

**DIVERSITY AND HISTORICAL
PROCESSES IN HUMAN
DEVELOPMENT:
THE DECLINE OF RATIONALITY**

Ismail Sirageldin

Working Paper 0204

The ERF Working Paper Series disseminates the findings of research working progress to promote the exchange of ideas and encourage discussion and comment among researchers for timely revision by the authors.

The Working Papers are intended to make preliminary research results available with the least possible delay. They have therefore not been made subject to formal review and ERF accepts no responsibility for errors.

The views expressed in the Working Papers are those of the author(s). Unless otherwise stated, copyright is held by the author(s). Requests for permission to quote their contents should be addressed directly to author(s).

As of August 1998, financial support towards the ERF Working Papers Series from the Commission of the European Communities (through the FEMISE Program) is gratefully acknowledged. The views expressed in the Working Papers are those of the authors and do not necessarily reflect the views of the European Commission.

Abstract

The paper is divided into two parts: conceptual and factual. A conceptual review of the historical processes that led to the present state of human diversities and differentiations has not been optimistic. Technological changes, especially those associated with the industrial revolution that started three centuries ago, promote new knowledge and technological achievements that enhanced material progress and human development for large segments of the world populations. It also introduced severe socioeconomic inequalities and poverty to major population groups and regions. Scientific and technological developments also introduced new views of nature that, in many cases deepened inequalities and diversities. For the majority of humanity, the central challenge remains unanswered: namely, how to reach a sustainable level of development? For more than three decades, the development establishment has been occupied in efforts and programs around the world to enhance human capabilities, opportunities and the overall quality of life. Yet, views and paradigms about development processes and strategies have changed little, if any, even while the world system and its political and technological bases have changed dramatically. Without a global value system, the fate of the majority of humanity will be relegated to persistent poverty and lack of freedoms, the essay concludes.

1. Introduction

“The present, for all its awesome importance to us who chanced to dwell in it, is only a random point in the long flow of time.”(p.13). “This extraordinary fact, that none of the basic types has become extinct bothered Sigmund Freud, who could not see why all ancient forms have not yielded to a death wish, and it has bothered some others who feel that progressive evolution should imply constant replacement of all lower forms of life by higher.” (p. 19).[George Gaylord Simpson 1949]

The evaluation of prospects and challenges for human development in the 21st Century requires an assessment of the human capacity to adapt to fast changing technologies, increasing private and public risks of exogenous shocks and mounting environmental constraints. Meanwhile, the evolving environment of population growth and scarcity requires the ability of human societies to set common goals to preserve the global 'commons' accept diversity and cooperate as a global family. The question is whether the emerging global society is distancing itself from the mechanisms of the pre-symbolic age of the organic evolution, at which time conflict and dispute resolution were brought about through irrational force and violence, and moving towards the means of the symbolic cultural evolution, based on reason and rationality—guided by a globally recognized Rule of Law and the ideal of Isonomy? The question is fundamental, since in its root is the presence of a dominant culture that rejects diversity and has a teleological view of historical processes. But progress is impossible without change based on assessing the shortcomings of the present in terms of past circumstances, and change is impossible without variation. We can therefore expect neither biological nor social progress unless we tolerate human differences both in physical type and in personal and social ideas.

There is no clear answer to this fundamental question. Part of the difficulty, aside from the search for an acceptable definition of the term progress, is the presence of socioeconomic differentials in capabilities and resource endowments. These differentials are the outcomes of technological developments, changing views of nature, and social processes in the evolution of human societies. There is, in the present context, a difference between differentiation and diversity. The latter evolves more slowly and naturally in the course of the adaptive processes of the organic evolution, and not necessarily a result of human design. On the other hand, human nature seems to have acquired a tendency for classification, inherited from Aristotle—partly transformed by Plato’s concept of *eides*¹—that has the potential to convert a natural and apparently neutral process such as

diversity, into a value-laden process of differentiation with negative socio-political consequences.

The remainder of the present essay is divided into two main parts: conceptual and applied. In part 2, we examine the roots of diversity and speculate as to how supportive the evolving global value system is to human development in the 21st Century? First, the contrast between the optimists’ and pessimists’ views is presented. This is followed by stress on the danger of teleological explanations, especially when used as a guide to socio-political policies. The role of knowledge and technological development is then examined. For many centuries, science has been the main engine of growth and development. Those who know more have better use of resources, better chances for survival and development, and, more essentially, more control on the destiny of others with less knowledge. Although the latter have the potential to join and contribute to scientific development. But scientific development introduces new views about nature that historically sanctioned injustices. Without a global value system, the fate of the majority of humanity will be relegated to persistent poverty and lack of freedoms.

