Course: Population Education-I (6573)
Semester: Autumn, 2021

ASSIGNMENT No. 1

Q.1 What do you understand by the term population education? Discuss various approaches and strategies being used in the population education.

There are two sources of data in Statistics. Statistical sources refer to data that are collected for some official purposes and include censuses and officially conducted surveys. Non-statistical sources refer to the data that are collected for other administrative purposes or for the private sector.

Statistical Survey

A statistical Survey is normally conducted using a sample. It is also called Sample Survey. It is the method of collecting sample data and analyzing it using statistical methods. This is done to make estimations about population characteristics. The advantage is that it gives you full control over the data. Y

ou can ask questions suited to the study you are carrying out. But, the disadvantage is that there is a chance of sample error creeping up. This is because a sample is chosen and the entire population is not studied. Leaving out some units of the population while choosing the sample causes this error to arise.

Census

Opposite to a sample survey, a census is based on all items of the population and then data are analyzed. Data collection happens for a specific reference period. For example, the Census of India is conducted every 10 years. Other censuses are conducted roughly every 5-10 years. Data is collected using questionnaires that may be mailed to the respondents.

Responses can also be collected over other modes of communication like the telephone. An advantage is that even the most remote of the units of the population get included in the census method. The major disadvantage lies in the high cost of data collection and that it is a time-consuming process.

Register

Registers are basically storehouses of statistical information from which data can be collected and analysis can be made. Registers tend to be detailed and extensive. It is beneficial to use data from here as it is reliable. Two or more registers can be linked together based on common information for even more relevant data collection.

From agriculture to business, all industries maintain registers for record-keeping. Some administrative registers also serve the purpose of acting as a repository of data for other statistical bodies in a country.

Types of Data and Data Collection

Like stated earlier, there are two types of data: primary and secondary.

Primary data

As the name suggests, are first-hand information collected by the surveyor. The data so collected are pure and original and collected for a specific purpose. They have never undergone any statistical treatment before. The collected data may be published as well. The Census is an example of primary data.

Methods of primary data collection:

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1. Personal investigation: The surveyor collects the data himself/herself. The data so collected is reliable but is suited for small projects.
2. Collection via Investigators: Trained investigators are employed to contact the respondents to collect data.
3. Questionnaires: Questionnaires may be used to ask specific questions that suit the study and get responses from the respondents. These questionnaires may be mailed as well.
4. Telephonic Investigation: The collection of data is done through asking questions over the telephone.to give quick and accurate information.

Secondary data

Secondary data are opposite to primary data. They are collected and published already (by some organization, for instance). They can be used as a source of data and used by surveyors to collect data from and conduct the analysis. Secondary data are impure in the sense that they have undergone statistical treatment at least once.

Methods of secondary data collection:

1. Official publications such as the Ministry of Finance, Statistical Departments of the government, Federal Bureaus, Agricultural Statistical boards, etc. Semi-official sources include State Bank, Boards of Economic Enquiry, etc.
2. Data published by Chambers of Commerce and trade associations and boards.
3. Articles in the newspaper, from journals and technical publications.

There are three commonly used qualitative data collection methods: ethnographic, theory grounded, and phenomenological.

Ethnography comes from anthropology, the study of human societies and cultures. Ethnography seeks to understand how people live their lives. Through this method, researchers veer away from the specific and practical questions that traditional market researcher's use and instead observe the participants in a non-directed way. This approach is intended to reveal behaviors from a subject's perspective rather than from the view of the researchers.

Ethnography helps fill in the blanks when a participant may not be able to articulate their desires or the reasons for their decisions or behaviors. Instead of, or in addition to, asking why a participant acts a certain way, researchers use observation to understand the why behind these desires, decisions, or behaviors.

Grounded theory arose when sociological researchers sought to provide a level of legitimacy to qualitative research — to ground it in reality rather than assumptions. Before this method, qualitative data analysis was actually done before any quantitative data was collected, so it was disconnected from the collection and analysis process.

