THE IMPACT OF DEMOGRAPHY ON GLOBAL AND REGIONAL WATER RESOURCES

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Summary

Population growth due to high fertility rates and migration is one of the main drivers within the consumption of water resources. By explaining the finer nuances regarding demography we can come a step closer in explaining the relationship between population and global and regional water resources demand and supply. As the population of the world is increasing more water will be needed to drive the various biological and socio-economic functions in society. Water is needed not only for metabolic functioning of organisms but it is also a crucial ingredient regarding the economy of every region, state and city. The world's population has in the past, at present grown by an exceptional rate. This rate will continue in future and more so in developing states than in developed regions of the world. The distribution of the number of people on earth is also very unevenly distributed and various views on demography exist in relation to the impact it can have on the natural and socio-economic environment. More water will be needed in future in regions, states and regions within states and the supply therefore to the various parts of the world will be a major challenge for policy planners and individual citizens alike. In order to plan ahead for the future water needs of the world population growth and the other aspects surrounding it should be understood and scientists should also keep abreast of the various factors underlying the connection between population increases and water demand and supply.

1. Introduction

In the preceding topic level and article level chapters demography and its impact on

global and regional water resources were given scant reference. It is now time to discuss this phenomena and its impact on global and regional water resources in more detail. The world today is a much more crowded place than a century ago. An interesting statistic reveals that for every person alive in 1900 there were four people alive at the end of the twentieth century. This increase in the world population during the twentieth century had a large impact on individual life styles and on the demand for resources, such as water.

During the twentieth century the world became a much more crowded place, due to population increases in all the regions across the globe. For every person that lived in 1900 there were four people existing by the turn of the twentieth century. The increase in the world's population had a massive impact on the life styles of people and on the demand for resources, both natural and anthropogenic. Global and regional water resources are no exception. This chapter will look at the growth of the world's population in the past, at present and in the future. One important aspects of demography that will be discussed in the second place, is that of the distribution of the world's population. The reasons for demographic dynamics will be studied in the third place with the different views on population coming under the spotlight fourthly. The impact of population growth on global and regional water resources will be discussed in the last instance, where a number of issues like urbanization and water availability will be highlighted.

2. Population Growth: Past, Present and Future

Two million years ago, about the time when humans appeared on earth, there were a small number of these organisms. Twelve thousand years, when people started using agricultural, the estimated world population was in the region of five million. When the Christian era began 2 000 years ago, the world population stood at 250 million. During the period from 1 A.D. to the onset of the industrial revolution around 1750, the population of the world tripled to about 728 million. For the next 200 years, from 1750 to 1950, another 1.7 billion people were added to the human population of the globe. The most stunning increase in the human population on planet earth was during the last five decades, from 1950 to 2000. During this period the world's population ballooned to around 6 billion.

If we look at the percentage growth rate of the world's population from two million years ago up until 300 years ago, it grew at an annual rate of about 0.002 %, or 20 million. This growth rate was not at all steady. A number of factors contributed to the waxing and waning of the world's population, such a disease, natural disasters, and the variation of the growth rates among the different regions of the world. Nonetheless, by 1750, the growth rate had quickened by 150 times from 0.002 % to 0.3 % per annum. By the time just after the Second World War (1950s) it had accelerated again, increasing threefold to around 1 % per year. In the 1970s this pace of acceleration tapered off at 2.3 %. Currently the population growth rate of the earth's human population is about 1.5 %, which is historically still a very high rate.

If we look at the increase in population numbers from a time perspective it is startling to notice the time it took the world's population to grow to such an enormous magnitude.

Before 1650, it took about 1 400 generations, or 35 000 years, for the population to double. In less than 45 years, currently, in just over one generation, the world's population will double. Furthermore, in period from 1 A.D. to 1750 *1 750 years) 480 million people were added to the population of the earth. With current growth rates the same number of people will be added to the world's population every six years.

It is projected that the world's population will grow by about 80 million per year until the year 2025. The United Nations Population Fund (UNFPA) projects that the population on earth will be about 10 billion in 2100. Yet, one should treat population and population growth figures that go beyond the next decade with great caution. Nevertheless, whatever the exact figures of the world's population in future, there will be more people then than currently.

3. Distribution of the World's Population

The world's population is quite unevenly distributed by geographic region, by fertility and mortality rates and by age structure. More than three-quarters of the world's population in 1995 lived in developing countries and less that one-quarter in the developed Northern states. In 1990 the total population was around 5.2 billion people of which 56.7 % lived in Asia and Oceania; 12.8 % in Africa; 9.3 5 in Latin America; 9.7 % in Europe; 6.2 % in the former Soviet Union and 5.3 % in North America. By the year 2020 the projected population is expected to be 7.9 billion. It is also projected the distribution would be as follows: 58.2 % would live in Asia and Oceania; 18.5 % in Africa; 8.9 % in Latin America; 6.3 % in Europe; 4.4 % in the former Soviet Union and 3.7 % in North America.