Meanwhile, the world is changing rapidly in scientific development and material substance—changes that influence and, in turn are influenced by the prevailing view of nature and the associated value system. It took from the dawn of history to the beginning of the twentieth century for the world economy to grow to \$600 billion. Now it increases by more than that in less than two years and the basic forces of this material growth are advances in scientific knowledge, population growth, technological innovations, institutional development, and other factors including questions of equity and sustainable natural resources, that impact welfare outcomes. This accelerating material growth has not been without ecological and welfare cost, especially in increased differentiation and inequality among individuals and groups. There are three basic processes that are related to these mixed and tangible outcomes: demographic developments, diversity in resource endowments, and the distribution of income and capabilities.

In Part 3, the discussion moves from the conceptual analysis of diversity and historical processes to their tangible impact on the present status of humanity. First, the role of population dynamics and the distribution of capabilities in human development is examined. There are at least three reasons for this initial focus. The first is that population change is not independent on historical and evolutionary processes. Present diversities in demographic structures tend to reflect socioeconomic and political differentiation. Second, the consequences of population growth, age structure and spatial movement play a pivotal role in development by shaping the fate of natural resource endowments, and development prospects, directly and indirectly through externalities that radiate to regional and global levels. The third is that initial resource endowment and the

¹ *Eides* refers to Plato’s famous cave allegory according to which reality is only seen indirectly. The real nature of things—its essence is never revealed directly, accordingly the *essentialism* view of nature. When combined with Aristotle’s classifications, a system of taxonomy tends to become part of the view of nature.

processes of development and their outcomes, in turn, shape these population structures. These three, mutually constitutive dynamics generate the forces leading to resource scarcity and differentiation in capabilities and life chances, yet, if clearly understood, also point to their potential solutions. This is followed by a brief discussion of diversity and sustainability of resource endowments, exemplified by the case of water and food. The essay ends with brief remarks about the future of human development in the 21st Century.

2. Historical Roots of Diversity²

The question as to whether the emerging global society is moving towards reason and rationality, guided by a globally recognized Rule of Law and the Ideal of Isonomy is a debatable question with optimists and pessimists providing answers that lie on opposite poles of the spectrum. It is instructive to observe that the present phase of human evolution is guided by the interaction of two types of evolutions, not necessarily in harmony either in mechanism or in direction: organic and social evolutions. Organic evolution, also labeled biological or materialistic, rejects acquired characters in inheritance as part of its adaptive mechanism. Its adaptation depends basically on orienting the essentially random, non-environmental interplay of genetical systems. It is limited in its spread in both space and time because of its inflexible system of proximity and the necessity of continuity. However, we should observe, as many biologists and evolutionists have informed, that, like human laws, the “Laws” of evolution are not divine and are often broken or even reversed. Indeed, they are human constructions which science impose as a theoretical premise on the complex phenomena of nature and which nature is under no obligation to follow. It is known that, in his analysis, Darwin emphasized the role of both chance and design in the adaptation processes: the variability of the gene pools is subject to chance, while the molding of these highly variable gene pools is the product of natural selection. As Mayr (1997: 43) put it: “the solution of Darwin’s paradox is that natural selection itself turns accidents into design.” Evolutionary biology does not possess the theoretical framework of physics with its goal of establishing general laws and to reduce all phenomena to a minimal number of such laws, since the presence of heterogeneity in groups, individuals and down to the level of DNA; and in development patterns and in rates of change is the common order in the living organism. It should be evident that the presence of such uncertain outcomes should be truer in the case of the new social evolution, being less material in structure and subject to greater chance variation. Care needs to be exercised when using analogies between the two types of evolutions,

for example, social biology, since their structures and evolutionary dynamics are basically different.