Grounded theory uses the following methods:

- Participant observation. Researchers immerse themselves in the daily lives of subjects. Another term for this is "fieldwork."
- Interviews. These can vary in formality from informal chats to structured interviews.

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- Document and artifact collection. Grounded theory often is about more than observation and interviews. Researchers can learn about a group of people from looking at materials the group used. For example, a local community's laws may shed light on opinions and provide a clearer picture of residents' sentiments.

Sometimes, a person's true colors emerge only when they are genuinely put to the test. As such, phenomenology describes how people experience certain events or unique encounters. This method measures reactions to occurrences that are outside of the norm, so it's essential to understand the whole picture, not just facts and figures.

An example of phenomenology is studying the experiences of individuals involved in a natural disaster. To analyze data from such an event, the researcher must become familiar with the data; focus the analysis on the subject matter, time period, or other factors; and categorize the data.

Completing these tasks gives the researcher a framework for understanding how the natural disaster impacts people. Together, the understanding, focus, and organization help researchers identify patterns, make connections, interpret data, and explain findings.

Each of these qualitative data collection methods sheds light on factors that can be hidden in simple data analysis. Qualitative data is one way to add context and reality to raw numbers. Often, researchers find value in a hybrid approach, where qualitative data collection methods are used alongside quantitative ones.

Q.2 Discuss the basic concepts and area of population studies with examples.

One of the greatest challenges facing our students at the end of the century rarely finds its way into newspaper headlines or the public consciousness. Instead, we discuss the symptoms of this problem-global poverty, urban and suburban growth, migration pressures, environmental degradation, civil strife, and social inequality. Meanwhile, a silent but steady explosion is forever altering the world around us, threatening both the health of the planet and the quality of life for all its inhabitants. This explosion is not fueled by dynamite or nuclear bombs, but by us-humans. Sound alarmist? Consider that in the time it takes you to read this sentence, our finite Earth is becoming home to 18 more members of our global family. That translates into 250,000 more people every day, and nearly 90 million more people each year (about the size of Mexico's population). At our current rate of growth (1.5 percent) our global population of 5.8 billion would double to nearly 12 billion in just 46 years. In preparing our students to meet the challenges of the twenty-first century, population education needs to be an integral part of the social studies curriculum.

When the British economist Thomas Malthus cautioned the world about the threat of population growth during the late eighteenth century, fewer than one billion people inhabited the Earth, and few could have foreseen the exponential growth of the population that would mark the next 200 years. With the advent of the Industrial Revolution, death rates began to fall as advances in medicine, sanitation, nutrition and agricultural technology increased life expectancy. Birth rates have gradually dropped in the rapidly industrializing Northern hemisphere, remaining higher in the developing countries of the South, especially those with agriculturally-

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based economies. Many of us remember hearing about the "population explosion" nearly 30 years ago when Dr. Paul Ehrlich, a Stanford biologist, drew attention to the issue with his bestseller, The Population Bomb. Ehrlich warned of the dire consequences to our ecosystems and human survival if the population of 3.5 billion continued to grow unchecked. Since that time, the human population has increased by 40 percent and many of our planet's life-support systems are feeling the squeeze.

The size of the human population affects virtually every environmental condition facing our planet. As our population grows, the demand for natural resources increases, adding to competition, pollution and waste. More energy is used, escalating the problems of climate change, acid rain, oil spills and nuclear disposal. More land is required for agriculture, leading to deforestation and soil erosion. More homes, factories, and roads must be built, occupying the habitat of other species and leading to their extinction. Simply put, the more people inhabiting our finite planet, the greater the stress on its resources.

When people do consider the population issue, they usually focus on the world's largest countries, China and India. Because most of the population increase today (over 90 percent) occurs in developing countries, many Americans feel that they neither contribute to nor are affected by the problem. In fact, the United States ranks as the third most populous and the fastest growing industrialized country, adding 2.6 million people each year. That's the equivalent of adding another city the size of Houston annually. While a third of this increase is due to immigration, most U.S. population growth results from having one of the highest birth rates among industrialized countries. Births to teenage mothers alone total a half million each year.

