertility preferences and is therefore linked to the same modifications in the attitude towards life Reher (2011) inserts in his framework.

Figure 3.6 Contraceptive Prevalence Rate (CPR) and Total Fertility Rate (TFR) in Bangladesh, 1963-1996



Source: Bairagi and Kumar Datta, 2001, p. 6

Information we have provided in this section has to be read in the light of this: the processes here recalled that started in 1950s, took place in a country that was still extremely poor and backward from many points of view. All these changes were great if considering the starting point, but at the beginning of the 1990s huge steps had still to be taken. From this perspective, a deeper analysis of the following years has been undertaken hereafter.

3.3 Last Years' Demographic Developments

Once the demographic transition had started, the greater challenge was for Bangladesh to sustain the changes that were taking place, continuing with the programmes it had implemented, developing them in response to the contingencies and finding new ways to further stimulate fertility decline to reach replacement level. The most recent indicator we have on fertility dates to 2013, and is particularly close to replacement level, with 2.17 children born per woman. According to estimates, and to the planning of the Health Population Nutrition Sector Development Program of the World Bank (El-Saharty et al., 2014), replacement level will be finally reached in 2016.

Relying on *Demographic and Health Surveys* and of Reher's diagram, we shall now analyse what happened in Bangladesh, and how society mutated over the past twenty-five years. The *Demographic and Health Survey* for the years 1993-1994 confirms Bangladesh being in the third phase of the demographic transition, during which fertility is declining but not fast enough to stop population growth (DHS, 1994). Table 3.1 gives evidence of the rise in population Bangladesh underwent: in spite of the differences between the sources here reported, one can easily recognise an upward trend, with an increase of about 30% in only twenty-two years, from 111.4 million people in 1991, to 156.6 in 2013. United Nations estimates (United Nations, Department of Economic and Social Affairs, 2013, p. 62) foresee that it will keep growing, and by 2050 the country will have a population of about 200 millions.

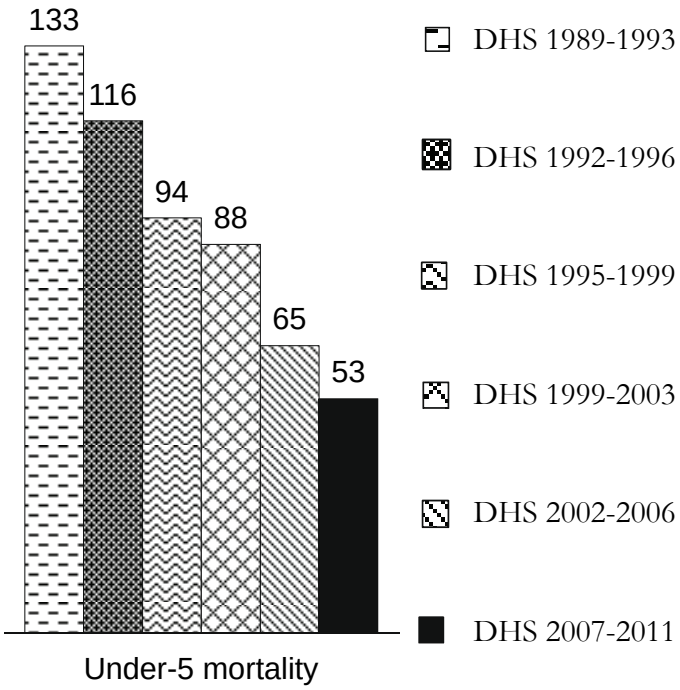
Table 3.1 Total Population in Selected Years

Millions	1991	1993	1994	1995	1999	2000	2011	2013
Maddison		119.1	121.6		134.2	136.7		
World Bank		114.9	117.4		130.0	132.4	152.9	156.6
DHS	111.4			120.0			149.8	

Source: Maddison, 2010; World Bank, 2015a; DHS 1994, 2001, 2013

3.3.1 Mortality

Figure 3.7 Trends in under-5 Mortality, 1989-2011 (deaths per 1,000 live births)



Source: DHS, 2013, p. 114

Following the path initiated in the previous years, between 1989 and 2011 the under-five mortality rate decreased impressively. Figure 3.7 shows how in about twenty years the number of children who died before reaching their fifth birthday halved from 133 to 65, and went further down to 53 per 1,000 live births during the period between 2007 and 2011. This was paralleled by an overall improvement in children and women's nutrition, access to health facilities increased, and so did the proportion of women seeking antenatal care. In recent years diseases' treatments were generally more frequent, awareness over healthier behaviours widespread (DHS, 1994, 2001, 2013), and vaccinations were delivered to a higher number of children, with 86% of those aged 12-23 months fully vaccinated in 2011 (DHS, 2013, p. 145).

However, nutritional status is still low, and has improved only slightly, especially among women in the lowest wealth quintile. Depending on educational attainment, wealth and residence, women are more or less nourished and healthy: healthier people are found in urban areas and among wealthier and more educated groups, while poorer and less educated rural people have to face worse nutrition and health conditions (DHS, 1994, 2001, 2013).

3.3.2 Fertility and Fertility Preferences

Population growth has been curbed by fertility decline, and the data reported at the beginning of this section are sustained by the findings of the *Demographic and Health Surveys*. According to these works, since 1993-1994 the TFR diminished of about one third, from 3.4 to 2.3 in 2011 (Table 3.2), with a more steady decrease during the last 10 years (DHS, 1994, p. 26; 2013, 62). Yet, interactions among demographic, social and economic patterns are best understood when the divergences registered in fertility not just over time, but also by background characteristics, are taken into consideration (Table 3.2).

First of all, in Bangladesh the TFR is always lower in urban contexts than in rural areas. This is in accordance with the assumption that rural families might have an advantage in having a numerous offspring, for it assures a wider labour force, that becomes necessary when other resources are scarce, and when the wealth flow between children and parents favours the latters. Indeed, a gap among urban and rural TFR is registered in all the three periods, but interestingly it has been narrowing over the years: for example, in 2011 the gap registered by the DHS interviews was only 0.5, for urban areas' TFR was 2.0, whereas in rural settings TFR amounted to 2.5 (see Table 3.2).

Regarding education, the trend has been basically the same: higher education levels generally correspond to lower TFRs, and over time it is always among people with no education that the highest fertility rates are registered. In 2011, the lowest TFR of 1.9 is reported among women who have completed at least secondary school: a rate that is even lower than replacement level (see Table 3.2). The relationship existing between fertility and education comes with an assumption: the main difference between educated individuals and those who have received no education lies in that very shift in attitudes toward life that is part of the framework of changes at issue (Reher, 2011).

Table 3.2 TFR by Background Characteristics

	1993-94	1999-00	2011
Residence			
Urban	(2.69)	2.45	2.00
Rural	3.54	3.54	2.50
Education			
No education	3.83	4.12	2.90
Primary incomplete	(3.43)	3.30	2.60
Primary complete	(3.26)	3.42	2.30
Secondary/Higher	(2.58)	2.40	2.20[1] 1.90[2]
Wealth quintile			
Lowest	-	-	3.10
Second	-	-	2.50
Middle	-	-	2.20
Fourth	-	-	2.10
Highest	-	-	1.90
Total	**3.44**	**3.31**	**2.30**

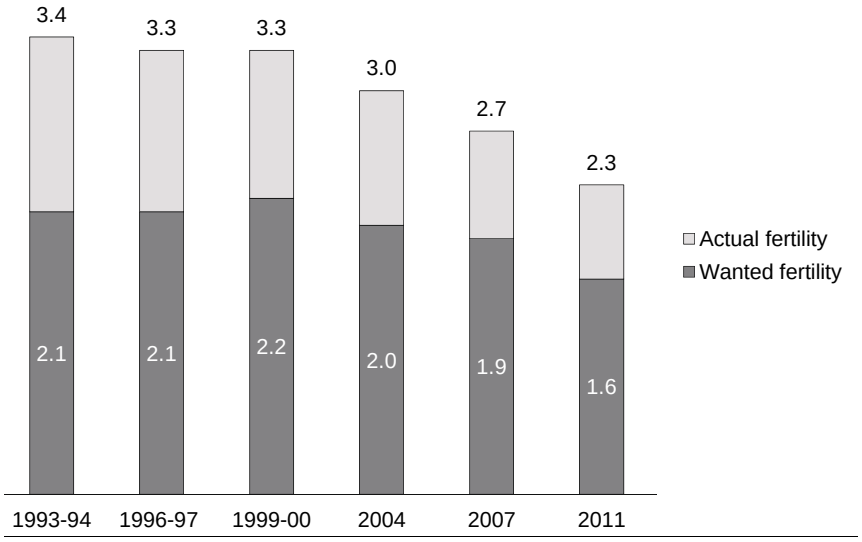
Note: rates in parentheses indicate that one or more of the component age-specific rates is based on fewer than 250 woman-years of exposure.
[1] Secondary incomplete
[2] Secondary complete

Source: DHS, 1994, p. 26; 2001, p. 33; 2013, p. 62

Differences in actual fertility levels depend both on whether family planning needs have been met by the aforementioned outreach programmes, and on fertility preferences, that strongly depend on modifications in cultural attitudes. Fertility preferences have changed over the years in Bangladesh. Total wanted fertility has always been lower than TFR, and in 1993-1994 the *Demographic and Health Surveys* already reported a total wanted fertility rate at

about replacement level, corresponding to 2.1, and in 1999-2000 to 2.2, both values far below the respective TFR of more than 3 (see Figure 3.8).

Figure 3.8 Wanted and Actual Fertility Rate



Source: DHS, 2013, p. 80

Besides, as fertility desires are linked to a wider set of preferences, they are also related to wealth and residence. Just like in the case of TFR, over the years differences between rural and urban settings, and greater or lesser wealth still exist, and always do greater wealth and urban residence come with lower levels of desired fertility (see Table 3.3).

This inevitably comes with an observation: fertility, population growth, education, wealth and even residence are linked. No direct and univocal connection can be drawn among these factors, and we will not try to propose a distinction between causes and consequences. What is indeed both useful and interesting, especially in a case like Bangladesh, is to keep in mind these relations, as an effective means to be used by policy-makers to enhance life conditions in all these sectors.

Table 3.3 Wanted Fertility Levels by Background Characteristics

Residence

	Urban	Rural
1993-94	1.7	2.2
1999-00	1.7	2.4
2011	1.5	1.6

Education

	No education	Primary incomplete	Primary complete	Secondary/ Higher	
1993-94	2.4	2.1	2.1	1.7	
1999-00	2.8	2.1	2.3	1.8	
2011	1.8	1.6	1.6	1.7[1]	1.5[2]

[1] Secondary incomplete
[2] Secondary complete

Wealth quintile

	Lower	Second	Middle	Forth	Highest
2011	1.8	1.7	1.6	1.5	1.5

Source: DHS, 1994, p. 90; 2001, p. 96; 2013, p. 80

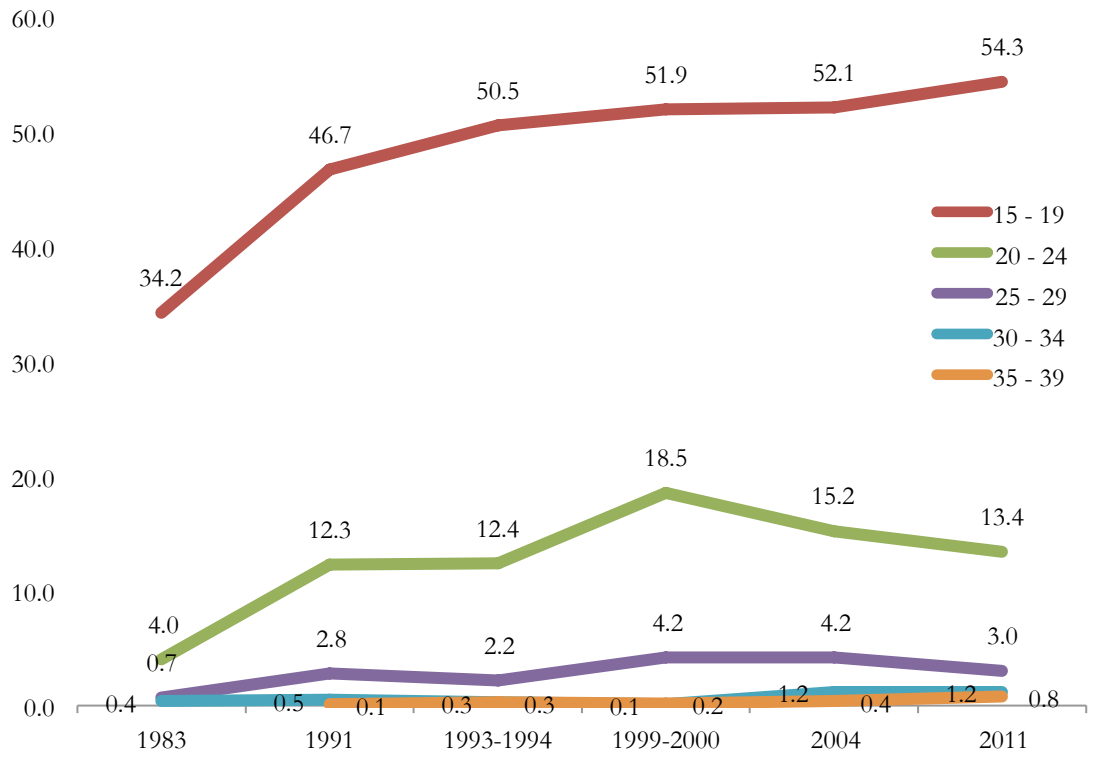
3.3.3 Marriage

In Bangladesh the recent fertility decline has occurred in parallel to other various demographic modifications, among which nuptiality, sexual intercourse, abstinence and so forth. Among all these factors we focus on marriage, whose pattern is changing in the country. Access to and the timing of marriage are some of the regulatory mechanisms that, prior to contraception and preferences, influence fertility. In cases like Bangladesh, where childbearing outside marriage is uncommon, the proportion of women who have never married affects fertility levels (DHS, 2013, 48).

This strict link between marriage and childbearing testifies the importance the former has in Bangladesh's society, in the local culture and in women's lives. Especially in the past, seldom could women choose whom to marry, but although the pattern has been changing, and men can exert some influence on the choice of their partner, it is families that usually make agreements on their children's marriage in the country.

Also, marriage is basically universal in the country, since over the past forty years more than nine women in ten were married, and the trend has remained almost unchanged, despite a few differences emerging in Figure 3.9 (DHS, 2013, p. 49), namely the increase in the proportion of never married women between 15 and 24 years of age. As a consequence, marriage universality has contributed to the exposure of all fertile women to pregnancy, and has raised the chances they have to bear children.

Figure 3.9 Percentage of Never-Married Women Aged 15-39 in Selected Years



Source: DHS, 2013, p. 49

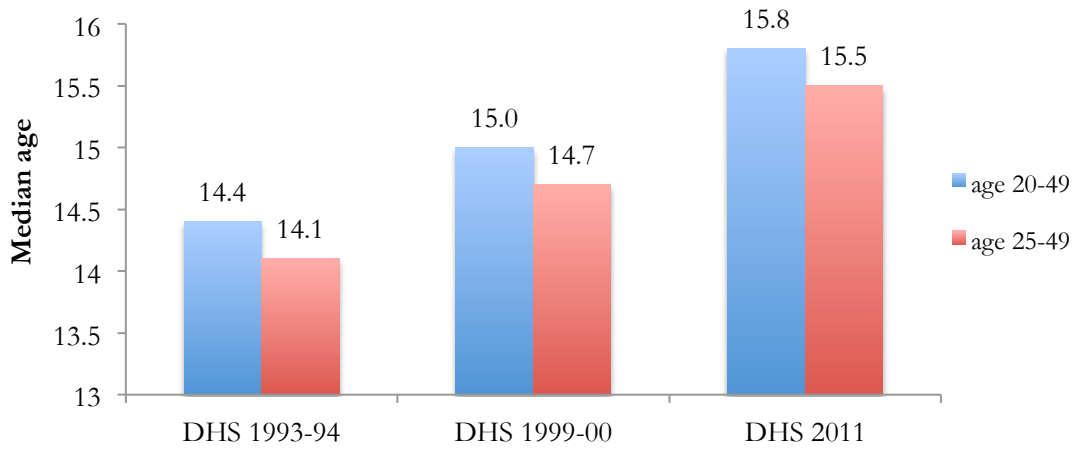
To understand fully the data presented here, it has to be reminded that what *Bangladesh Demographic and Health Surveys* consider to be marriage is not the formal union, but cohabitation, because in the country it is frequent for couples to wait some time – months, or even years - before starting to live together (DHS, 2013, p. 47). As a consequence, data on the percentage of women who have never married reported in Figure 3.9 only refer to women with high chances to have children, and the portion of those who are formally married, but do not cohabit, is left out.