The more recent evolution peculiar to the present phase of humanity—labeled by many as the Symbolic Cultural Evolution and more recently, the Techno-physis Evolution—operates directly by the inheritance of acquired characters, knowledge and learned activities, which arise in and are continuously a part of ever-evolving systems of technological innovations and social organization. The inheritance of learning was initially limited in scope and space, similar to the case of the organic evolution, which still is in all the lower animals, not subject to the new social evolution; but in the modern human it has escaped these limitations. New means for recording and transmitting knowledge, external to the organism have been devised, by graphic methods, at first, and then by recordings of several other types and by wire and wireless transmission, and by more forthcoming advances in communication technologies. In the new Symbolic Cultural Evolution, present generations can inherit directly from ancestors dead many millennia back or from their organic kin in far away distances, instantaneously, and with the potential to spread the inheritance to the whole human species. This potential is new. It has never been realized before, yet it is the outcome of the new evolution, and when combined with advances in neuroscience and biotechnology that presents opportunities for control over the structure and direction of the organic evolution, its outcomes will have significant consequences to human development, that are yet to unfold—with optimist and pessimist presenting different scenarios (cf. Zhang’s contribution to the Human Development Theme, EOLSS). A major source of future uncertainties is that advances in science and technological innovations introduce disruptions in the social system that require changes in views of nature and in social organization that could be beyond the adaptive capacity of these institutions. This is the case, since scientific and technological developments impact, and in turn are impacted by the basic tenants of the social system: personality, society and culture. In the rest of this part we examine the basic issues and consequences of these developments, and the divergent evaluative views.

2.1 Optimists Versus Pessimists: A Dialogue

As mentioned above, the answer to the question of whether the emerging global society is moving towards reason and rationality in conflict resolution, or resorting to the pre-symbolic response of irrational force and violence, is highly complex and debatable. There are historical and unsettled philosophical issues underlying that debate. We hope that by contrasting these divergent points of views, the issues may gain clarity. There are, for example, optimists who feel that human societies are increasing their ability to chart and follow a purposeful course of change towards a better life for all, a course in which diversity is

² This section is indebted to the contributions of Ibn Khaldun (1377/1967, Frankfort, Frankfort, Wilson and Jacobsen (1949), G. G. Simpson (1949/1956), Derry and Williams (1960), Barbu (1971), Foucault (1972: 245), Stebbins (1982), Straus (1989), Davies (1993), Diamond (1997), Mayr (1997), Rifkin (1999), Sirageldin (2001, 2001B), among others.

welcomed and historical lessons are positively interpreted to provide for better future guidance for equitable development and sustainable environment.

Optimists, however, are balanced by an equal, if not larger number of pessimists who believe that the inexorable laws of 'nature and evolution' will eventually override purpose and cause the human species to decline and disappear, as other animal species have done in the past. As we begin to approach the earth's carrying capacity we severely limit our room for maneuverability in response to change—limits that enforce our species' natural tendency for non-cooperation, violence, irrational values and unconscionable behavior. As population density intensifies, humans invent new paradigms or 'world views' that legitimize unjust actions and behavior. Teleological explanations, such as the "End of History," "Eugenics," "Clash of Civilizations" or even the "End of the Fertility Transition," portray contemporary inequities as the inevitable result of the 'final cause' or as the ultimate purpose of human history—a view that leads the majority of humankind to a state of perpetual poverty, violence and despair. Today, teleological explanations prevail and guide policies and actions, some of which are not necessarily rational and could be harmful when examined in the light of earlier circumstances or causation.

For the pessimists, the turbulent events that beset the twentieth century exemplify their view about human nature. As the 20th century dawned, in 1907 to be precise, Governor von Götzen concluded that a famine would flush out the rebels in his Province of occupied Tanganyika as only hunger and want could bring about a final submission. It was done. Three German columns advanced through what was then the German East African Colony, pursuing a scorched-earth policy that left famine in its wake. People were forced from their homes, villages were burned to the ground and food crops that could not be taken away or given to loyal groups were destroyed. Testimonies and evidence brought to light in the 1960s suggest that most of the 250,000 to 300,000 people—about one-third of the total population—who died as a result of this policy succumbed to starvation (Reader: 595-601). They were not, however, considered victims. They were viewed as savages in keeping with the conviction of the time. This violent behavior, and its associated classification of humans into higher and lower orders, continued unabashed throughout the century and beyond, with two World Wars, numerous regional and local brutal wars and conflicts, and many other known inhumane crimes and atrocities that continue through the present time.³

³ There are many examples of recent attempts to resolve conflict through brutal force rather than reason. The following are illustrative: the case of Apartheid in South Africa, its long-term racist atrocities and final resolution is well known and requires no further elaboration; the ethnic Bosnia war, illustrated in the Dutch government-commissioned, 7,600-page report by the Netherlands Institute for War Documentation (2002); the September 11 (2001) suicide attacks in the USA and the US military and political global response that followed; or the 50-year Israeli-Palestinian conflict and