The real issue in charting our future, though, is not just the number of people in the United States or in the world, but the impact we together exert on our environment. Two critical factors in determining this impact are the amount of resources consumed by the average person, and the environmental damage caused in the process of manufacturing the goods consumed. Dr. Ehrlich, still educating the public about population issues, sums it up in the following formula: I = PAT, where I = Impact; P = Population; A = Affluence (Consumption); and T = Technology (Ehrlich 1990). When approached this way, it becomes clear that the responsibility for global environmental impacts is shared by the rapidly growing developing countries and the rapidly consuming industrialized nations.

Though modest compared with many developing nations, population growth in the United States-coupled with our affluent lifestyle-places a disproportionate demand on the world's resources. Our five percent of the world's population is responsible for 30 percent of the world's annual energy consumption, including 25 percent of fossil fuels. On average, one American consumes as much energy as 2 Japanese, 6 Mexicans, 13 Chinese, 31 Indians, 128 Bangladeshis or 370 Ethiopians! (Census Bureau, 1994). Industrialized countries comprise one-fifth of the world's population, yet consume 86 percent of the world's aluminum, 81 percent of its paper, 80 percent of its iron and steel, and 76 percent of its timber (Brown 1995). Evidence of U.S. population growth surrounds us-intensifying traffic congestion, disappearing wetlands and forests to make room for subdivisions and strip malls, and landfills too full to handle the mounting garbage and hazardous waste that Americans create

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daily. In the last 200 years, the United States has lost 71 percent of its topsoil, 50 percent of its wetlands, 90 percent of its old-growth forests, 99 percent of its tall grass prairie, and up to 490 species of native plants and animals with another 9,000 now at risk (WRI 1993). We are currently developing rural land at the rate of nine square miles per day, and paving 1.3 million acres each year-an area roughly equal in size to the state of Delaware. Many attribute these problems solely to wasteful habits and poor planning. Even so, the increasing number of people exercising these habits only serves to compound the problems. Efforts to relieve environmental stress by cutting consumption would be undermined, if not negated, by either continued population growth or stabilization at a size larger than our resources can sustain.

Population Questions in the Classroom

If education is meant to prepare young people for their future, then population education must be a part of it. Young people are very interested in protecting the environment. They have taken the lead in many schools with projects on recycling, energy conservation, and rainforest and endangered species protection. It is vitally important for young Americans to learn how population, resources and the environment are interrelated, and to realize that their personal decisions will affect everyone's quality of life. With a third of the world's population entering their reproductive years this decade, young people personal choices will determine whether or when the population stabilizes and how rapidly natural resources are consumed. World leaders agree. The Programme of Action adopted by 170 global delegates at the U.N. International Conference on Population and Development (ICPD) in Cairo, Egypt in 1994 recommended that all nations adopt population education programs. While population studies cut across disciplines, they are most closely tied to the social studies curriculum, where they are integral to the study of world and U.S. history, geography, global studies, anthropology and economics in grades K through 12. In the new National Geography Standards, for example, population plays an important role in each of the six essential elements, especially the guidelines for teaching Human Systems and Environment and Society. These standards expressly encourage students to understand "the relationships between population growth, urbanization and the resultant stress on physical systems" (GESP 1994). Within the NCSS Curriculum Standards for Social Studies, population studies is a component of many of the ten themes, most notably, 3People, Places and Environment; 8Science, Technology and Society; and 9Global Connections.

Even though many educators have recognized the need to include population education in the social studies curriculum, they often have difficulty finding textbooks that provide adequate information on population trends and the resulting social and environmental impacts. In a follow-up survey of more than 2,000 educators who attended training workshops offered by Zero Population Growth (ZPG) in 1995, 29 percent cited "lack of background on population issues" as a key obstacle to teaching about population issues. In the same survey, 82 percent of respondents felt the textbooks they used did not cover population topics adequately (ZPG 1996). This may be the single greatest barrier to population education, for it has been estimated that more than 90 percent of curriculum is textbook based.