What has indeed changed over time is the age at first marriage (Figure 3.10). Later marriage signifies that marital exposure[3] begins later, and the period during which women are most likely to become pregnant shortens, affecting fertility – though slightly. In a country in which marriage is so widespread, even slight changes in the pattern can affect fertility in a relevant way.

More in detail, the median age at first marriage has always been low in Bangladesh, and it is still so, yet the recent decades have witnessed an increase in the indicator. Back in 1993 and 1994 women aged between 25 and 49 years had first got married when they were about 14.1, but if one chooses to consider a wider portion of women, namely those aged 20-49 (thus including younger individuals), the median age at first marriage rises slightly to 14.4 (Figure 3.10), highlighting an increasing trend among generations. Figure 3.10 gives a summary of the findings of the *Demographic and Health Surveys*, and shows not only the contemporary differences among women of various ages, but also the increasing trend towards later marriage, with the highest value of 15.8 in 2011 among women aged 20-49.

[3] The *Bangladesh Demographic and Health Survey 1993-1994* reports: "Marital *status* refers to the current status of women, while marital *exposure* refers to the proportion of time women spend in marriage" (DHS, 1994, p. 73).

Figure 3.10 Women Median Age at First Marriage



Source: DHS, 1994, p. 75; 2001, p. 81; 2013, p. 53

Table 3.4 instead emphasises the changes in median age over time, as related to education and residence characteristics. Also, these data support the interaction at issue, namely between education, residence, economic status, social and demographic behaviours. In fact, in each of the Bangladesh DHS reports the differences among groups, distinguished on the basis of education, wealth and residence, are sizeable.

Taking education, over the years women have married always somewhat later, and the higher levels of education brides had reached, the older they were when accessing to marriage – namely, when starting cohabitation. In fact, the lowest median age of 13.8 is registered in 1993-1994 among women with no education aged 25-49, and the highest – 19.9 – is found in 2011 in the age group 20-49 among those who have completed secondary education. This means that higher levels of instruction correspond to later marriage, so that lower fertility can be expected if school attendance becomes more widespread among females. Also, since longer time spent in education corresponds to later marriage but also to both lower wanted and actual fertility, overall it is precisely a different attitude towards life that comes hand in hand with these phenomena.

Table 3.4 Women Median Age at First Marriage by Background Characteristics

Education

1993-1994	1999-2000	2011	1993-1994	1999-2000	2011
Age 20-49			**Age 25-49**		
No education					
13.9	14.1	14.8	13.8	14.0	14.7
Primary incomplete					
14.1	14.5	14.9	13.9	14.4	14.8
Primary complete					
14.7	15.2	15.4	14.5	15.0	15.4
Secondary/Higher					
17.1	17.9	16.3[1]	16.1	17.2	16.2[1]
		19.9[2]			19.6[2]

[1] Secondary incomplete
[2] Secondary complete

Residence

1993-1994	1999-2000	2011	1993-1994	1999-2000	2011
Age 20-49			**Age 25-49**		
Urban					
15.4	16.2	16.5	14.8	15.8	16.2
Rural					
14.3	14.7	15.6	14.0	14.4	15.3

Wealth quintile – 2011

	Age 20-49	Age 25-49
Lowest	15.1	15.0
Second	15.3	15.0
Middle	15.5	15.2
Fourth	16.0	15.6
Highest	17.4	17.0

Source: DHS, 1994, p. 75; 2001, p. 81; 2013, p. 53

Regarding differences among residence characteristics (either urban or rural), an upward trend has been registered in both cases; still, rural women keep getting married before their urban counterpart. Most importantly, not only does a higher median age at first marriage correspond to greater education and urban residence, but it is also paralleled by better economic conditions. Evidently, during the past few years women of all wealth quintiles have progressively started to get married later, for DHS data show that in the age group 20-49 median age at first marriage is slightly higher (DHS, 2013, p. 53). Most importantly, the wealthier households are, the later women get married.

To sum up, all these data sustain the idea that better and greater opportunities – namely: higher levels of education, greater wealth and urban residence – correspond in Bangladesh to a change in preferences regarding fertility and marriage, and not least in actual fertility for all women benefiting from these chances.

3.4 Last Years' Socio-economic Developments

All demographic changes outlined so far cannot be completely understood but in parallel with the socio-economic developments of the last two decades or so. We shall now focus on the conditions according to which the *Demographic and Health Survey* data (presented in the previous section) vary, and on some of the related phenomena that have characterised Bangladesh's latest changes.

3.4.1 Households

An aspect to be taken into account is the household: the basic unit into which Bangladesh's millions of dwellers join. In the *Demographic and Health Survey* programme it is defined as "a person or group of people who live together and share food" (DHS, 1994, p. 9): this is a useful definition, for it gives the idea of bonds existing among people, and allows to identify a unit that

presumably shares resources and reasons jointly in terms of what is "economically rational". In this regard, the household is the very starting point of change. It is within households that demographic changes take place; also, within the household preference patterns are expressed, fertility desires come to life, choices regarding economy are made, investment on children education is decided, women can be more or less independent, and so on. Therefore, it is important to analyse the households' composition and identify the prevalent characteristics of Bangladesh's households. They can be considered the starting point to thrust the country's development and a sort of control unit to detect deficiencies in the path leading to the improvement of people's lives.

The first interesting finding resulting from the work of the *Demographic and Health Surveys* is that between 1993 and 2011 the mean size of household in Bangladesh declined, with an average of 5.4 people in 1993-1994, 5.2 in 1999-2000, and 4.6 in 2011 (DHS, 1994, p. 12; 2001, p. 12; 2013, p. 21). In general, in rural areas the indicator was slightly higher, especially in 2011 when rural households had an average of 4.7 members, while in urban areas the mean size was 4.4; yet, in 1999-2000 there was no difference between rural and urban households' size, therefore over the last ten years the gap between rural and urban conditions has widened (DHS, 1994, p. 12; 2001, p. 12; 2013, p. 21).

What is possibly more interesting about the household composition, is that back in 1993 and 1994 10.2% of the households considered by the survey had nine members or more, with a slight prevalence of this pattern in urban areas (11.2% against 10.1% in rural areas), and an average of only 1.2% of the households were constituted by a single member (DHS, 1994, p. 12). In the following years, this trend has been inverted: the percentage of one-member households has increased to 1.7%, whereas the rate of households with 9 members or more has decreased to 4.1%, but less so in rural areas (4.5%, against 3.1% in urban settings) (DHS, 2013, p. 21). This is the consequence

of a decrease in fertility, but also of a diminution in the number of extended households, corresponding to a shift to nuclear family households.

This phenomenon has been accompanied by a relevant increase in the percentage of households with four members - from 18.8% to 25.5% on average -, which testifies an approaching trend towards replacement level (DHS, 1994, p. 12, 2013, p. 21). On this purpose, in a thought-provoking documentary on world population titled *Don't Panic!*, the Swedish statistician Hans Rosling interviewed a family in Bangladesh that is deemed to be standard: one consisting of four members, namely the parents and two children – in that case two daughters (Gapminder, 2013). This "piece of the puzzle" contributes to show the proximity to the completion of the demographic transition, and permits to grasp the shift in preferences among Bangladesh people. No longer do parents wish to have a numerous offspring to put to work as soon as possible; instead, smaller families are preferred, because they allow higher investment on human capital and better resources' distribution.

3.4.2 Education

Education has a great role in the development of a country, for it creates better human capital, and gives to individuals higher chances to move up the social ladder. As already suggested, education has also an important role in fertility reduction. At the same time, it is favoured by a decrease in fertility, since lower fertility often corresponds to greater possibilities for children to go further in education, and to better human capital. Altogether, in the period between 1993 and 2011 school attendance has increased in Bangladesh, and a growing percentage of people between six and twenty-four years of age were enrolled in school (Table 3.5).

Table 3.5 School Attendance

Age group	1993-94	1999-00	2011
6 – 15, total	67.8%	73.5%	83.7%
Rural	67.7%	73.9%	84.1%
Urban	68.2%	72.0%	82.3%

Source: DHS, 1994, p. 15; 2001, p. 15; 2013, p. 23

Specifically, between 1993 and 1994 67.8% of children aged 6-15 went to school, in comparison with a percentage of 73.5 during the period 1999-2000, and an impressively higher 83.7% in 2011. Gaps between urban and rural school attendance were mostly present in 1993-1994, with rural areas being slightly less schooled; on the contrary, in the following years the trend was reverted, and the proportion of rural youth going to school was actually higher than their urban counterpart. However, rural areas are still behind in secondary education, for the share of rural children beyond 15 years of age enrolled in school is still notably lower than in urban settings. Just to give an example, the 38.9% of urban youth aged 16-20 was enrolled in school in 2011, whereas among rural dwellers the share fell to 32.6% (DHS, 2013, p. 23).

There is plenty of data on educational attainment in Bangladesh, but there is one indicator that is worth mentioning, because it gives an idea of the general improvement that has been going on in the country: the median years of schooling. Overall, back in 1993 and 1994 the median years women spent in school were only 0.9, while men reached – however short a period – 2.1 years (DHS, 1994, pp. 13-14). Over time, this value has increased first more rapidly for men, and then at a faster pace both for men and women. In 1999-2000 the median years of schooling for women was still 1.2, men instead had reached to 2.6 (DHS, 2001, p. 13). More recently, in 2011 DHS registered an average of 2.9 years for women (still low, but well above the previous years), and 3.4 for men (DHS, 2013, pp. 24-25). Despite these being still really low values, it must be recognised that investment in education has been constant,

and Bangladesh government has enforced reforms to make sure universal literacy is reached, both among children and adults. Nowadays, primary school is free for all, and as recalled in the previous chapter, girls wishing to attend secondary school have been provided with stipends for some years now, with the aim to move towards gender equality in education.

3.4.3 Age Structure

The demographic transition, and more in general changes in demographic patterns imply a shift in population age structure. Over the years, the great number of new children born turns into working age population, and over time it reaches retirement age. In contexts like Bangladesh where the demographic transition is ongoing, when childhood mortality falls, the percentage of young population grows, and it only starts decreasing once fertility decline has begun as well. Table 3.6 gives a summary of the trends in Bangladesh age structure, and clearly shows that the percentage of people less than fifteen years of age has decreased steadily over the last years, and instead the portion of the rest of the population – particularly those in the age group 15-59 - has grown.

Table 3.6 Trends in Population by Age

Percent distribution of the de facto population by age group, selected sources, Bangladesh 1989-2011

Age group	1989 BFS	1989 CPS	1991 CPS	1993-1994 BDHS	1996-1997 BDHS	1999-2000 BDHS	2004 BDHS	2007 BDHS	2011 BDHS
<15	43.2	43.2	42.7	42.6	41.0	39.2	38.2	36.3	35.3
15-59	50.9	50.9	51.2	51.2	53.1	54.4	55.1	56.6	56.5
60+	5.9	5.9	6.0	6.2	5.9	6.4	6.6	7.1	8.2
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

BFS = Bangladesh Fertility Survey; CPS = Contraceptive Prevalence Survey; BDHS = Bangladesh Demographic and Health Survey
Sources: Huq and Cleland, 1990:38; Mitra et al.,1994:14; Mitra et al., 1997:9; NIPORT et al., 2001:11; NIPORT et al., 2005:13; NIPORT et al.,2009:12

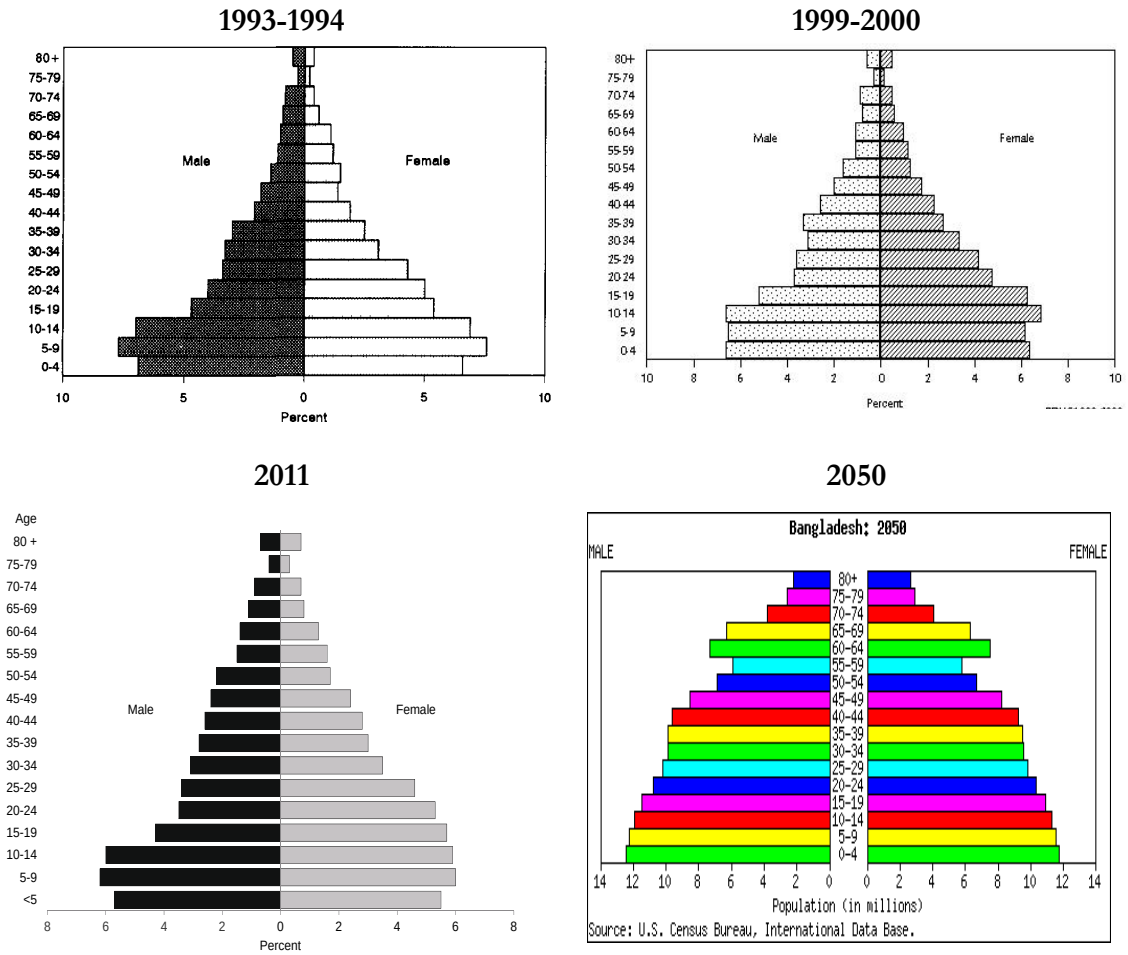
Source: DHS, 2013, p. 20

Also, Bangladesh *Demographic and Health Survey* reports point out a decrease in the percentage of children aged 0-4, going from 13.5% in 1993-1994, to

12.9% in 1999-2000 and to 11.2% in 2011 (DHS, 1994, p. 9; 2001, p. 10; 2013, p. 18). This shows that the proportion of children born has fallen constantly, and slightly more rapidly during the last years.

On the whole, the population pyramids in Figure 3.11 help visualise population age composition, and what results from a rapid look is that in comparison with the previous years, in the 2011 graph the difference between the base and the rest of the pyramid has shrunk. Besides, the forth pyramid reported above is a projection to year 2050, when allegedly replacement level will have been reached, and population will be more equally distributed, with a larger proportion of adult and older people than in the past.

Figure 3.11 Population Pyramids



Source, from left top to right bottom: DHS, 1994, p. 10; DHS, 2001, p. 10; DHS, 2013, p. 19; Khan and Raeside, 2005

This will have various implications, and scholars have often attempted to understand the role a shift in age structure has in a country's development, as well as the way in which the so called demographic dividend can be exploited at best (Pool, 2007). Overall the percentage of working age people increases as fertility diminishes, and if the burden of children dependence gradually declines, at the same time there emerges the need to sustain older generations. In fact, greater longevity corresponds both to a healthier population that has a longer and more productive working life, but it also comes with the necessity to give support to the elders who exit the labour force. In general, this corresponds to a further shift in attitudes toward life, and to a total modification of investment needs and of what is considered as "economically rational".

3.4.4 Households' Economic Status

Development and improvements in people's life conditions are bound to economic stability. Population growth can either trigger or restrain economic growth, and research has indicated that at a household level economic status and fertility influence one another. Economic rationality functions as an adjustment mechanism, so that households modify their demographic behaviours in accordance with the context in which they happen to be (Caldwell, 1976 and 2006). Indeed, investment made to enhance human capital quality is strictly connected to both economic growth and demographic processes (Galor, 2011): in a household, a reduction in the number of children to raise, higher education and economic possibilities constantly interact, and pave the way to faster changes in all three spheres. One of the economic indicators related to population growth, and significant for the improvement of economic development is employment: much of a household's possibilities depend on it.