By the end of the 20th century, science provided technological innovations that contributed to both human comfort and the development of deadliest weapons of mass-destruction that were ever invented, and humans never hesitated to use both, especially the latter whenever the existing powerful feel threatened or angry. Just like the ancient Mesopotamian myth when the "gods," who believed that they represent order in the world, hear that all the forces of the past, of the original chaos, or the terrorists in modern terminology, are making ready to do battle with them, they get ready to battle. First, they look back, with dissatisfaction to the past and feel proud of their achievements, certain of the superiority of the present and confident in their control of future *progress* and in the fulfillment of what they consider their destined role in guiding the world towards a final cause. Accordingly, they justify their deeds regardless of the legitimacy of the means they use. But in the process, they lose rationality and forgot that they wrote the original myth, designed the patterns of its diversity, and that their culture is a result of historical processes of *cultural diffusion*. In that Mesopotamian myth, the 'gods' become:

"Angry, scheming, restless day and night, they are bent on fighting, rage and prowl like lions. Gathered in council, they plan to attack. Mother Hubur – creator of all forms – adds irresistible weapons, has born monster serpents, sharp toothed, with fang unsparing; has filled their bodies with poison for blood. Fierce dragons she has draped for terror, crowned with flames and made like gods, so that who ever looks upon them shall parish with fear, and they, with bodies raised, will not turn back their breast." (Frankfort et. al.: 190)

Underlying this Mesopotamian tale is the belief in "the historical process," meaning that these processes are *the* justification and guarantee for their mission to succeed in the actualization of the better life. But historical trends are ambiguous in providing a standard of moral values or certainty of outcomes. The present, to an outside observer seems to be an age of science and myth, a mixture of rational and irrational behavior, or, according to Strauss (1989:227-270) an age of unfinished dialogue between reason and revelation. A recent statement by Sen. Bob Graham, Chairman of the US Senate Intelligence Committee, discussing President Bush's proposal for a domestic security agency, a fallout of September 11th, 2001 incident (see Footnote. 3), illustrates the concern with using religion as a tool for political ends: "if the administration takes the stonewall position that every word in their plan is biblical and if you change it you're unpatriotic, I think that will be a very serious error" (*The Baltimore Sun*: Monday, June 10, 2002: Page 3A). But the inner motive behind human

its atrocities, illustrated by the recent Israeli assault on the Jenin Palestinian refugee camp (April 2002, quoted in *The International Herald Tribune* (April 17, 2002: pages 1, 4 & 7). Most of these conflicts reflect struggles of populations seeking their freedom and basic rights for self-preservation—a right Hobbes regarded as absolute [see the discussion of Hobbes below].

aggression seems to persist: human greed to control the earth's strategic resources, a greed that breeds aggression.

Pessimists view the goal of sustainable human development as unrealistic. To regard societies as one family and enhance the quality of life for all its members by providing good health, equal access to knowledge and education in the context of equitable and dignified treatment of all individuals and societies is a recent objective—and not one that is universally shared. That goal has no parallel in the history of human evolution. Human evolution has been characterized mainly by ruthless competition, non-cooperative behavior and socioeconomic outcomes that produced glaring inequalities and indifference, yet, in the realm of the evolutionary paradigm, are championed as the source of the human race's vitality—survival of the fittest, while a majority of the human race are either eliminated or reduced to a state of bare survival. A state that does not provide for positive promise for human development even if some moral philosophers have written that man's hands and tongue, two most noble instruments for ennobling him, would not have done their work perfectly nor would they have carried the works of men to the height to which they are seen to have been carried, if they had not been driven on by necessity. As Strauss (1989: 21) pointed out, the jump from the realm of necessity into the realm of freedom will be the inglorious death of the very possibility of human excellence.

Optimists feel, however, that this crude Darwinian scenario, which foresees human extinction similar to the fate of many other species, is not an inevitable destiny. Reason, according to this view, will prevail. As we enter the 21st century, it is becoming evident that the global system, including its natural environment, is fragile and increasingly linked as both the present and future fortunes of any given society depend on the actions and fortunes of others. But fragility and reduced maneuverability do not necessarily signal the continuation of selfish and aggressive genes. Rather, human survival calls for a new social contract, which will bind the global system, accept cultural diversity, and seek peaceful means for conflict resolution—a clear prerequisite for sustainable human development in the 21st Century. This universal social contract appears to evolve, if at a slow and reluctant pace. There are cultural, economic and technological causes for such reluctance, if not reversal, that need to be addressed. Teleological views of nature, whether Hegelian or Rousseauian or Aristotle's final cause, when used to justify economic or political ends, regardless of their righteousness, deepen inequities among social or cultural groups, and therefore need to be clarified and have their foundations assessed.