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A comprehensive treatment of population issues in the social studies classroom would include an explanation of past and present global demographic trends, and how these trends are connected to social factors such as the status of women, religious beliefs and cultural traditions. There should also be discussion of the economic, environmental and public health impacts of population change. Future projections and a range of proposed solutions to gloomy forecasts could also be presented. These solutions include universal access to education, comprehensive health services, the information and means to plan families, and strategies for reducing resource consumption and preserving ecosystems.

Ideally, population issues should be team-taught with colleagues in life science/biology, mathematics, and even family life education. Life science and biology courses generally cover population dynamics and ecological interrelationships. Math courses may offer problems based on real-world population and environmental data. Health and family life classes often stress individual decision making related to childbearing, and the effects of personal decisions on one's own life and the lives of other people.

The following principles can guide effective population education:

- Make the abstract concrete by using hands-on activities that get students actively involved in the learning process. Simulations, games and group problem-solving and decision-making exercises are excellent techniques for population education.
- Encourage students to express and consider different points of view in the classroom. Discussing complex population and environmental issues can help students think them through and come to their own conclusions.
- Make it clear that everyone can do something about population and environmental problems, even though these problems are great. Discuss concrete individual actions that, cumulatively, can lead to change.
- Teachers probably fear community resistance to population education much more than they actually experience it. In practice, population education is not controversial when it is offered in a context relevant to existing curriculum objectives, with facts and figures and differing viewpoints considered.

Q.3 What are the implication of family life education? Discuss in details socio-cultural changes as a result of over population in Pakistan.

Family Life Education is the professional practice of equipping and empowering family members to develop knowledge and skills that enhance well-being and strengthen interpersonal relationships through an educational, preventive, and strengths-based approach.

The skills and knowledge needed for healthy family functioning are widely known:

- strong communication skills
- knowledge of typical human development
- good decision-making skills, positive self-esteem
- healthy interpersonal relationships

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The goal of Family Life Education (abbreviated FLE) is to teach these skill and knowledge areas to family members across the lifespan, and foster positive individual and family development so families can function optimally.

Family Life Educators have knowledge based in the discipline of **Family Science,** and they **are employed** in a variety of settings and roles. They consider societal issues — economics, education, work-family issues, parenting, sexuality, gender, and more — within the context of the family. They believe that societal problems like substance abuse, domestic violence, unemployment, debt, and child abuse can be more effectively addressed from a perspective that considers individuals and families as part of larger systems.

Family Life Educators empower families themselves to apply knowledge about healthy family functioning to prevent or minimize problems.

Preparing individuals and families for the roles and responsibilities of family living is nothing new. Because knowledge about human development, interpersonal relationships, and family living is not innate, societies have needed to develop ways through which they may transmit the wisdom and the experience of family living from one generation to succeeding ones. Some societies transmit this knowledge through formal means such as puberty or initiation rites. For the most part, however, individuals learn about family living in the family setting itself as they observe and participate in family activities and interactions in their own and other families.

As societies change and become more complex, this pattern of informal learning about living in families becomes inadequate. The development of new knowledge, advances in technology, and changing social and economic conditions create situations where the teachings of previous generations are no longer appropriate or sufficient. In these circumstances, societies must find or create new ways to prepare individuals for their family roles and responsibilities. One of these new ways is family life education.

In North America, family life education developed as an educational specialty around the turn of the twentieth century in response to the changing social conditions of the time (Lewis-Rowley et al. 1993). Changes such as urbanization, industrialization, and the changing roles of women commonly resulted in family and societal difficulties, including increased parent-child strife, juvenile delinquency, shifts in marital roles, and an increased divorce rate. Families were inadequately prepared to deal with these changes, and the founders of family life education believed that providing educational programs in family life education would help to ameliorate or reduce these and other family-related social problems and thus improve family living and social well-being.