As a whole, *Demographic and Health Survey* work on Bangladesh shows that since 1993 the employment level has been increasing (DHS, 1994, 2001,

2013). Yet, a major issue is represented by the impressive gap between male and female employment: in all *Demographic and Health Survey* reports on the country, women's employment level is recorded to be always incredibly low, and the highest level was registered in 2007, when employed females among all age groups constituted on average only the 22.9% (DHS, 2009, p. 24). In the same year 68.3% of male population was working (DHS, 2009, p. 24); both for men and women employment had been growing at least since 1993, but after the 2008 crisis there was a general setback in employment levels.

Paid employment is deemed to be early in Bangladesh, yet over the years there has been a steady decrease in the number of children working. In this regard, it is worth mentioning childhood employment levels: particularly among boys aged 10-14, the percentage of individuals employed passed from 17.2% in 1993-1994 (DHS, 1994, p. 16), to 11.9% in 1999-2000 (DHS, 2001, p. 16), and 9.3% in 2011 (DHS, 2013, p. 27). This trend has gone hand in hand with the increase in schooling levels among all children. Furthermore, excluding 1993-1994 survey, urban settings always register a slightly higher level of employment.

Better housing characteristics, and higher levels of durable goods ownership parallel the general increase in the number of people employed: housing conditions were hugely different in past years, and although there are still major differences, Bangladesh has witnessed global improvements in rural housing conditions. Table 3.7 synthesises the main outcomes of the surveys.

In 1993 and 1994 electricity was available to only 10.4% rural households, in contrast with 75.2% urban households having it at their disposal. In only about seven years the percentage of rural households having electricity doubled to 20.5%, and urban settings registered an improvement as well, reaching 81.2%. In 2011 further advancements have been noted, with 90.2% urban households having electricity, and more interestingly 49.3% of their rural counterpart declaring electricity availability (see Table 3.7). Besides, overall housing structures have improved, and in comparison with twenty

years ago sanitation facilities can now be found in many more households. That is, in 1993 and 1994 one third of rural residences could rely on no sanitation facility; this share diminished in 1999 to 23.8%, and it went further down to 5.8% in 2011 (see Table 3.7).

Table 3.7 Housing Characteristics

	Urban			Rural			Total		
	1993-94	**1999-00**	**2011**	**1993-94**	**1999-00**	**2011**	**1993-94**	**1999-00**	**2011**
Electricity									
Yes	75.2%	81.2%	90.2%	10.4%	20.5%	49.3%	17.8%	32.0%	59.6%
No	24.8%	18.8%	9.8%	89.6%	79.5%	50.7%	82.2%	68.0%	40.4%
Floor material									
Earth	45.2%	43.7%	32.1%	96.0%	93.6%	88.3%	90.2%	84.2%	74.1%
Wood	2.1%	0.6%	0.2%	0.2%	0.4%	0.1%	0.4%	0.4%	0.2%
Cement/concrete	52.6%	55.6%	62.1%	3.7%	6.0%	11.3%	9.3%	15.4%	24.1%
Ceramic tiles	-	-	5.3%	-	-		-	-	1.5%
No sanitation facility/bush	4.8%	3.0%	0.9%	33.4%	23.8%	5.8%	30.2%	19.9%	4.6%

Source: DHS, 1993-1994, p. 17; 2001, p. 17; 2013 pp. 13-15

Housing improvements and a more widespread availability of sanitation facilities are particularly useful indicators. On the one hand, they allow getting an overview of the quality of life people experience, and in contexts where natural disasters are frequent, the stability of housing structure is certainly one of the elements to be improved in order to avoid the worsening of already critical situations. On the other hand, sanitation facilities – and possibly not shared ones – are necessary devices to reduce the risk of diseases (diarrhoea, dysentery etc.) that can be fatal if not prevented in the right ways, and therefore they can help reduce both morbidity and mortality levels.

Regarding households' economic status there are another few elements to be considered. Firstly, since 1999-2000 the portion of people owning a homestead has been fortunately on the rise, and it has shifted from an average of 86.8% to 94.4% in 2011 (DHS, 2001, p. 19; 2013, p. 16). Also, the percentage of people who owns neither a homestead nor any kind of land has decreased both in urban and rural settings (DHS, 2001, p. 19, 2013, p. 16), and this might be the consequence of the government attempts to redistribute land among landless people. On the contrary, the proportion of people owning land has undergone an opposite trend (Table 3.8). Overall it has decreased, but interestingly it has slightly risen among urban households.

Table 3.8 Land Ownership

	Urban		**Rural**		**Total**	
	1999-00	**2011**	**1999-00**	**2011**	**1999-00**	**2011**
Owns a homestead	80.9%	90.4%	88.2%	95.8%	86.8%	94.4%
Owns other land than homestead	37.4%	38.6%	53.7%	49.4%	50.6%	46.6%
Neither	16.6%	8.7%	9.6%	3.9%	10.9%	5.1%

Source: DHS 2001, p. 19; 2013, p. 16

Precisely, in the period 1999-2000 the urban households owing land were the 37.4%, whereas in 2011 they were the 38.6%; in rural settings instead, the percentage of rural household owing land fell from 53.7% in 1999-2000 to 49.4% in 2011 (see Table 3.8).

What should be noted is that overall, rural households often rely on agricultural land to survive, and the fact that only half of the units really owns land could be interpreted in two ways. On the one hand, it might be bound to a major shift of population from agricultural to other kinds of occupation; on the other, as we know that more than 40% of the population still works in agriculture, it certainly witnesses an inequitable distribution of land, that

endangers households' economic stability and curbs the attempts to fulfil improvements in agriculture.

3.4.5 Women's Empowerment

Another important issue is represented by the role women have in society. Gender equality is positively related to higher chances for development, as women's empowerment has an incredibly relevant role in determining households' condition. All kinds of institutions involved in development projects have put their efforts in assuring gender equality for many reasons. In societies where fertility is high, women suffer from high levels of maternal mortality, even long after childbirth (Say et al., 2008). From another perspective, lower levels of autonomy often correspond to higher levels of fertility, although some have underlined the necessity to understand the relationship between gender inequality and the fertility transition (Amin and Lloyd, 2002). Usually, women's earnings are negatively associated with fertility levels, and the same relationship can be identified with education: gender equality in education assures higher labour force quality and wider possibilities for economic growth.

Bangladesh Demographic and Health Surveys observed these trends among women interviewed, and in line with data provided by UNDP (Table 2.3) outlined a widespread inequality between female and male population. Women have lower access to employment, education, land ownership, and lower autonomy in decision-making. Specifically, not only women are most of the times unable to choose their partner, but data provided by *Bangladesh Demographic and Health Survey* demonstrated that in 2011 women participation in households' decisions was still low. Table 3.9 shows that half of married women make decisions jointly with their husbands, while the proportion of women autonomously making decisions regarding family issues is extremely low. This is particularly so in the economic sphere, for major household purchases are only made mainly by women in 7% of the cases.

Table 3.9 Participation in Decision-making

Percent distribution of currently married women age 15-49 by person who usually makes decisions about various issues, Bangladesh 2011

Decision	Mainly wife	Wife and husband jointly	Mainly husband	Someone else	Other	Missing	Total	Number of women
Own health care	12.9	50.1	30.6	6.0	0.2	0.1	100.0	16,635
Major household purchases	7.0	52.5	29.8	10.2	0.3	0.1	100.0	16,635
Child health care	14.5	52.1	19.6	4.6	9.0	0.2	100.0	16,635
Visits to her family or relatives	9.7	52.9	28.7	8.2	0.3	0.2	100.0	16,635

Source: DHS, 2013, p. 216

3.5 A Virtuous Circle

This outline has supported the validity for Bangladesh of the scheme provided by Reher (2011) (see Figure 1.2): demographic, social and economic changes are all related to one another. Bangladesh has experienced modifications in various fields, and every time improvements were made in one of them, a thrust toward further and faster changes in the other fields took place. Just to make an example, the reduction of mortality levels and improvements in health facilities are possibly at the basis of all these changes, but at the same time they have been further propelled by improvements in both economic and social conditions. Also, the scheme Reher proposes (Figure 1.2) comes in handy because it gives a summary of the consequences institutional interventions can have, even if carried out in just one of these sectors.

In Bangladesh all these issues have received the attention of institutions, and achievements were reached thanks to actions taken at multiple levels. Investment was made in education to increase the degree of literacy and the years spent in school by each child, as well as to promote equal access to schooling for both males and females. Family planning programmes have been implemented throughout the years with outreach campaigns performed in schools, with the help of media, and most effectively with the action of thousands of fieldworkers. Also, contraception devices were made available

for free, and health facilities were improved and spread throughout the country.

In relation to this, poverty has been fought with trade policies aimed to favour the expansion of industry: for example, the garment sector has become the greatest producer of exports (namely, 80% of total Bangladesh exports is produced by the garment industry) (CIA, 2014). It has absorbed part of the additional labour force derived from population growth, it has helped reduce gender inequality allowing for a greater number of female workers to have an employment, and has produced resources to be invested in further development. Also, programmes aimed to provide credit to poor people, and most significantly to women, have been developed by numerous NGOs like Grameen Bank, Bangladesh Rural Advancement Committee, Association for Social Advancement and Proshika[4].

Overall, all these actions have supported improvements, and have been going hand in hand with changes in preferences. All demographic, social and economic preferences and behaviours have been changing as improvements in health, human capital quality, better living standards and longer life expectancy spread. In parallel, the widening of better perspectives for Bangladeshis has contributed to further developments at all levels, and has supported the actions taken by both governmental and non-governmental bodies.

To sum up, a virtuous circle has been triggered, and expectations are that, with constant efforts, further changes will be achieved.

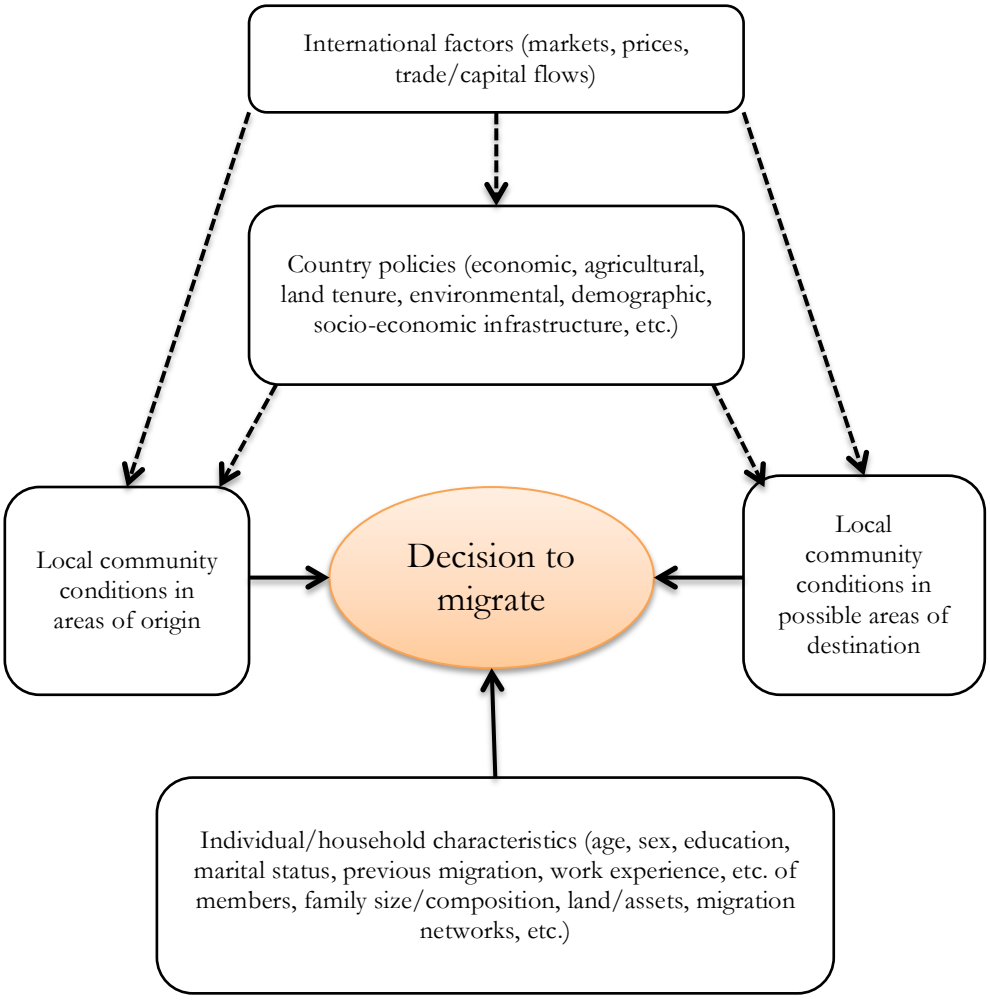
[4] It has been suggested that these four organisations alone had more than three million beneficiaries (Amin and Lloyd, 2002, p. 302).

4. Population and Environment in Bangladesh

4.1 Migration

So far, something has been left behind in this analysis. If one looks back to the diagram in Figure 1.2, another implication of the demographic transition, and of the consequent population growth is migratory pressure, and specifically out-migration. The decision to migrate has often no single cause, and can instead be ascribed to a set of conditions that make it desirable to migrate, either abroad, or within the country, usually from rural to urban areas. Figure 4.1 synthesises the factors influencing the choice. At a macro-level, international factors (such as markets, prices, trade, and capital flows) have a role in determining the conditions of the communities in which people live. So do national policies related to all kinds of sectors, be it economy, demography, environment, agriculture, land tenure, and the socio-economic infrastructure. All these aspects contribute to the definition of local communities, and the gap emerging among them can either thrust or deter from migration. At the individual or household level, various characteristics come into play. Age, sex, marital status, household composition, work experience, ownership of land or any other asset, general economic status, and migration networks are some of the most relevant factors that can lead to the decision to migrate (Bilsborrow, 2002).

Figure 4.1 The Decision to Migrate



Source: Bilsborrow, 2002, p. 17

What is especially interesting for this analysis, is that population pressure is among the conditioning factors that propel migration. In a developing country like Bangladesh, experiencing a tremendous population growth, and a population density among the highest in the world, widespread poverty and the lack of employment lead to the decision to migrate. This choice usually results in either rural-to-urban or international migration, depending on the set of aforementioned community and individual/household characteristics.

Since its independence in 1971, Bangladesh experienced both kinds of migration. It was estimated that at the end of the twentieth century about three million Bangladeshis worked legally abroad: most of them were employed in the Middle East, but many have been moving to Southeast, East

Asian and Western countries as well (Shrestha, 2002, p. 196). Throughout the years, the number of migrants has grown up to 8.6 million people in 2013, and more than half of them have been staying abroad for at least five years (*Report on Survey on the Use of Remittance (SUR) 2013*, 2014). This growth was mainly due to the failure of Bangladesh economy to generate sufficient domestic employment to match the increase in population (Shrestha, 2002). Besides, 97.4% of migrants are male, most below 39 years of age (SUR, 2014, p. xxi).

Migration comes with both positive and negative consequences. Among the positive implications, remittances do have a major role. In the 1990s, they corresponded to more than 50% of all the exports of the country (Shrestha, 2002, p. 197), and during the last ten years, remittances to Bangladesh oscillated between 7.7 and 10.7% of the GDP (World Bank, 2015a). Interestingly, an impressive 72% of the invested share of remittances was destined to dwelling house construction. This implies an overall improvement of life conditions, further helped by greater resources spent on food – hence the increase in nutrition levels. Since for many households remittances constitute the major source of earnings (78% of income of the receiving households) (*SUR 2013*, 2014), they allow a general improvement in human capital among receiving individuals and, in line with the scheme we are working on (Figure 1.2), they further propel social, economic and demographic changes. Just to give a few more elements, almost all remittance-receiving households own a mobile phone and a cot (respectively 96.4% and 88% of them), followed by items like the Almirah (a sort of wardrobe), the television and the refrigerator. Also, about 94% of the households that receive remittances have access to tube well drinking water, which is regarded as a safe source *(SUR 2013*, 2014, pp. 19-20).

Among the overall positive implications migration has, Reher (2011) identifies socioeconomic contributions to host societies (which is not the case for Bangladesh, that is mainly a country of outmigration), international

convergence, migration of capital, and social mobility. For example, social mobility is linked to remittances and to the general redistribution of resources to which they contribute. This is certainly relevant, and is linked to a few more aspects related to international migration.