2.2 The Danger of Teleological Explanations

For millennia, teleological explanations have been a major focus in the analysis of causation and a source of confusion ever since. The concept of teleology, all goal-seeking behavior, had its origin with Aristotle's classification of causes with

“final” cause as one of the categories. Final cause has been defined as “the cause responsible for the orderly reaching of a preconceived ultimate goal” (Mayr 1976: 364). But, although the definition of “final cause,” with unproven optimality, is beyond the rational calculus, it has been used nevertheless to justify otherwise unacceptable means to reach that final destination. In many cases, teleological explanations provide non-rational justification for future outcomes and policy directions regardless of their just or equity content. Teleological explanations also have the added danger of subjecting liberty to goals dictated by authority: a license for the tyrannical view that “individuals can be forced to be free.”

Teleological explanations also relate to how we view history: history of the past or history of the present. Underlying these two views of history are two approaches to political thought, classical political rationalism and liberal political philosophy. These paradigms represent key approaches to the philosophy of political thought that impact human development and require some elaboration.

Political rationalism started with the moral, political and theological teaching of Socrates. As a result, a delicate dialogue emerged and hence, the appearance of norms of civic justice and of civic virtue and vice. These norms appeared despite an inevitable and continuing tension between Socrates' skepticism on the one hand, and the loyalties and commitments required by family, community, religion, and citizenship, on the other hand. Although the emerging norms are not absolute, they are transhistorically legitimate since they are based on rational insight in the nature and deepest needs of humanity. Yet, classical political rationalism, from its beginning, appears to be antidemocratic when compared, for example, to the egalitarian deep moral sentiments and culture of the 20th century. It is certainly true that Socrates and his greatest students or his spiritual descendants—Xenophon, Plato, and Aristotle were critics of democracy. But Strauss insisted that “the criticism was not hostile to democracy, but instead favorable to democracy and, indeed, rooted in a genuine attachment to democracy—though a rational and sober attachment – the truest friend of democracy or of the people will be the frequent, not to say constant, critic of the people—and, even more, the critic of the political and cultural flatterers of the people or the critic of the wisdom of the people” (Pangle 1989: vii).

In discussing classical English political philosophy, the origin of “liberalism,” Berlin (as reviewed in Strauss 1989: 13-26), distinguishes two senses of freedom, a negative and a positive sense. Used in the negative sense, “freedom” means “freedom *from*”: in that context, some portion of human existence must remain independent of social control; there ought to exist a certain minimum area of personal freedom which must on no account be violated. Positive freedom, on the other hand, is “freedom *to*”: the freedom of the individual “to be his own master” or to participate in the social control to which he is subject. In that context,

“freedom to” cannot be unlimited. It must have boundaries based on some criteria. It is the bases of the criterion that is in dispute whether absolute or relative. On the other hand, these two alternatives for freedom overlap another alternative: freedom for the *empirical* self [associated with negative freedom, freedom *from*]; or freedom for the *true* self [associated with positive freedom, freedom *to*]. But liberalism has been facing a crisis since its attempt to abandon its absolutist basis and become entirely relativistic. Attempts, as those of Berlin (ibid), to strike a middle ground between relativism and absolutism seem to be futile. The difficulty is that setting boundaries for freedom requires an absolute criterion. But in its basic structure, the required belief in liberalism is based on relativistic value judgment that delimits the development of a case or presents no conclusive case for or against liberalism. In other words, a ‘militant’ liberal, to avoid contradiction, may not be able to reject a nonliberal position and label it “barbarian,” for example, since it must be admitted that there is an indefinitely large variety of notions of civilization each of which defines barbarism in its own way. In brief, reason alone cannot provide universality to the liberal position. In present-day positivism in social sciences, reason is unable to show the superiority of unselfish gratification to selfish gratification or the absurdity of any attainable ends that imagination and idiosyncrasies lead individuals to pursue. Reason can tell us which means are conducive to which ends but it cannot tell us which attainable ends are to be preferred to other attainable ends. Reason cannot even tell someone to act rationally or that acting irrationally is acting badly or basely.