The regional distribution of the world's population will therefore, given the current growth rates in different parts of the world, will change to a significant extent by the year 2020. For instance there will be an increase in the population of Africa and Asia and Oceania, with Latin America, Europe, the former Soviet Union and North America seeing a drop in their populations. By 2020, it is likely that there will be 6 billion people more than in 1950 and more that 2.5 billion more than in 1990. Yet, it is projected that over 60 % of the increased population will live in Asia. In this region the overall population size will have increased by 400 % since 1950. The corresponding increase in Africa and Latin America are estimated at 500 %, although the population size of Latin America would have dropped slightly. These three developing continents will possess, by 2020, more than 85 % of the world's population. This is in contrast with their 1950 and 1990 population sizes which were 70 % and 78 % respectively. The proportion of the world's population residing in Europe, the former Soviet Union and North America will have fallen from 30 % to less than 15 % of the total.

Not only is the world's population distributed unevenly across different regions of the world. There is also a discrepancy in the distribution of the world's population between individual states. The 15 largest countries, in terms of population size, in 1995 is as follows: the People's Republic of China (PRC), India, the former Soviet Union, the United States, Indonesia, Brazil, Japan, Nigeria, Bangladesh, Pakistan, Mexico, Vietnam, Philippines, Germany and Italy. Together these 15 states account for more than 70 % of the total world population. All these states are situated on all the

continents. Yet, it is striking to note that India, Indonesia, Brazil, Bangladesh, Pakistan and Nigeria add more to the world's population increase than most of the economically developed states do. Nigeria, which is ranked sixth, adds nearly twice as many people to the absolute growth of the world's population that the United States, which is in the fourth position. Also, Brazil, ranked sixth, adds more people on an annual basis than the former Soviet Union which is in the third position.

Furthermore, populations are also distributed unevenly within states. One of the most important changes in many states over the past 200 years has been the proportion of people residing in cities. In 1900 only 160 million people, one in ten of the world's population resided in cities. By the turn of the last (twentieth) century the majority of the world's population lived in urban centers. This represented a figure of almost 3 billion people. This proportion of the total world population living in urban areas, as opposed to rural regions, grew from 29 % in 1950 to over 40 % by 1985 and 50 % in 1995. It is projected that this will increase to 60 % by 2015. The fastest urban population growth rates will occur in the least developed countries (LDCs), about 5 % per annum until 2015. In 1900 two-thirds of the urban population of the world was in the developed states. Britain, for instance had the most urbanized population, three out of four lived in cities, with one in five people staying in London. However, by 1975, for the first time in human history, a majority of the world's urban population lived in developing states. The size of cities also grew. At the beginning of the twentieth century only nine states in the world had a population of more than one million people. These cities were all situated in developed states. Just 90 years later there were thirteen cities with populations of more that 10 million people and eight of them were situated in developing states.

The density of the world's population is extremely uneven. Population density varies a great deal between regions, states and regions within states. For instance, Africa is a continent which is at the same time under- and overpopulated. The average population density of sub-Saharan Africa, for example, is less than 25 people per square kilometer (km^2). This region also has a lot of potential rain-fed cropland in the humid tropics. Most of these millions of hectares of cropland is, however, uncultivated and, at the same time, underpopulated. There is, on the other hand, in conjunction with these underpopulated areas, areas of very high population density in the cities, along the coast and in the highlands. Population pressure has contributed to a large extent to the degradation of the environment in and around these areas.

Looking at the increase and distribution of the world's population it is also important to note the reasons for this increase and distribution. A complex number of reasons regarding demographic dynamics can be presented.

4. Reasons for Demographic Dynamics

What are reasons for this amazing increase in the world's population? A number of factors are responsible for this. During all of recorded history the world's population waxed and waned due to wars, famine, disease, natural disasters and a host of other elements that controlled the human population. Yet, in the twentieth century these natural and anthropogenic conditions came under more and more technological and

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Biographical Sketch

Richard Meissner received his training as a political scientist at the Rand Afrikaans University (RAU) in Johannesburg. He obtained a Magister Artium (M.A.) degree in Political Studies from the same university in 1999 and is currently busy with a D.Phil. in International Relations at the University of Pretoria (UP). He was one of the first students in South Africa to complete a Master's thesis on water politics.

He was employed by the Political Studies department at the Rand Afrikaans University from 1996 to 1998 as a research assistant. He is currently employed as a research associate by the African Water Issues Research Unit (AWIRU) which he joined in 1999. He was involved in a number of studies regarding the management of national and international water resources in Southern Africa and the Middle East. He has also written a number of articles which were published in accredited journals. His scope of interest lies within the field of water politics and particularly the interaction of diverse actors within the domestic and international domains regarding water resource issues. Richard Meissner is a member of the South African Political Studies Association and the South African Institute of International Affairs.