The first one is the loss migration generates in Bangladesh's society as in any context of outmigration. Migrants are often young, healthy, and skilled people, who have received education and whose departure creates a void in the country, since their skills are used elsewhere (Shrestha, 2002). Therefore, positive outcomes of the investment in human capital formation seem diminishing, though at the same time, there is another positive implication underlying this temporary loss: optimistic analyses look at return migration. Returning migrants come back with newer skills and resources to use at home (Reher, 2011), so that they contribute to the improvement of households' economic and social conditions.

Also, people movement inevitably produces domestic employment, that is generated by the increased necessity of all those services related to labour migration: namely, means of transport, travel and recruiting agencies, banks, health facilities, secretarial services, and so forth (Shrestha, 2002, p. 197). Such a creation of employment is linked to another positive consequence of international migration, which is the reduction in population pressure, exerted mainly at two levels. First of all, when labour supply exceeds labour demand, the outmigration of workers helps reduce the burden of domestic unemployment; at the same time, in a country like Bangladesh, where live an average of about 1,203 people/km^2 (World Bank, 2015a), the departure of a solid number of people, especially from most environmentally endangered areas, helps reducing the risk of worsening of already precarious situations.

In relation to this, another phenomenon that invested Bangladesh is rural-to-urban migration. In the past the country had a low degree of urbanisation: only 5% of the population lived in urban areas in 1961 (Shrestha, 2002, pp. 197-198). Yet, during the last few decades population

growth was paralleled by a rapid urbanisation, and people living in cities and towns passed from 2.6 millions in 1961, to 22.5 in 1991 - the 28% of which lived in Dhaka alone - (Shrestha, 2002, p. 198), to 34% in 2014 (United Nations and Department of Economic and Social Affairs, 2014). During the last few years, the percentage of urban population increased as well, from 23.5% in 2001, to 27% in 2011 (DHS, 2013, p. 2). Evidently, this growth has to be ascribed to a general increase of native urban population, to the territorial expansion of urban areas, but most importantly to an impressive migration from rural settings (Shrestha, 2002, pp. 197-198). Such a change in the distribution of population comes with various consequences, but at the same time it is spurred by several causes. Figure 4.1 can be applied for rural-to-urban migration as well, and it highlights one of the first reasons why people choose to move: the differences existing between the characteristics in the area of origin and in the possible areas of destination.

Generally speaking, urban areas offer higher chances of employment, both to those who have received education and developed general skills – e.g., those whose parents have invested on human capital -, and to those who have scarce or no resources to rely on in rural settings. It is useful to recall the different percentage of homestead and land ownership among rural and urban dwellers. Table 3.8 indicates that both at the end of the twentieth century and in 2011 the percentage of people owning neither a homestead nor any other kind of land was higher in urban settings. This is linked to the propensity to migrate from rural to urban areas when one owns no resources to rely on. In such cases a city like Dhaka is among the most valued destinations, because it accounts for a large portion of national manufacturing employment (Shrestha, 2002, p. 198), and presumably offers higher chances to be employed[5]. It is no surprise that nowadays about 40% of the urban population of Bangladesh lives in Dhaka alone, and the growth of its population was due for about the

[5] Dhaka alone accounts for 80% of the garment industry of Bangladesh (*Urbanization: Challenges and Opportunities*, 2014, p. 28)

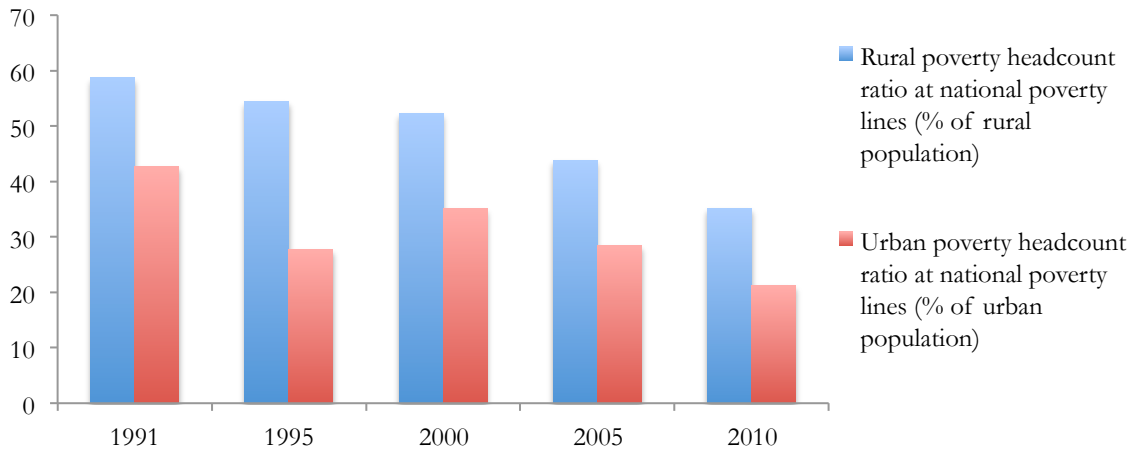
40% to migration (*Urbanization: Challenges and Opportunities*, 2014, p. 24-25). The capital city of Bangladesh has grown impressively since 1990 (see Table 4.1), adding more than ten million people in less than twenty-five years, passing from an already high amount of 6.6 millions in 1990, to 16.9 million inhabitants in 2014. According to the United Nations Department of Economics and Social Affairs (2014), in fifteen years urbanisation, population growth and the extension of the urban area will bring to a further dramatic increase up to 27.3 millions in 2030.

Table 4.1 Dhaka Population

Population (million)			**Annual Rate of Change (%)**
1990	**2014**	**2030**	**2010-2015**
6.6	16.9	27.3	3.6

Source: United Nations, Department of Economic and Social Affairs, 2014

Figure 4.2 Rural and Urban Poverty



Source: World Bank, 2015a

Evidently the decision to abandon rural settings for urban areas is often made because the formers usually offer worse life conditions. Yet, the percentage of urban dwellers living in absolute poverty is still extremely high. Figure 4.2 shows that, as a whole, over the last twenty-five years the percentage of

population living in poverty has decreased, urban areas have become generally wealthier, but still more than 20% of urban population is poor at national poverty lines.

Nowadays about 60% of Dhaka population lives in slums (*Urbanization: Challenges and Opportunities*, 2014), and no significant improvement has been registered in the life quality of slum-dwellers. Rapid urban growth has caused overall decay in life conditions in Dhaka, and the capacity of the city to provide services has been outpaced (*Urbanization: Challenges and Opportunities*, 2014), so that the city is now addressed to as one of the most unlivable cities in the world.

Pictures reported in an interesting article published on *Wired* (Figures 4.3, 4.4, 4.5, 4.6, 4.7) were taken in 2012 in Dhaka slums (Keitel, 2012, in Bierend, 2014) and witness the difficult life conditions people face in these contexts.

Figure 4.3 Slums in Dhaka: a Woman

Source: Keitel, 2012, in Bierend, 2014

Figure 4.4 Slums in Dhaka: a Child Sleeping

Source: Keitel, 2012, in Bierend, 2014

Figure 4.5 Slums in Dhaka: a Young Woman

Source: Keitel, 2012, in Bierend, 2014

Figure 4.6 Slums in Dhaka: a Baby

Source: Keitel 2012, in Bierend, 2014

Figure 4.7 Slums in Dhaka: Elders

Source: Keitel 2012, in Bierend, 2014

The luckiest slum-dwellers own makeshift houses, made of wood or tin at best, with hardly any bed, and the reports of the *Demographic and Health Survey* programme register a high portion of population sharing cooking places and latrines (when having one to share) (DHS, 1994, 2001, 2013). Evidently, still low nutrition and health levels further worsen such situations, and do not permit the enhancement of human capital, nor do they promote further social and economic improvements. It clearly emerges that despite efforts and great achievements reached thanks to interventions in family planning, education, financial services, health, and so forth, a long way still has to be tread.

Yet, among all the causes that may convince such a huge number of people to migrate and leave their place of origin, it is useful to focus specifically on one of these causes: environment, that very element that Dasgupta (1995) judges fundamental to have a comprehensive understanding of a country's wealth. In Bierend's article, the legend reported under Figure 4.3 reads:

> The people come to the cities because they can no longer live on the countryside (…), [m]ostly due to natural disasters. They are poorly prepared to live in the city and have no professional training. The path then leads directly into the slums (Keitel in Bierend, 2014).

Many have portrayed Bangladesh's development path as a surprising model, and data presented in Chapter 3 seem to acknowledge the astonishing improvements the country has experienced; nevertheless, is Bangladesh comprehensively wealthy, and has it really achieved an improvement from all perspectives?

4.2 The Environment in Bangladesh

Once again, in order to continue analysing the case of Bangladesh, it is useful to recall the diagram in Figure 1.2 borrowed from Reher (2011). So far, the scheme has been useful to reconstruct a possible development pattern focused on the changes that affect population and the quality of their lives. The purpose of this section is to add another dimension to the analysis, and to apply it to the case of Bangladesh.

In the first part of this chapter we analysed international and domestic rural-to-urban migration, and hinted at environment as one of the causes of migration, particularly as linked to people's movement from rural to urban areas. In Bangladesh, natural disasters usually affect most rural areas, and people often lose all they have because of frequent calamities. Nonetheless, domestic migration is not only rural-to-urban, but also rural-to-rural. The relationship between migration and environment is more complex than it might seem, and is in part determined by an interaction between environment and population at large.

In Chapter 1 we presented theories describing the set of relationships between population and the environment, and the possible vicious cycle (Dasgupta, 1995) emerging from the interaction of population, environment and economy. Especially in a changing context like Bangladesh, the connection between demographic transition, population growth, migration, socio-economic changes, and environment constitute the core of the bundle of interactions occurring simultaneously, and fuelling one another. The point is now to include the environmental conditions of Bangladesh in the scheme of its developmental path, and to try to understand whether the virtuous circle Bangladesh has undertaken can rely on a solid "environmental basis".

To begin with, the necessity to protect the environment has been acknowledged since the establishment of the People's Republic of Bangladesh. During its first years of independence, the government of the country issued the Wildlife Preservation and Water Pollution Control Acts

and the Environmental Pollution Control Ordinance (World Bank, 2006). Most importantly, in 1989 a comprehensive Ministry of Environment and Forests was established, and since then it has been dedicated to the management of environmental issues.

Overall, environmental factors have always been particularly relevant for Bangladesh for many reasons. As already explained in Chapter 2, Bangladesh is a country particularly vulnerable to natural calamities. The incredible number of rivers and streams, the high percentage of the territory consisting of flood plains and reaching no more than 12 metres above sea level, together with a climate characterised by monsoons and heavy rains, make Bangladesh particularly prone to natural disasters. Both sudden and slow environmental phenomena have been changing the country's landscape over time, and as a consequence have conditioned the lives of millions of people.

It has already been shown in Table 2.2 how frequent natural disasters are: between 1970 and 1998 more than 170 large-scale disasters invested the country. In the following analysis, all information will have to be seen in the light of this idea: in a country where population is already poor, life conditions are tough, and more than half of the population still rely on agriculture, such a high frequency of natural calamities represents one of the major threats to a smooth development.

4.2.1 Floods

Floods are among the most frequent calamities affecting Bangladeshis' lives. Eight major floods occurred in the last forty years, and the worst was experienced in 1998, causing the death of about 1,500 people, and making thirty million people homeless (Garibay et al., 2010, p. 46). In addition, it has been estimated that every year, even when no exceptional flood is registered, about a quarter of Bangladesh's territory experiences inundations (Walsham, 2010, p. 9). Exceptional events imply the inundation of far greater areas, with

impressive consequences for the whole country and particularly for the poorest.

Among the most relevant causes of flooding there are monsoon rains: when they become heaviest, river water discharge increases, until exceeding riverbanks and inundating riparian land (Shrestha, 2002, p. 189). The system of rivers and inland water bodies that streams through Bangladesh's territory covers consistent parts of the South-Asian subcontinent and no less than 7% of the total area of Bangladesh; also, the total annual Ganges-Brahmaputra-Meghna river basin inflow into Bangladesh amounts to a colossal volume of 1,110.6 km^3 (Frenken, 2012, p. 116).

The phenomenon of siltation that characterises these rivers has determined over time the modification of the country's flood plains. In addition, over time it has been reducing channels' capacity, resulting in lower channel gradients and a higher risk of flooding all over the area (Shrestha, 2002, p. 189). This is particularly so because most of Bangladesh's population lives in the Ganges-Brahmaputra-Meghna river basin: monsoon rains invest simultaneously the whole region, and cause an impressive concentration of water, that overloads the entire river system (Frenken, 2012).

Floods in Bangladesh are particularly dangerous not just because they are frequent, nor simply for the amount of water they involve: the extremely high population density, and the pressure it exerts on the environment has huge consequences for people every year. Rural households often do not own much land, and losing it because of floods affects enormously their lives. Beside this, high population pressure often causes a progressive movement of households and settlements onto further high-risk flood areas (Garibay et al., 2010, p. 46).

In general, people have tried to adapt and have adjusted their housing and farming systems to the danger of flooding they have to face on a daily basis, yet poverty and calamities of greater intensity do not allow for substantial improvements. It should be acknowledged that during the flood

season in low-lying areas it is quite common to be knee-deep in water, and local crops like rice depend on these events (see Figure 4.8); however, as floods frequency and intensity is changing, it remains hard for such communities to cope with them (Walsham, 2010, p. 63).

Figure 4.8 Life during the Floods

The legend of the picture in the original document reads:

> Anna (26) cooks food on a banana raft in front of her kitchen. They struggled with water for two weeks in the first phase of flooding and didn't move from their house. But they shifted to a new place in the second phase of flooding as their land was swept away by storm surge. Nandinar Char, Sariakandi.

Source: Walsham, 2010, p. 66

4.2.2 River Erosion and Char Lands

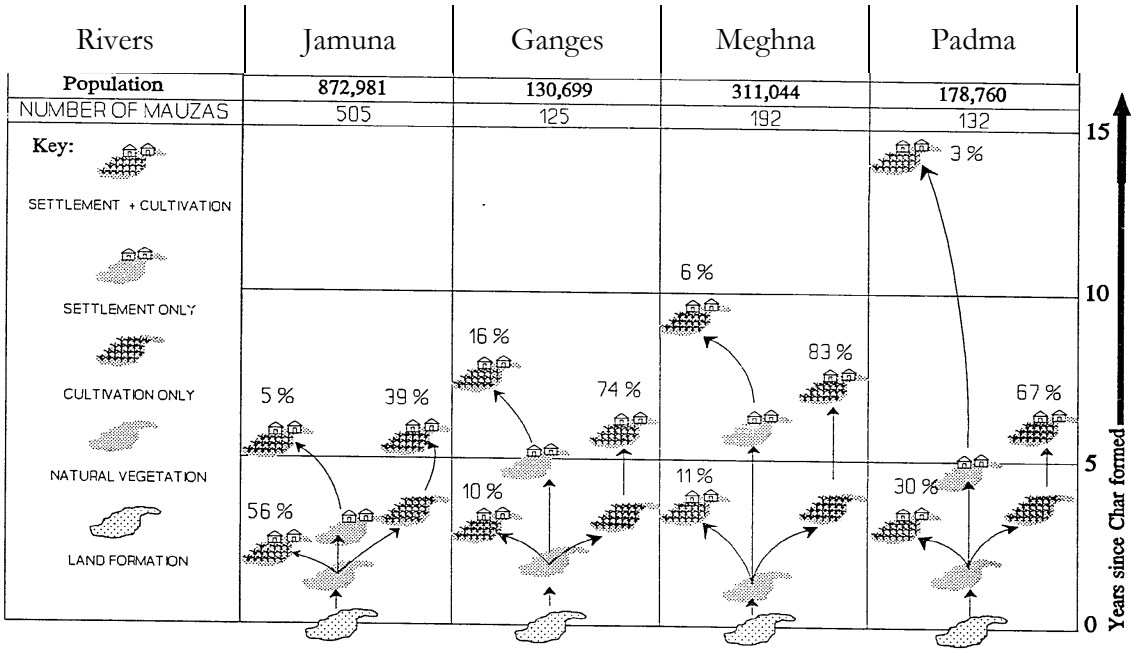
Another phenomenon that represents a major threat is river erosion, that is especially relevant in a context like Bangladesh, pervaded by water streams. In Chapter 2 we hinted at the thousands of hectares the country has already lost

in favour of its neighbouring states because of river erosion, and because of the weakness of interventions implemented by the government of Bangladesh. Most importantly, river erosion represents a major problem for people living in riparian areas, those very people that are most affected by floods.

It has been estimated that since 1973 more than 158 thousand hectares of land were eroded, and thousands of people are displaced every year: just to give an example, in 2010 alone about 11 thousand people had to leave their dwellings near the Jamuna river (Walsham, 2010, p. 13). Given the enormous consequences river erosion has, it is often addressed to as "the silent tsunami" (Garibay et al., 2010, p. 47): it has been estimated that every year 64 thousand people are displaced on average by river erosion (Garibay et al., 2010, p. 47).