The limitations in setting values in the liberal paradigm raise uneasy questions about the objectivity of social sciences and historical perspectives, especially as a guide to social policies. Some social scientists (cf. Lukás, quoted in Strauss 1989: 19-20) take the view that an objective and evaluating social science is possible provided social science does not limit itself to the study of arbitrarily selected “facts” or segments, but understands particular social phenomena in the light of the whole social situation and ultimately in the light of the whole historical process. But we should be cautious of such an approach. There is no solid ground to assume that the new horizon is better than the one it replaced! For example, while the ideologists of the French Revolution saw clearly the rottenness of the *ancien régime* and the necessity of a revolution, they were utterly mistaken about the goodness of the new society that their revolution brought to birth. Taking the history of the past as a guide to the future is clearly a teleological journey that has its risks and lacks solid foundation. This leads to the second view of history, history of the present.

Foucault’s histories for example, fall under the category “history of the present.” Foucault’s (1926-1984) primary objective is to understand the present and its shortcomings in terms of past circumstances. In this view of history, past circumstances—the processes leading to present practices and institutions—were neither necessarily right nor by no means inevitable. Foucault (1972: 5)

explained the approach to history of the present as follows: “the great problem presented by such historical analysis -- is no longer one of tradition, of tracing a line, but one of divisions, of limits; it is no longer one of lasting foundations, but one of transformations that serve as new foundations, the rebuilding of foundations.” In other words, to interpret the past so that it fits within preconceived views of nature or to “the end of history,” is to resort to thinly veiled, self-serving interpretations that justify present social and political ills—as the rise and fall of the Rule of Law in Western Civilization demonstrates (cf. Hayek 1955, Sirageldin 2001). We must be wary, however, that Foucault’s call for the ‘rebuilding of foundation’ implies an unspecified ideology, a combination of past and present values and experience, or the imperfect interpretation of historical processes as a teleological guide.

Meanwhile, in the seventeenth century, a new philosophy originated mainly by Hume, and a new science began to emerge. Science with a capital S becomes the authority for philosophy replacing that of theology that prevailed in the middle ages. But given the discovery of quantum mechanics which deals with atomic scale phenomena and has indeterminism built into it at a fundamental level, the Heisenberg’s uncertainty principle that states that all measurable quantities are subject to unpredictable fluctuations, and hence to uncertainty in their values (Davies 1992: 30), and introduced probability in physics. Accordingly, science cannot claim to be the source of perfect and assured understanding of nature. As Nietzsche put it: science is only one interpretation of the world among many (Quoted in Strauss 1989: 241). However, changes in ‘views of nature’ have been associated with scientific and technological developments. But history illustrates that many of the views of nature were convenient ways to justify unjust actions or, otherwise undesirable *status quo*, that were the socioeconomic and political consequences of technological change in the first place. Accordingly, the blanket use of the word “God” is rather confusing, given the manifold theological schemes that have been proposed throughout history and their social and political impacts.

2.3 Scientific Development and Views of Nature

The metaphysical schemes predominant in ancient times, given the status of scientific development of the time, were mainly preoccupied with myths concerning rhythmic patterns and the need to please Gods associated with those cycles, for example, ancient Middle Eastern metaphysics, the Chinese belief in cyclical cosmology or the Hindu system of cycles within cycles of very long duration. It is well known that Aristotle’s logic was much more advanced than his scientific knowledge. With the rise of scientific knowledge and the scientific method since the 14th century, Hellenistic influence became a main source for shifting theological schemes, which fluctuated with the success of science in explaining the nature and origin of the Universe—timelessness versus historicism. Some of these schemes portrayed “God” as wholly other than and

beyond the physical universe, whether a form of “deism,” in which God is posited as independent of time and who starts off the universe only to sit back to watch the unfolding of his ‘perfect’ creation or a form of “theism” in which God is perceived as the creator of the universe who continues to be involved in the day-to-day running of the world. The latter view leads to the *ex nihilo* view of creation—God alone is necessary for sustaining the universe in existence at all times. In other views, whether “pantheism,” or “panentheism,” there is no separation between God and nature—God is identified with nature itself although panentheism assumes that the universe is in God but not in all of God. These schemes generated the known debate of whether the Laws of Nature are dictated by God—a view adopted by Judaism, Christianity and Islam, or are based on a partner relationship as in the Greek “Pantheon” doctrine (Davies 1992: 74-76). Furthermore, scientists, in recent developments, mainly in the field of physics, have proposed a type of God who evolves within the universe, eventually becoming so powerful as to resemble Plato’s second God, the Demiurge, who fashions existing matter into an ordered state. There are also views of nature that conform to recent developments in biotechnology that are bound to change the meaning and roles of humanity itself in the 21st Century. Furthermore, the history of scientific development indicates two conflicting trends. The first is to reduce the significance of human existence in the evolving views of “nature,” while, for the few, increasing human “pride” in its evolving power of knowledge, thus creating a confused system of social contracts—lack of a coherent universal system of human rights and obligations.