By the end of the twentieth century, the family life education movement in North America had experienced considerable growth in the number and kinds of programs available and in the scholarship underlying these programs (Arcus 1995). These developments were not unique to North America, however, as other countries throughout the world have sought ways to help families deal with social and economic changes. Some examples of international family life education initiatives include the Marriage Encounter movement, founded in Spain but present in other countries; the International Family Life Education Institute, Taiwan; Marriage Care

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(formerly Catholic Marriage Guidance), United Kingdom; the Australian Family Life Institute; and family planning and sexuality education programs throughout the world. The United Nations named 1994 as the International Year of the Family, further attesting to the importance of providing support for families globally.

The purpose of family life education is to strengthen and enrich individual and family wellbeing (Thomas and Arcus 1992). Major objectives include (1) gaining insight into one's self and others; (2) acquiring knowledge about human development and behavior in the family setting over the life course; (3) understanding marital and family patterns and processes; (4) acquiring interpersonal skills for present and future family roles; and (5) building strengths in individuals and families (Arcus and Thomas 1993). It is assumed that if these and other similar objectives are met through family life education, then families will be better able to deal with or prevent problems and will be empowered to live their family lives in ways that are both personally satisfying and socially responsible. Family life education programs are preventative, intended to equip individuals for their family roles rather than to repair family dysfunction.

The Framework for Family Life Education, developed under the auspices of the National Council on Family Relations, specifies nine broad content areas deemed essential for family life education: families in society; internal dynamics of families; human growth and development; human sexuality; interpersonal relationships; family resource management; parent education and guidance; family law and public policy; and ethics (Bredehoft 1997). The Framework lists the most important knowledge, attitudes, and skills relevant to each area, with the focus and complexity differing for people of different ages (children, adolescents, adults, and older adults). Key processes of communication, decision making, and problem solving are incorporated into each area. Other terms sometimes used to describe the same general content include sex education, human relations education, personal development, and life skills education.

Q.4 Explain the trends of population in South Asia. What suggestions would you propose for inter and intra coordination to address the population problem?

Until the time of Napoleon, there were less than 1 billion people on Earth at any one time. Since the Second World War, we have been adding a billion people to the global population every 12-15 years. Our population is more than double today what it was in 1970.

Every two years, the United Nations makes projections for future population growth. Its latest median projection is a population of **9.7bn in 2050** and **10.9bn in 2100**. Because many factors affect population growth, it makes a range of projections depending on different assumptions. Within its 95% certainty range, the difference in population in 2100 from the highest to lowest projection is almost 4bn people - more than half the population we have today.

The second graph above shows the UN's projected population if, on average, every other family had one fewer child or one more child than in the median projection ('minus half a child' or 'plus half a child' per family).

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This shows the enormous difference in total numbers that arise from just very small variations in family size. If we can achieve that modest reduction in number of children born, we will have more than 3bn people fewer by 2100 - a lower population than we have today.

- Nine countries will make up over half the projected total population increase by 2050: India, Nigeria, Pakistan, the Democratic Republic of the Congo, Ethiopia, Tanzania, Indonesia, Egypt and USA.
- Around 2027, India is expected to overtake China as the world's most populous country.
- 55 countries are projected to experience a population reduction by 2050. China's population, for example, is projected to decrease by 2.2% or 31.4 million.
- Rapid population growth and its causes continue to pose a major impediment to achieving the Sustainable Development Goals, in particular eradicating hunger and poverty, achieving gender equality, and improving health and education.

More than half of the people added to the world's population over the rest of the century will be in sub-Saharan Africa. Although it is falling, fertility rate (the average number of children per woman) remains high in most African countries (see 'Bringing Down Fertility' below for why). Due to its high fertility rate, sub-Saharan Africa has a very young population - 60% of the population is less than 25 years old. That means that many people are entering their childbearing years. Thanks to improvements in access to health care, life expectancy is increasing and child mortality is declining, meaning there are now more generations alive at the same time.