At the same time, the corresponding land accretion generates new land both along and in the rivers. The portions of land that emerge in the middle of the rivers are called char lands, and estimates suggest that more than two million people live there (Walsham, 2010, p. 13), often after being displaced and losing their original land because of other natural calamities.

Figure 4.9 The Evolution of Char Land Settlements in the Major Rivers



Percentage given is the number of mauzas where the sequence was recorded.

Source: Charland Socio-Economic Summary Report, 1995, p. 12

Figure 4.9 gives an example of how settlements were established along major Bangladesh's rivers, and gives evidence of the stages through which such pieces of land are first covered by natural vegetation, and then in a few years they are gradually used for both cultivation and settlement. It is interesting to notice that it is not just scattered homesteads that are established in char lands, but entire "mauzas" – namely, villages – that are built on those islands.

However, these dwellers are far from being safe. The origin of char land inevitably makes it risky to live on it, and if displacement is already frequent among Bangladeshis in the rest of the country, it is even more so among people living on char land: more than 250 thousand people living in these islands suffer the consequences of land erosion every year, and their total annual economic loss amounts to an average of 145 thousand US$ - a huge sum, considering the widespread poverty of these families (Garibay et al., 2010 p. 47). Although providing not particularly recent data – actually collected in 1991 –, Table 4.2 supports this information. Char lands might represent a temporary solution for landless and homeless households, yet indeed they are more prone to suffer from flooding. Just to give an example, the percentage of area flooded in upper Meghna river was higher on both island char and attached char (respectively, 94% and 74%), while in unprotected mainland it "only" reached 65% (see Table 4.2).

Table 4.2 Percentage of Area Flooded at Peak Flood, 1991

River Reach	Island Char	Attached Char	Unprotected Mainland	Total
Upper Jamuna	73	63	51	65
Middle Jamuna	53	18	22	43
Upper Meghna	94	74	65	73
Meghna Confluence	44	83	61	66
Ganges (Middle)	90	84	86	87
Padma (Middle)	88	56	69	71

Source: Charland Inventory

Source: Charland Socio-Economic Summary Report, 1995, p. 41

It is clear that life conditions are tougher for char land dwellers, and not just because they have to face harder environmental conditions: also, they often need additional resources like small boats to try and earn a living, to protect as much as possible their belongings, and to make ends meet.

In relation to this, findings about river erosion frequency and intensity have been contrasting, and apparently different areas have experienced variable phenomena, depending on local specificities. For example, Walsham (2010, p. 13) reports that, over the last years, river erosion has declined in the area of the Jamuna river: allegedly, during the 1980s the river underwent a loss of about 5,000 hectares per year, while during the 2000s the amount of hectares lost went down to 2,000. On the contrary, FAO reports a recent overall increase in frequency and intensity of river erosion, and refers to the forecasts the Centre for Environmental and Geographic Information Services made: according to them, in the future, an average of 29,000 people per year will be displaced among those living along major rivers alone (Garibay et al., 2010, p. 47).

Many studies have recognised the importance of the river erosion and char land issues, and they have encountered that people living in riparian areas often experience displacement more than once in their lives (Walsham, 2010, p. 13), even among four and seven times in a lifetime (Walsham, 2010, p. 13). This means that real life conditions' improvements are not always achieved, and that Bangladesh population faces environmental dangers on a daily basis. Resettlements usually take place within few kilometres from the place of origin, which entails an increase in population pressure in areas at risk. Also, the poorest are the most affected, for they are often those living in most dangerous areas, and they usually have small pieces of land, if any; although experiencing losses, those who have larger landholdings are more likely to be able to move to another part of their land, and might as well have more resources to recover from such calamities.

4.2.3 Droughts and Monga

Despite being a country characterised by frequent and abundant rain, Bangladesh is also affected by droughts. Evidently, such events do not affect all the regions of the country in the same way, and the area the most easily affected by them is the North-West of the country. Droughts often take place during the so-called "Monga" periods, namely when "employment and income opportunities of the rural poor strongly decrease between transplantation and harvest of paddy" (Zug, 2006, p. 1). In these periods, stocks of food run out, and this coincides with a reduction in temporary employment in agriculture, on which many rural households rely.

When floods precede droughts, the combination of such conditions worsens the lack of food and resources, and further endangers people's lives. The need for households to resort to loans to get food, and the decline (often below the adequate threshold) in the quantity of food taken, are among the consequences such periods have (Garibay et al., 2010, p. 48). This further endangers the poor, and causes troubles at the nutritional and health level for many people.

In any case, the connection between droughts and Monga is relevant because it witnesses the strong relationship between environmental and socio-economic issues. In a country where about half of the population is still employed in agriculture, and heavily relies on cultivation outcomes, such environmental conditions further scathe Bangladeshis' lives.

4.2.4 Climate Change and Related Phenomena

Climate change involves all the phenomena addressed so far, and contributes to the occurrence of many others. Much attention has been given to climate change because of the consequences it can bring, affecting significantly both the integrity of the environment and the population's life conditions. Expectations are that climate change will cause an increase in intensity and

frequency of river erosion, floods, and droughts, and it will also exacerbate other environmental issues, e.g. those in connection with rising temperatures.

For example, cyclones often invest Bangladesh, and bring devastation and death. The Gorky Cyclone, which blew in 1991, is sadly remembered for causing the death of about 120,000 people, and for leaving entire communities with serious damage to their assets and to already poor infrastructure (Garibay et al., 2010, p. 46). Cyclones have kept damaging and devastating Bangladesh, affecting most of all the Southern part of the country. The 2009 Aila Cyclone interested almost four million people (Walsham, 2010, p. vii): the consequences for the population involved displacement, disappearance of or severe damage to land, loss of title deeds, and so on. Over the years, both preventive warnings and post-disaster assistance have been improved; shelters have been provided in some of the most affected areas, yet much is still to be done, for people often live too far from these shelters, or are not informed in time of the coming calamity (Garibay et al., 2010, p. 46-47).

Other two phenomena that have been taking place, and that are exacerbated by climate change are coastal erosion and saline intrusion. They are linked to the rising level of the sea, and might contribute to the further loss of land. Coastal erosion has two main causes, namely river flows and rising sea levels. At the same time the increase in sea level contributes to salt water intrusion in the deltaic area: it acts together with weaker flows of river water during the dry season, that is often influenced by rising temperatures (Walsham, 2010, p. 18).

Salt-water intrusion has many significant implications. First of all, people living in coastal areas that are affected by this phenomenon can no longer rely on fresh water to drink. Often, they need to spend more time and energies fetching sweet water, with possible consequences on human fertility levels and women empowerment, as well as on comprehensive health, nutritional and economic status.

Also, crops like rice cannot be grown where the salt level is high, and people who used to rely on those cultivations before saline intrusion, in the end need to convert their activity, usually into shrimp farming (Noman and Farouque, 2008). This has additional consequences at a socio-economic level: shrimp farming is less labour-intensive in comparison with traditional crops, thus the shift towards this activity has generated unemployment in coastal communities, and has worsened life conditions of those households relying on agricultural employment (Noman and Farouque, 2008, p. 168). Overall, to population these phenomena mean being constantly in danger, with the possibility to lose basic assets and the few resources necessary for their subsistence.

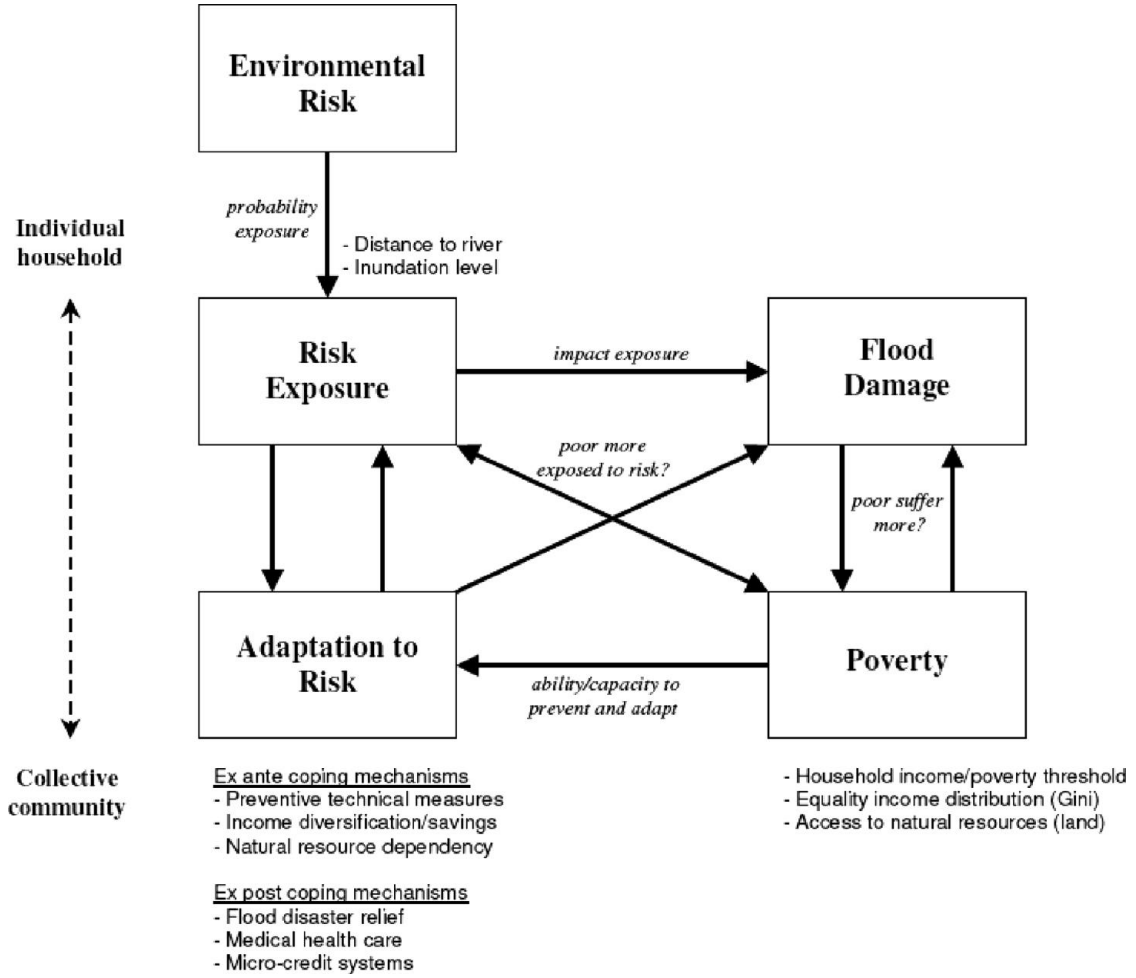
These are just some of the consequences climate change comes with. What has to be stressed for our purpose is that environmental issues, and changes in the environment affect enormously people's lives, particularly in poor and rural contexts. Health, social and economic improvements, and even fertility choices can be related to them. Frequent disasters cause higher levels of mortality, and can affect fertility choices, which in turn do not allow households to concentrate efforts and resources on improving their children's education and health – please read, human capital. Moreover, economic losses caused by natural calamities contribute to this downward spiral, and so forth: greater poverty boosts population growth, reduces chances to successfully respond to natural disasters when they occur, and so hence and so forth. This is precisely the vicious cycle Dasgupta speaks about (1995).

4.2.5 The Relationship between Poverty and Environmental Risk

To gain a deeper understanding of the greater exposure of poor people to environmental risks, it is useful to borrow a scheme from Brouwer et al. (2007). Figure 4.10 explains the main findings of the study carried out by the authors, regarding the allegedly higher vulnerability of the poor to floods and climate change in Bangladesh. Specifically, they suggest that the poorer

households, the greater the chances that they will face higher levels of inundation and more significant damage and loss.

Figure 4.10 The Relationship between Poverty and Environmental Risk



Source: Brouwer et al., 2007, p. 316

The study at issue concentrates on the consequences floods have, but the model can be applied to the other natural phenomena as well. What emerges is that overall the poorest are more exposed to environmental risk: firstly, because they usually live closer to sources of danger like rivers; secondly, damage caused by floods – or any other natural events – is generally greater for them; thirdly, the worse the conditions in which households already are, the more difficult it becomes for them to prevent and adapt to risk. Overall, all these conditions are linked to one another and further worsen poverty and

life quality. For poor households it is often hard to take preventive technical measures, even the simplest; income diversification and savings are usually not available, or they are not enough to help in hard environmental situations. Also, adaptation mechanisms regard communities as well: it is not households alone that need to cope with such risks. Efficient health, relief, and micro-credit services would help recover, and would stop, or at least curb, a downward trend towards further poverty and hardship; equal income distribution would help as well, and so would a more equitable access to natural resources like land.

4.2.6 Water, Pollution, and Land Degradation

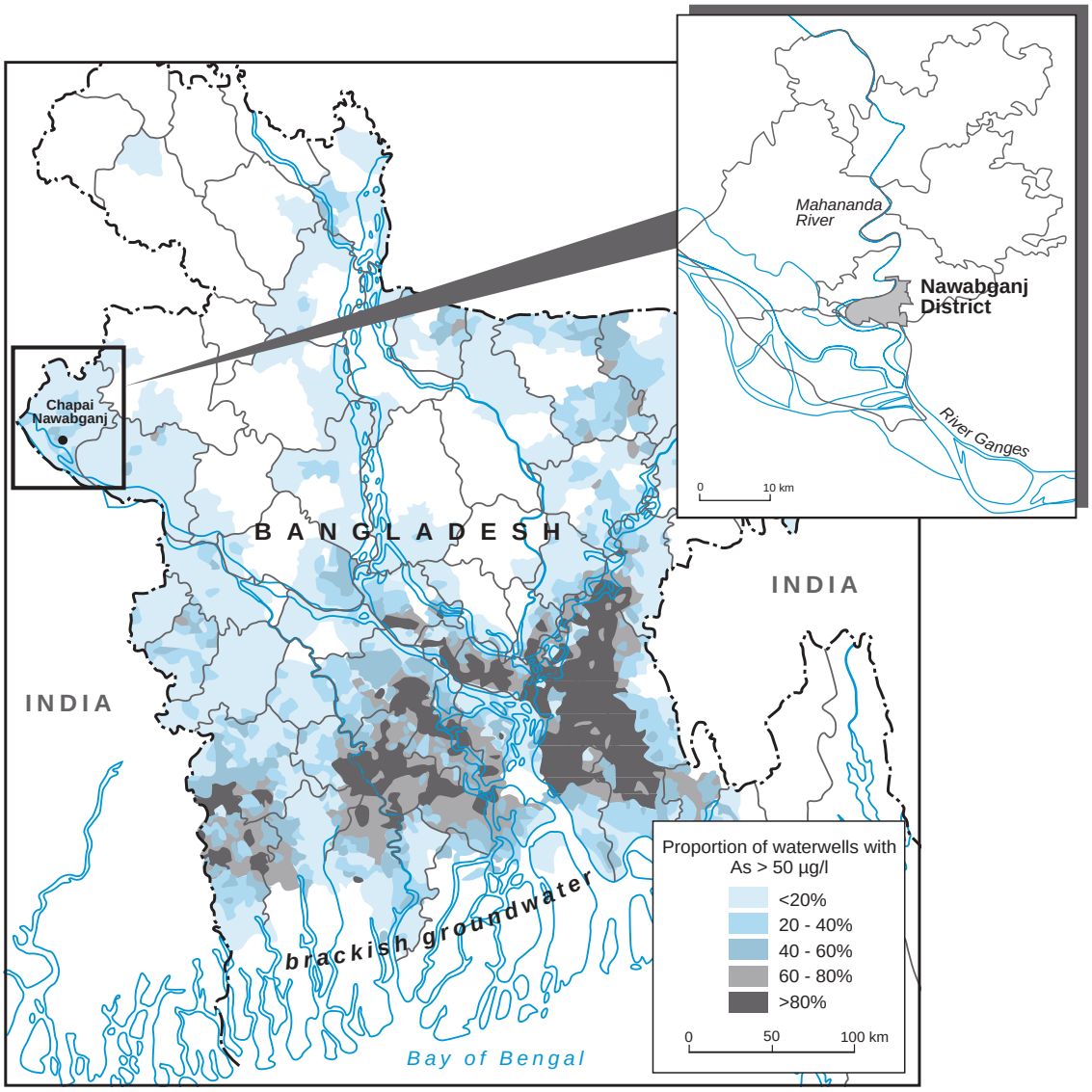
It is now evident that the path out of hardship and towards development involves multiple actions, which can be fully effective only keeping in mind the relevance of many aspects in people's lives, including especially the environment. However, so far we have only considered phenomena that mostly do not depend on the humankind. There is a series of environmental issues that is instead tightly bound to population pressure on nature, and that is part of the vicious cycle within which poverty, population and environment interact (see Figure 1.3).