These views of Nature and God had, over the course of history, important social and political implications—some of which could be irrational and result in severe harm to human welfare—which require more elaborate analysis beyond the scope of the present discussion. They serve, as a reminder of how fragile the Einstein dictum is: “God is subtle but not malicious,” as evident from the “views of nature” adopted by those who ruled the world over the course of history—views that may be best characterized as “malicious but not subtle.” This state of affairs seems to continue over the course of history. As G.G. Simpson (1949: 194) aptly put it more than half a century ago: “The present chaotic stage of humanity is not, as some wishfully maintain, caused by lack of faith but by too much unreasoning faith and too many conflicting faiths within these boundaries where such faith should have no place.” Evidently, the consequences of the frequent changes in ‘views of nature’ not only shackled established values and beliefs but, over the course of history, have been given teleological interpretations to justify and grant legitimacy to the outcomes of various socioeconomic and political systems—whether hunting, gathering, agricultural, early or late industrial, and regardless of these outcomes’ degree of justice or equity. But how do such schemes relate to scientific and technological developments?

In the rest of this section, we present some historical illustrations of three technological developments: the printing machine that signaled the beginning of the Newtonian and chemical industrial age, the Darwinian evolutionary revolution, and the present biotechnology revolution; as they impact views of nature, and in turn, impact the socioeconomic and political systems of their time. The discussion is brief. For details and elaborations, the reader is referred to Davies (1992), Rifkin (1998), Sirageldin (2001, 2001B), and references cited.

It was probably the invention of the printing machine in the fifteenth-century by Johannes Gutenberg that signaled the beginning of the modern scientific era. It seemed to have introduced significant changes in socioeconomic organizations and in views of nature and anticipated the Newtonian ethical system, adopted by Adam Smith in his famous “invisible hand” metaphor. It was the technology of the printing machine—although basic, compared to present day technological and scientific advances—that introduced the assembly line and the roundabout production processes. Human labor is only one part of total inputs, whether natural or man-made, all enter the production processes in precise quantities and time frame, working together in harmony, according to a preconceived design, with the unified objective of producing a perfect outcome. Every input, human or non-human is measured and timed with precision, and accordingly gets a *just* return for its contribution to the final product. Humans are part of nature’s design and the destiny of each individual or a group of individuals is preconceived by nature’s design. Accordingly, humans *should* accept their destiny and be proud of their role and contribution to God’s design—no human is an island by-itself.

The view of nature introduced by the advent of the printing machine and given scientific credentials in the Newton and Adam Smith system may be summarized as follows: nature is not aimless, its parts are in continuous motion, every part is free in its movement but related to all other parts and has its destined role precisely set and timed. Thus, although the relation between the parts and the whole looks random, since every part is free to decide its own movement independently, in reality, these movements if left to its own, move toward an optimal whole with just and optimal totality. This view of nature illustrated by Adam Smith’s invisible hand metaphor provided, on the one hand for agreement between scientific knowledge and a view of nature, while on the other hand attempted to justify the nature and organization of the new industrial era and its systemic effects—the movement of production from the farm to the factory, from the countryside to towns and cities, and from the management of landlords to owners of capital—with significant redistribution of power, wealth, capabilities and the management of social production. Adam Smith, however, was concerned that the functioning of the capitalistic system in the era of the industrial revolution may not reach the expected optimality and may actually introduce serious injustice and inefficiencies if left to its own. He proposed selective interference by a designated authority that has democratic legitimacy. It must be

mentioned, in this respect, that the impact of the advent of the printing machine went far beyond introducing a new view of human role in nature. It facilitated communication and the spread of knowledge and information beyond the slow technology of the word of mouth or handwriting that reaches only the privileged few. It started a true and practical system of democratic participation and transparency in governance and in private dealings and agreements—basic requirements for the functioning and efficiency of the capitalistic system in the dawning era of the industrial revolution.