These figures regarding populations of different continents and countries include assumptions about future migration, but are necessarily very speculative. Climate change, poverty and population pressures themselves will lead to a highly mobile global population, with Africa likely to be the largest source of emigrants.

It is important to remember when looking at all these figures that while population growth is highest in the Global South, and relatively low in most parts of the Global North, consumption, resource use and carbon emissions are far greater in the richest parts of the world. That means that the global environmental impact of each individual in wealthy countries is far higher than in poor countries: the size of families and the overall population matter there too.

'Total fertility rate' - broadly speaking, the number of children a woman is likely to have in her lifetime - gives an indication of how family size is changing. A TFR of 2.1 is the "replacement rate" - a population with that TFR will eventually stabilise.

- Globally, the current average TFR is 2.5.
- TFR is highest in sub-Saharan Africa, at 4.6.
- Almost half of all people now live in a country or area where TFR is below the replacement rate.
- Fertility rates are expected to fall worldwide, to the point where no country is expected to have fertility of more than five births per woman by 2050.

Populations are also affected by death rates, net migration and the proportion of people of childbearing age. Populations of countries with fertility rates below replacement level often continue to experience natural

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increase (births minus deaths) for some time. In particular, where birth rates have recently been high, when the babies born in that period reach childbearing age they increase the number of families, even though the size of their families is smaller than in the previous generation. This is called 'demographic momentum' and means that the impact of changes in fertility normally take many decades to be reflected in population.

Many countries with less than replacement rate are also growing in large part due to net migration. When immigration is greater than emigration, this increases numbers of people directly but it can also increase the birth rate. This is usually because migrants tend to be younger people of working age so are more likely to have children than the existing population, and because in some cases, they come from countries or cultures with traditionally higher fertility rates and family sizes.

Fertility rates decrease rapidly when women are empowered, when children (especially girls) stay in education for longer, when countries become more affluent, and, crucially, when people can use modern contraception.

More than 200 million women in developing countries currently have an unmet need for family planning, meaning they do not want to get pregnant but are not using moden contraceptive methods. Research published by the Guttmacher Institute shows that this is often because they are unable to access family planning but more commonly because of concerns about side effects and misinformation, and, in nearly a quarter of cases, because their male partners or others close to them oppose contraceptive use. Contraception provision must be accompanied by education, support and female emancipation to be effective.

Another important factor in uptake of contraception is desired family size. Religious, cultural and social influences all play a part in that, as do economic and political factors. Where people cannot rely on the state to support them, they tend to have larger families to ensure they have children who can support them. Where child mortality is still high, people also seek to have more children. The "value" of women and girls may also be judged by the number of children they have (not just in places where women are not empowered) and traditions valuing larger families are often internalised. Effective family planning programmes, such as that in Thailand, have also addressed desired family size.

Q.5 Describe the important features of different courses of population explosion in South Asian countries.

Through the nineteenth and the first half of the twentieth century, intellectuals were roughly divided between the followers of Malthus and the followers of Marx. Crudely stated, Malthusians believed that high rates of population growth condemned societies to more or less permanent states of underdevelopment and that only by breaking the iron linkage of high fertility to poverty could real improvements in standards of living be achieved. Marx, on the other hand, argued that high fertility was a symptom, not a cause, of poverty and said that only by bringing about a radical transformation in the underlying causes of poverty would living standards rise and birth rates begin to fall.