Water is one of the most important resources for the humankind, and in a country like Bangladesh it is even more so, considered its landscape pervaded by water. Clean water is fundamental for the health of the population, as well as to maintain a wholesome environment to obtain the resources necessary for subsistence and – why not – for economic growth. However, one of the major problems that have invested Bangladesh's water is arsenic poisoning.

Arsenic is a metallic substance, relatively soluble in water, which can be found naturally in the subsoil. It comes from pyrite, a sedimentary rock that is found in the Himalayas: from such rocks, some bacteria release arsenic in a soluble form that reaches aquifers (Shwartz, 2010). Over time, rivers have

brought it down to the Bengal basin and spread it all over the territory of Bangladesh, mainly within 50 metres depth of aquifers (Shrestha, 2002, p. 190) (see Figure 4.11 for a map of arsenic contamination). Particularly high levels of arsenic were found in groundwater extracted with tubewells: as most of the water used by Bangladeshis is extracted from the soil, millions of people were exposed to arsenic poisoning, and to the deadly consequences it has on the population.

Figure 4.11 Spatial Distribution of Groundwater Arsenic Contamination in the 'Upper Aquifer' of Bangladesh



Source: Tuinhof and Kemper, 2010, p. 2

According to researchers, for decades arsenic has been seeping into the water supply, but a higher concentration of arsenic (far above the acceptable threshold of 10 micrograms per litre suggested by the World Health Organisation), and a higher exposure to it, is now mainly due to the faster rate of seepage, caused by the more rapid withdrawal of groundwater (Shrestha, 2002, p. 190). Millions of tubewells were established since the independence of Bangladesh to give access to clean water to everybody in the country, but the backlashes of such measures have been disastrous: Bangladesh is now possibly the country most affected by arsenic poisoning, and it has been estimated that about half of the millions of tubewells in the country might be contaminated with it (World Water Assessment Programme, 2009, p. 138).

As a consequence, studies have suggested that almost half of the population of Bangladesh has been affected by arsenic poisoning, which increases enormously the probability to die within few years from exposure (Walsh, 2010, and Argos et al., 2010). Many health problems like arsenicosis, various types of cancer and blindness have been linked to arsenic poisoning: these have certainly affected life expectancy in Bangladesh, which in the past few years has improved (see Table 4.3), but it has been certainly curbed by such a threat to human health – nonetheless, in less than ten years, it grew of about two years for men, and three for women.

Table 4.3 Life Expectancy (year)

Sex/Year	2002	2010
Male	64.5	66.6
Female	65.4	68.8

Source: DHS, 2013, p. 2

Also, poisoned water has been used for irrigation, and it has therefore invested not only the population drinking it, but also all the cultivations for which contaminated water has been used, entering the food chain and possibly spreading the consequences to an even greater number of people. This is even more so, because groundwater is one of the major sources of irrigation: e.g. in 2008, 75% of the irrigation coverage within the Ganges-

Brahmaputra-Meghna river basin in Bangladesh (almost 5 million hectares) was covered by groundwater (Frenken, 2012, p. 119).

It is evident that such a widespread threat to population's health restrains impressively the possibilities of human capital improvement, and conditions not just life expectancy, but life quality as a whole. Before causing death, arsenic affects life quality, which is already poor in these contexts.

Another issue regarding water is pollution caused by a series of pollutants: arsenic contamination and saline intrusion are not the only phenomena that affect water quality. For instance, agrochemicals and wastes due to industrial activity are some of the factors that affect irrigation water quality in Bangladesh (Frenken, 2012, p. 117), and that influence cultivation output, as well as the income of those households relying on agriculture. It cannot be denied that there are several, and variously significant troubles that affect water and access to it: evidently the purpose of this section is not to give a comprehensive outline of all the issues to be faced in Bangladesh regarding water. Instead, what is indeed relevant is to give an idea of the width of consequences such issues can have, and particularly the role played by them in a country striving for development and that has already done pretty much to fulfil overall decent life conditions.

Notwithstanding, it is useful to present some other aspects. Water pollution affects both rural and urban areas, but it is in urban areas that air pollution is most relevant instead. Huge urban concentrations like Dhaka present innumerable problems that cause environmental depletion, and at the same time constitute a risk for human security. Just to give an example of pollution levels, Dhaka is among the most polluted cities of Asia, which actually register the highest level of air pollution. For example, regarding the average annual concentration of particulate matter less than 10 μ in diameter, the capital of Bangladesh presented in 2002 a value of more than 110 $\mu g/m^3$, well above the threshold of 20 $\mu g/m^3$ suggested by the World Health Organisation (United Nations Environment Programme, 2007, p. 216).

Moreover, population density, is even higher in urban areas: it has been estimated that Dhaka has recently achieved a population density of around 34,000 people/km^2, which makes it one of the most densely populated cities in the world (*Urbanization: Challenges and Opportunities*, 2014, p. 29). Such an impressive density implies greater troubles in providing services to assure human health and well being, and it also comes with greater and more concentrated levels of waste. Both from a sanitary and an environmental perspective, the management of waste becomes of great importance: interestingly, in Dhaka several projects regarding solid waste management and composting have been implemented at a community level (United Nations Environment Programme, 2007, p. 225). Such actions have helped reduce soil degradation and pollution; also, they could reduce health problems due to poor hygiene, and create employment, hence reducing poverty, hunger, and enhancing life quality.

Among the consequences urbanisation comes with, there is also the loss of productive agricultural land (World Water Assessment Programme, 2009, p. 138). The expansion of urban areas – most of the times characterised by degradation due to either industrialisation or wide slum areas – steals productive land to agriculture, and endangers agricultural production. It should not be forgotten that the high percentage of population still working in that sector and often completely relying on it, together with the incredible population density of Bangladesh make both the quantity and the quality of food produced especially central to the development of the country: in fact, health, human capital, and economic improvements largely depend on access to sufficient and healthy food.

This kind of urban pollution and natural degradation is part of the vicious cycle addressed in Section 4.2: as already suggested, urbanisation is often due to rural-to-urban migration, but most importantly, this kind of migration is often thrust by other environmental issues affecting rural areas. When floods, cyclones, river erosion, and any other natural calamity make

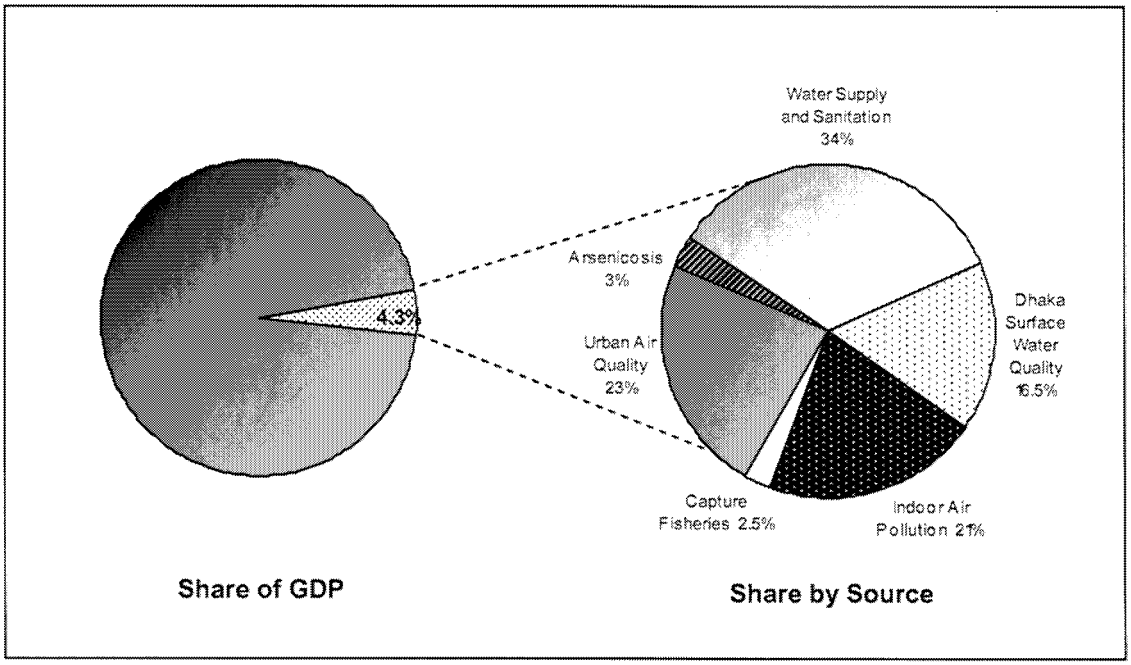
land disappear, and destroy homesteads, crops, and the few resources households have, those remaining landless are often forced to move to major urban areas, looking for somewhere to stay (Garibay et al., 2010, p. 47). This happens especially when calamities are sudden and people lose everything overnight: when phenomena like river erosion are slow, people might have the time to save at least their belongings, and find a less drastic solution. In any case, such movements imply several backlashes: households often cannot recover from such losses, they end up living in slums, or as pavement dwellers if their conditions are extremely severe, and need to adapt to urban life. Also, this kind of migration implies further population pressure in urban areas, with greater pollution and a general degradation of the environment.

Moreover, once households leave rural areas to find new chances in cities and towns, they may choose to abandon pieces of land that could be recovered and reused with sufficient resources. Abandoned areas, as well as those with many displaced people run into the risk of contamination of water, poor sanitation and a general degradation in the environment and human health (contributing to an increase in diseases like diarrhoea) (Walsham, 2010, p. 22).

4.2.7 The Implications of Environmental Degradation

All this reasoning comes with a suggestion: environmental degradation is costly, as the environment influences improvements in life conditions, human capital formation, economic growth, social development, and even demographic issues. In an interesting report of the World Bank on the environment of Bangladesh published a few years ago, estimates were reported regarding the portion of GDP the country had to spend because of problems related to environmental degradation (Figure 4.12) (World Bank, 2006).

Figure 4.12 The Costs of Environmental Degradation



Source: World Bank, 2006, p. 88

Figure 4.12 shows that the estimated amount spent on coping with the consequences of environmental degradation reached the 4.3% of the GDP of Bangladesh. Also, not surprisingly we find some of the issues we have discussed so far among the items that determined the most relevant share of expenditure. For example, urban air pollution caused almost one quarter of the expenditure due to environmental degradation. Indoor air pollution was particularly relevant as well, counting to about one fifth of that share. Impressively, about 50% of the GDP share spent because of environmental degradation (corresponding to about 2.1% of the entire GDP) was ascribed solely to issues related to water, and about one third of it was caused by water conditions in Dhaka alone. Arsenicosis was detected among the major causes of expenditure as well, and so was capture fisheries.

The latter has not been analysed in this work, but it is sufficient to say that it is considered to provide two-thirds of the Bangladeshi's animal protein needs, and is important particularly for the poor, whose nutritional needs depend largely on fisheries supply. As agriculture expansion and urbanisation

have caused the loss of vast areas previously destined to capture fisheries, both the population nutritional level and the economy of the country have suffered from these changes likewise. From an economic point of view, the World Bank has estimated that the value of the annual loss has been of about $60 million (World Bank, 2006, p. 91), and in addition to that, one should consider all the backlashes the poor nutritional status of the population entails.

To sum up, it is evident that the tight bond between environment, population, and development cannot be denied, and the real challenge for Bangladesh lies in avoiding the vicious cycle that such interactions might entail, promoting instead the virtuous circle between demographic, social, and economic changes, sustaining it with a wise management of the environment.

5. Development, Environment and Demography

5.1 Environmental Degradation, Land Tenure, and Equality

One more step is needed to complete the framework. Environmental degradation comes with poverty and population pressure, and so does poverty imply the depletion of environmental resources (see Figure 1.3). For instance, poverty obliges households to exploit as much as possible the resources, – and more often land – they have at their disposal. This comes with further environmental degradation, and so forth.

In relation to this series of interactions, one of the most significant and severe consequences of natural hazards for poor people is landlessness. In Chapter 3 we already noticed that fortunately the overall percentage of population owning neither land nor a homestead has decreased considerably. Yet, in 2011 still 5.1% of the sample interviewed for the Demographic and Health Survey Programme was landless, and a higher percentage of 8.7 was registered among urban dwellers (Table 3.8) (DHS 2001, p. 19; 2013, p. 16). The report of the 2008 Agricultural Census instead presents a higher percentage of 12.8 landless rural households (Garibay et al., 2010, p. 51). In any case, although some studies suggest that the percentage of people experiencing such a condition has diminished, this is evidently a high

proportion that reflects the poverty of the country, and the hardship a still large part of the population has to face daily[6].

If we borrow the definition of landless given by FAO instead, and include among the landless also those households with either only a homestead or no more than 0.2 hectares of land (Garibay et al., 2010, p. 51), evidently a larger amount of households is involved, with less than half of them owning something more than just a homestead even in rural areas, where a wider percentage would be expected (specifically, in 2011 49,4% of rural households had both a homestead and other land) (see Table 3.8) (DHS 2001, p. 19; 2013, p. 16).

Overall, landlessness has been propelled by environmental degradation. Mainly river erosion, cyclones and floods have caused numerous households to become landless (Garibay et al., 2010, p. 51), and forced many to move either to still disaster-prone neighbouring riparian land, to just as (or even more) dangerous char lands, or to towns and cities. Regarding the latter choice, the higher percentage of landless households reported by the *Demographic and Health Surveys* (Table 3.8) among urban dwellers is in part the result of rural-to-urban migration due to natural hazards.

In addition, landlessness comes not just with economic consequences, nor is it sufficient to take into consideration only the backlashes it has on the health of people: the condition of being landless entails a particularly low status from a social perspective. In a society that still relies significantly on agriculture, and whose population lives mostly in rural areas, people owning land can be extremely influential, and can exert a power not to be underestimated. Thus, it is evident that natural calamities and environmental phenomena taking land away from households have consequences on those very attitudes toward life Reher has included in his diagram, bound as they are

[6] In this section extreme poverty linked to landlessness is taken into account, but this does not imply that owning a homestead is considered as being well off: our mind goes to the shacks presented in Figures from 4.3 to 4.7, taken in Dhaka slums.

to demographic phenomena, as well as to social and economic changes (Figure 1.2).

Indeed, the advantage poor households may have in bearing many children is even greater when there is a high risk that all the other resources will be lost suddenly, with low chances to escape from such a "destiny". Households that behave rationally from an economic perspective (Caldwell, 1976 and 2006) do so taking into account the local environment, as just one of the many factors that affect their lives, together with all the other cultural, demographic, social, institutional, and economic circumstances. Within this list are to be included both the elements presented in Reher's framework (Figure 1.2), and the factors Bilsborrow identifies as determinants of the decision to migrate (Figure 4.1). In fact, together with natural phenomena they are all part of the same set of interactions that determine people's quality of life, their greater or weaker chances to improve their conditions, and more generally the developmental path of a country.

However, landlessness as connected to natural hazards is just part of a wider problem that affects Bangladesh: an inequitable access to land. The origins of the actual landownership system of the country lie in the regulations established under the British colonial rule: back then feudalism was the system used. It was with the Bengal Tenancy Act of 1885, and more significantly with the East Bengal State Acquisition and Tenancy Act of 1950 under Pakistani rule, that the first real steps to abolish feudalism were taken (Garibay et al., 2010, p. 49). With this Act, the control of land tenancy passed from landlords – so called "Zaminders", who could collect revenues – to the Government, and it was established that no family with more than 60 bighas (corresponding to about 20 acres) could acquire new agricultural land. In case surplus land was obtained, it would be destined to the landless (Garibay et al., 2010, p. 49).

After the independence of Bangladesh, thanks to two major reforms issued in 1972 and 1984, further measures favouring both landless and

marginal farmers were taken. It was prohibited to evict agricultural tenants from their homestead lands, households with less than 25 bighas of land were exempted from land taxes, and sharecroppers were recognised by the law (Garibay et al., 2010, p. 50).

However, as land revenues were the major source of income for local governments, policies were directed at gaining more from land assignment, which caused a reduction in the positive effects of land redistribution. Indeed, surplus and khas land – government-owned land (*Charland Socio-Economic Summary Report*, 1995) – were assigned on payment of deposits usually corresponding to the market price of the land. This meant that poor and needy people could not receive such lands, which inevitably were taken by families in already good economic conditions.

Fortunately, nowadays such a regulation is no longer in force, and landless people can obtain khas lands without paying any deposit (Garibay et al., 2010, p. 50). However, a general lack of awareness of these laws among rural people represents the main trouble concerning landlessness nowadays, so that it impedes an effective use of such measures (Garibay et al., 2010, p. 50). In addition, it must be said that some of the khas lands are char lands, and more generally new lands emerging because of natural phenomena: in those cases, the successful assignment to landless households does help reduce the level of social, economic and health vulnerability of those people, but at the same time it does not dissolve the risks related to the nature of these pieces of land. Furthermore, a widespread corruption favouring already influential and wealthy families further weakens the already scarce enforcement of these regulations, and does not allow for a real and effective redistribution of land.

In relation to this, it is useful to take into account how land is distributed among those who own some. FAO (Garibay et al. 2010, p. 51) distinguishes between mainly four classes of agricultural landowners in Bangladesh, namely:

- People who own homestead land only but have no land for cultivation;
- People who own homestead and agricultural land and take lease land to increase their farm area;
- People who own agricultural land but lease out part of it because they cannot manage all the land;
- People who own agricultural land but lease all of it to others for cultivation (sharecropping or money arrangements).

Within these groups, about 80% of farm households own only 40% of agricultural land: they usually have between 0.02 and 1.0 hectares of land, and the average farm size among these small landowners is 0.35 hectares (Garibay et al., 2010, p. 51). This means that a small portion of farm households owns a relevant part of the land destined to agriculture, and that even among people with some property title, land is not particularly well distributed.

The issue is relevant from more than one viewpoint. From an economic perspective, depending on the group to which a household belongs, and on the extension of the property, revenues can be more or less sizeable; more significantly, from a social and cultural perspective even preferences and attitudes toward life change in accordance with the shift from one group to another experienced by households. All these four kinds of land ownership – and obviously landlessness as well – entail higher or lower chances for these units to improve their conditions further, and to enhance their human capital.

Coherently, some scholars have suggested that in the case of Bangladesh, the demographic pressure has worsened the consequences of ineffective redistributive measures; thence, over time no relevant improvement in the equality of access to land has been registered (Khan, 1988, p. 156). This seems to support the thesis of the so-called population pessimists, who consider fast population growth as a risk for economic growth, and a restraint

on development. In this sense, Khan (1988, p. 159) gathers that: "The Bangladesh experience clearly represents the archetypical case: demographic expansion successively leading to a reduction in the land-person ratio, a reduced access to land, increased proletarianization of the peasantry, and an increased incidence of poverty".

The role of the environment should be added to this cycle: it is not just the unequal access to land that increases poverty. Another important factor is represented by land degradation, often propelled by both population pressure and poverty. The former causes an increase in exploitation of land, that takes place in many ways: land intensification is needed, for more resources are to be produced on a constant amount of land; a greater quantity of raw materials is necessary as well; portions of land are changed into industrial and urban areas, and this inevitably comes with deforestation, and further land depletion.

The problem here addressed might seem inescapable. The concentration of land in the hands of a small elite, and the widespread practice of sharecropping allows neither for life quality improvements, nor for economic growth. This has mainly two reasons: first of all, sharecroppers are obliged to share the results of their toil with landlords, and secondly, such arrangement does not stimulate investment in technological advancement (Shrestha, 2002, p. 216). Also, land degradation is affected by population pressure, but it is indeed worsened by this general unwillingness or impossibility, that comes with poverty, to introduce improvements[7].

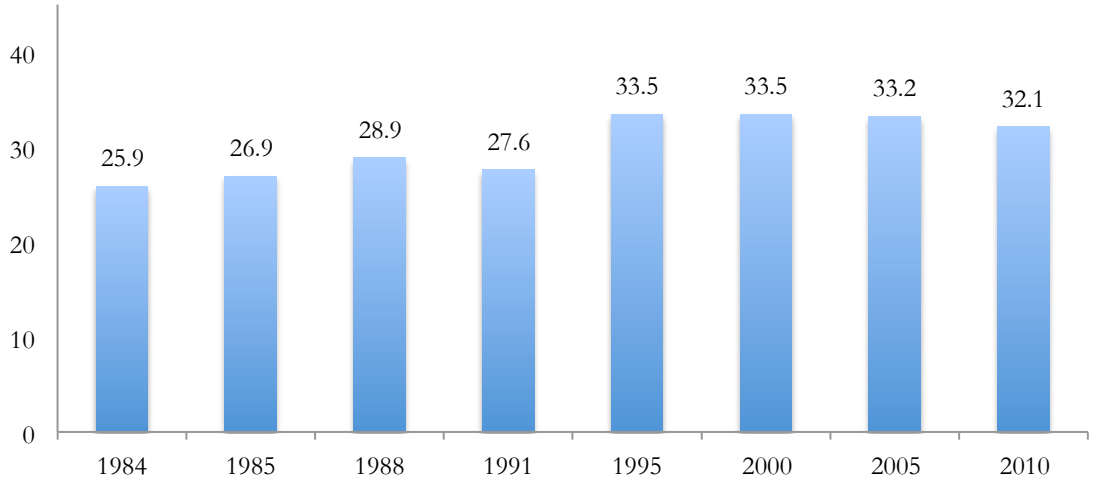
Notwithstanding, regarding land distribution, it is necessary to stress that the more or less equal access to land is just one of the aspects of an even greater problem of inequitable distribution of resources and wealth. It is useful to consider briefly the level of inequality in the country, as measured by the Gini index[8]. Figure 5.1 represents the recent values registered for Bangladesh: overall, particularly in the 1980s, inequality was not particularly

[7] Here again, Dasgupta's vicious cycle comes in handy (Dasgupta, 1995).

[8] A value of 0 corresponds to perfect equality, and 100 to perfect inequality; in practice, the Gini index usually ranges from about 25, to 60.

high, with a Gini index between 25.9 and 28.9. It was during the 1990s that higher levels of inequality were registered, passing in just four years from 27.6 in 1991 to 33.5 in 1995. Only after 2000 it started diminishing, and slightly higher equality was reported.

Figure 5.1 Gini Index for Bangladesh



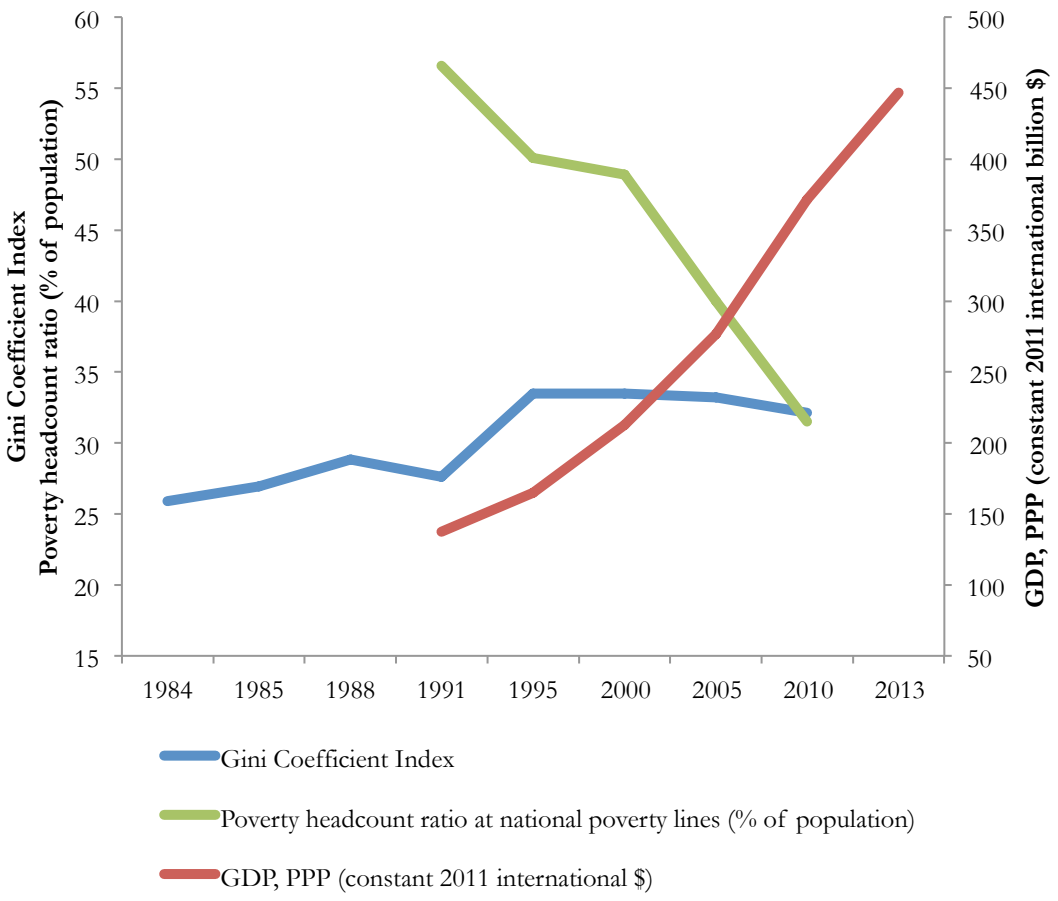
Source: World Bank, 2015a

These data are interesting because they help understand the overall situation of Bangladesh. The increase in inequality started in the same period when the economy of the country began to change, and particularly a rising Gini coefficient index corresponded to a steady growth of the GDP (see Figure 5.2). This was due to a large expansion of the service sector, and an industrialisation that throughout the last three decades has reached incredibly high levels, contributing up to 30% of the GDP. However, as both these indicators show, such an impressive growth did not benefit equally all the population.

At the same time, it is worth considering that the Gini index started going down in parallel with the reduction of the portion of people living below the poverty line: figure 5.2 highlights these trends. Certainly, the overall economic growth helped reduce poverty, and so did programmes and policies developed in parallel by the government of Bangladesh, and both

non-governmental and international organisations; still, looking at the slight decrease in inequality that happened during the last fifteen years, it was wealthy people that benefited most from the growth of the country, especially if environmental conditions are taken into account.

Figure 5.2 Inequality, Poverty and Economic Growth



Source: World Bank, 2015a

Nevertheless, last years' achievements concerning poverty do suggest that at least from a strictly economic perspective the right path has been taken. Even so, the route towards a comprehensive growth is not yet free from obstacles for Bangladesh.

5.2 Women, Land Tenure and the Environment

Indeed, one of the major issues regarding inequality, and curbing the development of Bangladesh is still represented by gender inequality. In the previous chapters we already acknowledged the fundamental role women empowerment and gender equality have in stimulating a virtuous circle, and institutional policies in Bangladesh have been addressed to promoting higher equality and access to public life in the broadest sense of the expression (from education, to employment, and so forth). Still, what should be stressed is that an uneven access to land between genders has several implications from the individual to the national level.

It is not just an uneven access to land among households that has negative consequences on life quality and economic growth. As a matter of fact, unequal distribution of resources within the household can be detrimental as much. Although improvements have been registered in this sense, in Bangladesh women and girls still incur in lower nutritional levels more often than males (DHS, 2013, pp. 183-187), and this is inevitably reflected in all spheres.

Numerous studies have recognised the necessity to empower women, and this is done also giving them direct access to property (Quansah, 2013). Overall, from a legal point of view they are guaranteed equality before the law, which implies that they have equal property rights. Yet, rarely are women owners of land. A USAID (2010, p. 6) report on land tenure and property rights in Bangladesh underlines that especially in rural areas, women usually have access to land only through their relationships with male members of their family. Back in 1996 only 3.5% of agricultural land reported a female name as the owner, and the percentage of women whose name was included on any kind of property rights documentation did not reach 10%. Ten years after, in 2006, gender inequality was still extremely widespread: Table 5.1

reports a value of 0.8[9] for women's access to land, meaning a really high discrimination. Only if other kinds of property are considered, does the discrimination indicator lower to a nonetheless high 0.5.

Table 5.1 Land and Gender Indicators in 2006

Women's Access to Land (to acquire and own land) (Range: 0-1; 0= no discrimination)	0.8
Women's Access to Property other than Land (Range: 0-1; 0= no discrimination)	0.5
Women's Access to Bank Loans (Range: 0-1; 0= no discrimination)	0.3

Source: USAID, 2010, p. 7

Such a scarce attribution of property rights to women depends on various factors, not last the high percentage of Muslim population, and the influence Islamic law and traditional practices still exert on private law issues. For example, regarding land property transmission, Islamic law provides that females usually inherit far smaller portions of property than males (USAID, 2010, p. 6). Indeed, since the independence in 1971, state laws have always enacted more equitable provisions in comparison with the Islamic law, favouring women and enhancing their status; yet, great difficulties are still encountered by women when they need to enforce their property rights: cultural norms sometimes restrain them from standing for their rights, and so do a weak knowledge of the law, and a scarce access to resources impede the accomplishment of equality (USAID, 2010).

Moreover, the low percentage of women actually owning land has numerous implications, among which stands the fact that women suffering from the loss of crops, lands, and properties – often because of natural hazards –, on which they devote their energies, rarely receive any kind of compensation, because they are not legally registered as owners (USAID,

[9] Values range from 0 to 1, with 0 corresponding to no discrimination, and 1 meaning complete discrimination.

2010). Also, landless women often do not have the same rights to receiving khas land as men: unmarried women, widows with no sons, and more in general female-headed households cannot be assigned khas land, and therefore are denied an important possibility to recover from troubles and improve their condition (Garibay et al., 2010, p. 52).

Therefore, land ownership is often restricted, but it must be said that practical access to land does not exclude women in such an extreme way. Particularly among the poorest, women are constantly involved in the management of the land, although their decision-making power is usually greater on issues regarding the offspring and the homestead. In the case of households living in char lands, women are usually referred to be more involved than their mainland counterpart in those activities that are usually restricted to men: this is because sexual restrictions like purdah are usually less respected in poor and hard conditions, and households usually need to exploit all the possible sources of income.

Furthermore, the consequences of gender discrimination include also those households whose male members have chosen to migrate. Women left home, are at times entitled to manage the household while their husbands are away but, in a context of discrimination, what could be a chance to be empowered often implies greater vulnerability for the household instead. The great number of people migrating – especially abroad – gives the idea of the spread and relevance of such a condition.

Overall, women's lack of empowerment contributes to Dasgupta's vicious cycle (1995). High fertility levels go in parallel with poverty, and with environmental and land degradation. The latter is worsened not just because greater poverty does not allow investment on a sustainable management of natural resources, nor only because it is linked to greater population pressure; indeed, women discrimination further curbs the chances to protect land and the environment from being depleted. The lack of access to resources to

manage the household's assets do not allow for timely interventions to save land, homestead, and all belongings, and can affect all household's members.

On the contrary, enabling women to manage resources and land to the best of their abilities propels positive spirals, that inevitably have good implications at all levels, and stimulate a virtuous circle. In this sense, Bangladesh has wisely promoted and supported projects aimed to give access to financial resources, some of which exclusively dedicated to women. In fact, concerning women's access to bank loans, data have shown that a lower level of discrimination is registered – namely, 0.3 (see Table 5.1) close to level 0 of no discrimination – in comparison with the access to property rights (USAID, 2010, p. 7). Indeed, both governmental and non-governmental organisations have implemented microcredit programmes, contributing to the enhancement of women's conditions and of the economy of Bangladesh as a whole.

Lastly, it should be acknowledged that not only is progressive women empowerment benefiting the economy of the country, but it is also increasing women's self-esteem and their trust in their possibilities (Loro, 2013), and is therefore proceeding in parallel with a further cultural shift, hence a change in expectations and attitudes toward life. Again, the shift in the balance from the vicious cycle to the virtuous circle seems to be possible, but at the same time it has to be constantly sustained.

5.3 Is Bangladesh Embarking on a Sustainable Path?

It is now time to consider this: is Bangladesh really escaping from the poverty trap? How can it promote a virtuous circle, and instead reduce as much as possible the backlashes a vicious cycle entails? The analysis conducted so far has hinted at some of the factors that can have a prominent role in determining Bangladesh's development, but what are the issues that should be emphasised?

To answer these questions it is useful to recall the analysis Khan (1988) provided on Asia and Bangladesh. Although his proposal is not particularly recent, the author presents a few interesting factors to take into account. Precisely, to avoid a downward spiral caused by population growth one of the necessary steps is the expansion of non-agricultural employment, both through rapid industrialisation and the expansion of service activities in urban, and most importantly in rural areas (Khan, 1988). Bangladesh has done it extensively, especially allowing for the expansion of the garment sector, which has included a large number of women, and has given them the chance to be more independent from an economic perspective. It has also involved a large number of people in services like health and education, with the aim to achieve a universal outreach of all basic facilities: again, the employment of women in family planning services has thrust their empowerment, and has supported a shift in cultural attitudes. Also, Bangladesh has given significant freedom to non-governmental organisations, allowing for a further expansion and improvement in the employment of people of every walk of life.