In the modern era, which is to say since World War II, there have been three broad stages of economic thinking on the relationship between rapid population growth and economic performance. In the first stage, which

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followed the post war discovery by demographers of extremely rapidly expanding populations in many parts of the developing world, the work of scholars such as Coale & Hoover (1958), Myrdal (1968) and Enke (1970) came to be widely accepted. It was decidedly neo-Malthusian, arguing that only by bringing rapid population growth under control could countries hope to achieve improved economic performance and high standards of living. While this work hardly represented a consensus among development economists, it did capture the imagination of policymakers, particularly in the richer countries, and contributed to the formation of the modern 'population movement' as we have known it since the 1960s. This movement took as a given fact that rapid population growth harmed the prospects for development and that strong policies to reduce population growth rates were an essential precondition of sustained economic development (National Academy of Sciences 1971).

The second stage, which can be dated from around 1986, was what economist Kelley called the 'revisionist' period (Kelley 1986). The emblematic work of that period was the 1986 US National Research Council (NRC) publication, 'Population growth and economic development: policy questions'. The work of an expert committee, the 1986 NRC report, concluded that as one of its authors, Birdsall (1988) put it, 'rapid population growth can slow development, but only under specific circumstances and generally with limited or weak effects'. This was a return to mainstream neo-classical economics, which had always viewed Malthus's views as one-dimensional and simplistic, and which generally expressed skepticism about the strength of the relationship between high fertility and economic growth.

In an important sense, the NRC report broke the back of the population movement and ushered in a period of uncertainty about the priority that should be given to population policies, as well as about what the content of policy should be. It is fair to say that the NRC report fits nicely with the ideological predispositions of the Reagan Administration in the USA, which in 1984 had announced at the International Conference on Population at Mexico City that 'population growth is in and of itself neither good nor bad; it is a neutral phenomenon'.[1]

The NRC report also reinforced the views of feminist and human rights critics of the population policies of the 1960s–1980s who successfully lobbied for wholesale changes in orientation away from population control and towards a rights-based approach, culminating in the reproductive health and rights agenda that emerged from the International Conference on Population and Development at Cairo in 1994 (Singh 1998).

An important conclusion to be drawn from the history recounted thus far is that the views of economists matter a great deal. Indeed, notwithstanding Robert McNamara's deep commitment to population stabilization and his personal efforts to promote population policies during his presidency of the World Bank, the Bank's cadre of professional economists has for years succeeded in keeping population at a relatively low priority in terms of bank lending operations. More often than not, the macroeconomic and sector analytic work of the Bank pays scant attention to population dynamics, even in such chronically high fertility regions as Sub-Saharan Africa.

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This brings us to the third, and current, stage of economic thinking on population and economic development. A new group of development economists decided to look at the impact, not only of reducing population growth rates, but also of changing age structures on economic outcomes (Bloom & Canning 2006). They reasoned that rapidly declining fertility is accompanied by changes in the ratio between the economically active population and dependent population. As fertility falls, a larger proportion of the population is in the age range 15–65, compared with the under 15 and over 65 categories. This one-time 'demographic bonus' ought to be associated with increased economic output at the same time that social services requirements for those not yet economically active (e.g. for education and health care) decline. Thus, assuming countries also pursue sensible pro-growth economic policies, the demographic bonus ought to translate into a jump in income per capita. Applying the model to the Asian Tigers (Korea, Singapore, Taiwan and Thailand), these economists found that the data fit the model extremely well. Countries that incorporated strong and effective population policies within the broader context of social and economic development policies were able to cash in very profitably on the demographic bonus. So, by looking at a changing age structure in addition to declining fertility, economists were now able to discern a highly plausible causal connection between demographic change and economic growth—a connection that was much more difficult to see in the less sophisticated analysis of the 1986 NRC study and the prior revisionist research on which it reported (Merrick 2001; Greene & Merrick 2005).

One might expect that economists interested in examining the impact of fertility on household income would pay more attention to the micro-level than to the macro-level, but this is not the case. Much more research has been conducted at the macro-level than at the micro-level, probably because of the greater availability of appropriate datasets. The truth is, that only detailed household panel surveys or randomized interventions (or actual or natural experiments) are adequate to accurately estimate the impact of fertility at one point in time on household income at subsequent points. Such datasets are comparatively rare because of the time and expense required to construct them. In the absence of longitudinal household information, it is nearly impossible to address the issue of what economists call the 'endogeneity of fertility problem' and thus the direction of causality: does poverty reinforce high fertility or does high fertility lead to poverty?