The issue has been addressed from the demographic point of view as well, and the country has managed to reduce its fertility and growth rates to acceptable levels in an impressively short time. However, the growth in population Bangladesh is still experiencing requires an even greater expansion of employment, most importantly as long as the age structure provides with a large portion of population in their working age. Thanks to the development of both the industrial and service sectors, Bangladesh is trying to exploit the so-called demographic dividend, and will have time to do so for just a few decades more: Reher (2011) suggests that developing countries take advantage of the "window of opportunity" the demographic transition produces, together with all the implications it has, and the phenomena included in the virtuous circle that such demographic conditions help trigger. On the contrary, in case Bangladesh did not face the challenge of the increasing number of people of working age, the battle against poverty would not be

won, and within a few decades the country would face the trouble of sustaining a large proportion of elders (Khan and Raeside, 2005, p. 9).

Migratory pressures produced by the interaction of population growth and widespread poverty indicate that still much has to be done, and that the expansion of employment has not been sufficient so far. It is true that migration diminishes the negative consequences of unemployment, eases poverty, and in the case of international migration contributes to household incomes with remittances; yet, the longer or shorter absence of millions of people has negative consequences as well, not least from an emotional perspective, and so do the deaths of many migrants trying to find their way out of hardship. Besides, especially households migrating within the country – either from rural to rural, or from rural to urban areas – become particularly exposed to social, economic, and environmental risks, often have to face even greater difficulties, and in turn contribute to environmental degradation.

Furthermore, redistributive measures are particularly relevant to guarantee an even access to land, and to greater opportunities to escape poverty both successfully and permanently (Khan, 1988, p. 159). In this regard, Bangladesh has improved its legal framework concerning equal distribution, and the series of laws and acts enforced has certainly helped producing a more equal setting. Both private and public efforts to reduce poverty have given positive results, and gender inequality has been reduced in many sectors, starting from education.

Nonetheless, inequality, landlessness and uneven access to resources are still among the major problems of the country, and in this sense population growth represents an ulterior obstacle to economic growth and to escape from poverty. In fact, the decline in the land-person ratio due to an increasing population pressure, together with environmental depletion are a threat to land distribution, restrain the chances to have equal access to land and also diminish the possibility to access land in good conditions (Khan, 1988, p. 159).

Such evidence is partially against Boserup's theory, because it highlights the presence of negative consequences that rapid population growth has in a country like Bangladesh. All in all, it pinpoints the weaknesses of both the Boserupian standpoint and the hopes behind the Kuznet curve (namely the idea that, once higher levels of wealth will be reached, pollution will lower and the environment will be protected); at the same time, Dasgupta's work comes in handy to overtake these faults, and to understand comprehensively the challenges Bangladesh has to face.

With regards to the developmental path of a country, what Dasgupta (2003, p. 4) suggests is this: holding that a growing population can thrust technologic advancement, and the steady economic growth that follows it will help reduce the overall impact on the environment, means that the degradation of the environment is considered as reversible, so that humankind will always have the possibility to restore the original natural equilibrium, and have at its disposal an unlimited amount of natural resources. He suggests that in all contexts – and possibly in developing countries even more so –, all choices taken in order to enhance the quality of life and to drive economic growth are to be sustainable, for (poorest) countries risk to decumulate their wealth, particularly in proportion to their population numbers (Dasgupta, 2003, p. 7).

Accordingly, he states that "ecosystems are capital assets: like reproducible capital assets (road, buildings, and machinery), ecosystems depreciate if they are misused or are overused" (Dasgupta, 2008, p. 3). Indeed, if this is not taken into account, all efforts Bangladesh has made to improve people's quality of life, and promote the country's development may not be sufficient, up to the point that the positive trend might be either curbed or reverted.

In relation to this, it is useful to look briefly at the major measures taken in Bangladesh to prevent environmental degradation, and to support a sustainable development. It is clear that the main reason of concern for

Bangladesh is water, for it is at the centre of many of the phenomena that affect the country. For example, over the last few years the Bangladesh Arsenic Mitigation Water Supply Project has been directed to develop and implement actions to reduce the presence of toxic levels of arsenic in drinking water as much as possible (Frenken, 2012, p. 117). In addition, particularly during the dry season, groundwater has become also a source for irrigation, urban areas, and industrial activities. Therefore, the increased extraction has caused major problems both to the environment (such as saline water intrusion in coastal areas, reduction in river flows during the dry season, and lowering of groundwater levels) and to people relying on groundwater for domestic purposes: in fact, particularly in the driest region in the North-West of the country, and in Dhaka, where water consumption is extremely high, there has been a constant lowering of groundwater levels (Frenken, 2012, p. 117).

Climate change is another major problem for Bangladesh, which has been recognised as one of the countries the most vulnerable to it (Frenken, 2012, p. 118). Indeed, climate change is thought to be a threat to potable water availability, for the modifications in temperature and rainfall levels, and the higher frequency of natural calamities it involves. The government of Bangladesh has recognised the necessity to invest on environment protection, and in 2009 the Minister of Environment and Forests has published the *Bangladesh Climate Change Strategy and Action Plan* to respond to the countries' necessities (MoEF, 2009).

Without going into the details, suffice it to say that over the last decades the country has invested $10 billion to reduce the country's vulnerability, but it has acknowledged the need to make greater investment, and to establish newer structures to address all the major issues the country will face (MoEF, 2009). Among the measures that are presented as necessary there is the improvement of the infrastructure for the management of surface water: this would reduce the impact of floods, water pollution, water misuse and overuse;

in coastal areas it could help fight saline intrusion, and so on. Moreover, restoring and strengthening embankments would help reduce the damage from river erosion; improvements are needed for what concerns shelters against cyclones, early warning systems, and protection to the landless. Also, understanding the relationship between climate change and increasing incidence of diseases to prevent it and lower morbidity levels is among the concerns expressed in Bangladesh's strategy (MoEF, 2009).

All in all, these actions evidently need the engagement of local communities to be successful and to last in time; community participation gives higher chances to spot the major troubles with which people have to cope, and even to produce employment and improvements in life quality and possibilities. Indeed, the fact that most of flood-prone households regard such events as inevitable (Walsham, 2010), and are somehow resigned to their condition, and to the need to move from time to time, indicates that actions taken so far have not been sufficient, and parallel population growth and environmental degradation need to be faced. Beside this, present policies should be implemented more extensively: greater coordination between actors and agencies involved could increase successful results, and great obstacles like corruption should be fought in order to allow a better management of resources that have been earmarked for sustainable development.

Nonetheless, if necessary actions are implemented, and Bangladesh embarks on a sustainable path, adaptation to existing challenges is feasible (Walsham, 2010), and the country might successfully get out of the vicious cycle.

6. Conclusions

6.1 A Framework for Change

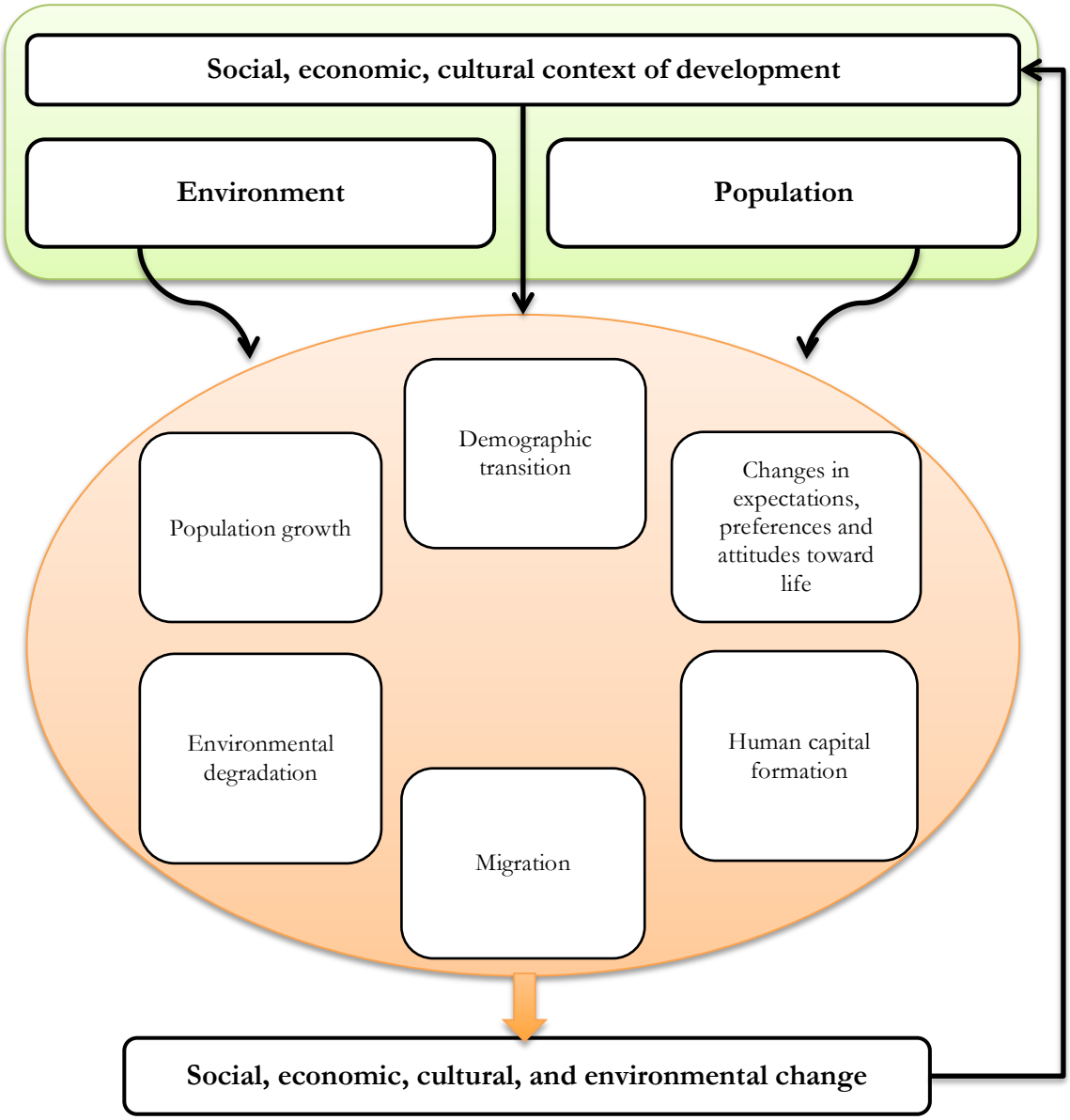
This analysis has spanned demographic, social, economic, and environmental issues. Clearly, once the developmental path of a country is taken into account, all these dimensions are to be thought of as interconnected, and one cannot deal with any of them without considering all the others. Such an interconnection is evident at all levels, but it is from the individual and household point of view that people are first affected by demographic, social, economic, and environmental conditions: the quality of their life depends on the setting within which their life elapses.

Thus, besides focusing on the major issues concerning population, development and the environment, this work has been unfolded keeping in mind the scheme Reher (2011) presented to explain the relationship between the demographic transition and the social and economic context within which it takes place. The environmental dimension has been added to this set of interactions in the wake of Dasgupta's work, in which the environment is addressed to as an irreplaceable resource not to be depleted.

In this light, the proposal in Figure 6.1 is an attempt to synthesise the interweaving of the issues proposed by Reher and Dasgupta here analysed, and understood as influencing one another in the case of Bangladesh. Specifically, population, environment and the social, economic and cultural

context interact, and a series of phenomena take place. The demographic transition, population growth, changes in preferences, environmental degradation, human capital formation and migration are all factors that are determined by the contextual conditions, and at the same time provoke changes that set in motion further modifications in the context.

Figure 6.1 Development, Environment and Population: a Framework



For instance, the demographic transition results in faster population growth, it allows for improvements in human capital, and parallels a shift in preferences and attitudes toward life. At the same time, exposure to environmental risks

is tightly bound to the decision of many people (Bangladeshis) to migrate, it implies changes in preferences and expectations, and is interconnected with population growth. Also, the environment changes together with the pressure exerted by the growing population and by migration, as well as with the improvements in the quality of life, in human capital, and in household's preferences. Furthermore, the social, economic and cultural context plays a significant role, for these phenomena take place always somehow affecting social and economic conditions, as well as cultural preferences.

Over the past few decades Bangladesh has been following this path, and it is possibly one of the countries in which the interaction between all these dimensions is most evident. It is clear that policies aimed to stimulate and support development can act on each of these elements, and no real achievement can be reached if even just one of these aspects is neglected or underestimated. Our attempt to understand whether Bangladesh is on the right path towards long-lasting results has evidenced both the improvements achieved so far, and also the major threats to be faced as soon as possible, and it has also highlighted that probably without adequate interventions the situation of Bangladesh would have scarcely improved.

From a demographic perspective, the country has experienced a particularly rapid decline in both mortality and fertility rates, and has almost terminated the demographic transition, with current rates close to replacement level. The growth of population has been rapid: it has reached incredibly high numbers, it will keep growing for some time, and will determine an even higher population density, among the greatest in the world. Mortality decline has been propelled by the spread of health services, sanitation facilities, and improved nutritional levels; also, it has gone hand in hand with the reduction of poverty and of vulnerability to hazards. Both actual and wanted fertility declines have been fostered by widespread family planning programmes, and paralleled by changes in fertility and cultural preferences. Indeed, the age at first marriage has shifted slightly toward older ages, the dimension of the

households has decreased, and thanks to state interventions the literacy level and the length of school attendance have increased, both among females and males. The demographic transition has gone hand in hand with a shift in the age structure, and a continuous movement towards larger portions of older population has characterised the last years.

Demographic changes have been paralleled by economic improvements and better living conditions, thanks to a greater availability of basic assets – including land – for many households, and a more widespread access to basic facilities. Both industrial and service sectors have expanded, the proportion of agricultural employment has diminished and overall households have differentiated their income sources. From a gender perspective, women have gained some autonomy, and policies have been directed at enhancing their independence and at empowering them in both private and public situations: still, a long journey has to be treaded.

Population pressure in Bangladesh has caused impressive levels of migration, both towards international and national destinations, with all the consequences these massive movements entail. Urbanisation has become one of the country's major concerns, because together with newer economic possibilities significant levels of poverty have emerged, great population density has been reached in relatively small areas, and natural resources have been degraded.

In relation to this, among the main concerns of Bangladesh environmental conditions play an important role, especially because they are worsened by climate change. Attention has been addressed to the country's already high exposure to natural calamities, and the (vicious) cycle of interactions between environmental degradation, human pressure, and poverty is possibly among the main problems the country will have to face in the future, as well as one of the issues that will most affect the outcome of next years' development.

Indeed, the interaction of all the policies implemented in Bangladesh has certainly triggered a positive trend, which has started to counterbalance the vicious cycle within which the country was trapped. The decline in population growth rates has reduced the negative consequences fast increases can have, yet still high population pressure has not helped deal with environmental depletion, nor has it reduced poverty and landlessness. At the same time, economic growth – partially stimulated by population pressure – and redistributive policies have counterbalanced the backlashes of population growth. Accordingly, steps taken to safeguard the environment and promote sustainable growth have accompanied last years' achievements, and the willingness to follow a positive trend has been expressed.

Overall, both scholars and policy-makers have acknowledged the necessity to consider demographic, social, economic and environmental issues as interrelated to one another, but continuous and greatest efforts are needed to make sure that the role of the environment in sustaining development is not neglected. Bangladesh condition requires major attention, for two opposite shifts are still possible, either towards a vicious cycle trapping people in poverty and environmental depletion, or towards gradual improvements in all fields, and most importantly in life quality.

6.2 Future Challenges

The scheme in Figure 6.1 is in no way meant to be exhaustive, nor is it aimed to give a comprehensive reading of the mechanisms underlying the developmental path of a country, or the changes in life quality people may experience during their lives. Instead, our analysis has been intended to acknowledge the complexity of such mechanisms, and to get an idea of how they have intertwined in the path toward development that Bangladesh has tread so far and on which it still is.

Theoretical interpretations here considered have been of great help to shed light on this path, and on the possibilities of interaction among

population, environment and development; they have helped interpret the case of Bangladesh, include it in a wider context, understand its specificities, and the importance of the achievements it has gathered. The case of Bangladesh is certainly among the most impressive for the changes it has been through, and its path is significant because in less than fifty years it has achieved great goals, with rapid demographic changes, increased ability to cope with natural disasters, important improvements in health, education, life conditions, gender equality, economic growth, and so on. Still, further long-lasting and substantial changes can only be obtained if the country keeps up with this pace and increases efforts to support all its population.

Did Bangladesh achieve to keep on this path and to propel an even faster virtuous circle through slower population growth, higher human capital, and increased and better-distributed wealth produced in a sustainable way, it could manage to avoid the risks posed by the vicious cycle between population pressure, environmental degradation (worsened by pollution and climate change), and the still high levels of poverty that affect Bangladesh people.

Certainly, one cannot predict what destiny Bangladeshi people will have to face, but in the light of last years' achievements greater goals can be pursued. The impressive resilience demonstrated by population against all kind of hardship suggests that obstacles can be overcome.

Premises are good for what is to come.

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Figures

Tables