Fortunately, in just the last few years, datasets have become available (or have been discovered by economists) that permit sophisticated micro studies of the fertility–poverty relationship (Merrick 2001). One of these is the Indonesian Family Life Survey, a panel study that covered several years and that permitted investigators to look at the effect of changes in desired and actual fertility at one point in time on subsequent household poverty. Canning & Schofield (2007) found that over a three-year period, one birth on average reduced the likelihood of female labour force participation by 20 per cent. This decline in women's contribution to household income, in turn, reduced expenditure per capita in the household, pushing a significant number of families into poverty and preventing the escape of a significant number from poverty.

One of the economists who has been most demanding of a solid evidence base for conclusions about the effect of fertility on economic development or poverty is T. Paul Schultz. Schultz, while willing to stipulate the

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plausibility that high fertility acts as a barrier to economic growth and poverty reduction, has nonetheless for many years remained skeptical that the relationship is as strong or as stable as many neo-Malthusians assert it to be. Recently, however, Joshi & Schultz (2007) conducted a study, 'Family planning as an investment in development: evaluation of a program's consequences in Matlab, Bangladesh', using data from the famous Matlab family planning quasi-experiments of 1974–1996 and the associated surveillance system. Schultz and Joshi found that in the 'programme', villages and individual households fertility declined by some 15 per cent more than in the 'control' villages. They then looked at the impact of that decline 'on a series of long run family welfare outcomes: women's health, earnings and household assets, use of preventive health inputs, and finally the inter-generational effects on the health and schooling of the woman's children. Within two decades many of these indicators of the welfare of women and their children improve significantly in conjunction with the programme induced decline in fertility and child mortality. This suggests social returns to this reproductive health programme in rural South Asia have many facets beyond fertility reduction, which do not appear to dissipate over two decades'.

The question of whether or not high fertility leads to, or exacerbates, poverty and whether this in itself should be grounds for policy interventions ultimately revolves around the question of parental intentions with respect to childbearing. If parents perceive children as good in and of themselves and are willing to forego other forms of consumption for the sake of having a large number of children, most economists would argue it is hard to make the case that they should be urged to have fewer of them. If, on the other hand, many of the children very poor parents are bearing are the result of unintended pregnancies, the case for public policies to assist them in having fewer would seem to be stronger.

Thanks to the remarkable series of surveys that began with the World Fertility Survey in the 1970s and continues to this day as the Demographic and Health Surveys programme, we know a great deal about fertility intentions in a large number of countries around the world, and the inescapable conclusion is that a significant proportion of births in developing countries are the result of unintended pregnancies. For example, an estimate by the Global Health Council in 2002 revealed that roughly one-quarter of the 1.2 billion pregnancies that occurred in the developing world between 1995 and 2000—some 300 million—were unintended (Daulaire et al. 2002). Since these estimates are the result of ex-post surveys of the women who had the pregnancies, many of whom may have changed their minds about the 'wantedness' of the pregnancies after they realized they were pregnant, it is quite likely that estimates of the number of unwanted pregnancies in fact understate reality. The ever rising numbers of abortions and of maternal deaths that result from abortion are additional evidence of the incidence of unwanted pregnancy around the world.

It seems justified to conclude that the burden of evidence from micro-analysis is that high fertility reinforces poverty and makes an escape from poverty more difficult. As Birdsall et al. (2001) conclude in their overview chapter in Population matters: demographic change, economic growth and poverty in the developing world, ' … the essays in this volume do point to a conclusion which links concern about population growth and change

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more directly to concern about the welfare of millions of people in the developing world. In their entirety, they put together a newly compelling set of arguments and evidence indicating that high fertility exacerbates poverty or, better put, that high fertility makes poverty reduction more difficult and less likely'.

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