However, although the era of the industrial revolution, in the 18th and 19th centuries produced vast material wealth and growth, it also produced severe injustice, far beyond Smith's worst concerns, from child labor abuse, to below subsistent wages especially for women, and indifference to social injustice both at home and abroad, especially with the spread of colonialism. The optimality of the system, its just and harmonious functioning, as envisioned in the Newtonian system, did not materialize. Newton's and Smith's view of nature, and the viability of the capitalist system itself were questioned, as illustrated for example by the socialist and communist movements of the 19th and the 20th centuries. There was a need for a new scientific view that advances a view of nature that justifies the emerging industrial organization and its negative externalities. It was the contribution of Charles Darwin (1809–1882), *On the Origin of the Species* (1872) that, to a large extent, provided the scientific framework for a new view of nature. Darwin may best be viewed as a 'historian of life,' that went beyond knowledge of fossils to an array of pertinent facts from other fields of earth sciences and life sciences, and weaves them all into an integral interpretation of what the world of life is like and how it came to be. In that respect, his contribution to scientific knowledge is lasting. But as a historian of life, Darwin as well as others in that field, were bound to reflect more deeply on their findings and face the riddles of the meaning and nature of life as well as problems of human values, ethical standards and conduct—the human meaning of evolution (Simpson 1956: 9-11). It is these interpretations and speculations, especially those beyond factual findings that are the interest and concern of the present discussion.

One question, hinted at earlier—whose answer represents alternative views of nature, with serious value judgment and policy implications—continue to be debated up to the present time, namely: What is the relative contribution of chance, direction, and necessity in the evolutionary process. Put differently, is the evolutionary process purposeful, directional and moving towards perfection, with humanity representing the pinnacle of its final and perfect creation, or is it random and subject to chance, and accordingly aimless? The question is basic. If it is the former, the implied view of nature provides justification for social and political ills and injustices, including the negative externalities of the capitalistic system, colonization or racism and eugenics, as the price for reaching the perfect

stage of the evolutionary process. Indeed, eugenics did flourish in the first part of the 20th century and some of its remnants continue to the present time. The following quote illustrates the potential seriousness of the eugenic movement:

Some day we will realize that the prime duty, the inescapable duty of the good citizen of the right type is to leave his or her blood behind him in the world; and that we have no business to permit the perpetuation of citizen of the wrong type. The great problem of civilization is to secure a relative increase of the valuable as compared with the less valuable or noxious elements of the population.... The problem cannot be met unless we give full consideration to the immense influence of heredity.... I wish very much that the wrong people could be prevented entirely from breeding; and when the evil nature of these people is sufficiently flagrant, this should be done.

These are the words of Theodore Roosevelt, the twenty-sixth president of the United States in 1913 (quoted in Rifkin 1998: 117). The eugenics movement was also deep-rooted in academic research, with leading geneticists in the early 20th century being "alarmed by what they considered to be a decline in the heredity quality of the American people" illustrated by statements such as the one made by Professor H. S. Jennings of Johns Hopkins University: "to go to the root of the troubles, a better breed of men must be produced, one that shall not include the inferior types"—an application of *artificial selection* to human beings (Rifkin 1998: 116-120). These examples illustrate the potential impact of evolving views of nature.

If the answer to the question about the nature of evolution is the latter one—the process is random and subject to chance—then there is no justification to view differentials in the human population as a result of Divine design, solutions need to be searched in the functioning of the socioeconomic and political system and not the genetical make-up. Indeed, views of nature once adopted, especially when self-serving, become deep-rooted and difficult to change even with new evidence to the contrary. For example, in 1971, Noble Laureate Jacques Monod in his book "Chance and Necessity" (quoted in Stebbins 1982: 69), advanced the theory that, first, the direction of mutations is entirely random with reference to their functional or adaptive values; there is no internal force that directed the course of evolution of its long history. Second, all mutations, even before they can be incorporated into the genetic information of a single individual, must run the gauntlet of the internal or cellular environment—every change in the DNA blueprint must add to the efficiency of operation of the cellular machinery or at least not detract from it. In other words, Monod advanced the thesis that the process of evolution entails both chance and efficiency or necessity considerations, and although proven closer to empirical findings, the thesis was met with resentment. It "engendered a violent storm in French intellectual circles, particularly among the followers of the Jesuit Pierre Teilhard de Chardin, who had written some twenty years earlier a very different account of evolution.

Teilhard saw evolution as a steady progress upward from the cosmos through the solar system, the planet earth and all the myriad plants and animals in it, to mankind as the pinnacle of evolutionary creation. Like T. H. Morgan and other early twentieth-century biologists, he believed that natural selection could do nothing except get rid of undesirable mutations. Teilhard gave no precise definition of the creative force in evolution, but he pointed to some kind of internal guiding principle; in this he differed from Darwin and Monod” (ibid: 70).

However, none of the students of evolution, whether believing in chance or design could have imagined that by the end of the 20th century the scientific insights and technological know-how would be in place to make real a vision of a commercial genetic civilization. As Rifkin (1998) put it: “the mapping of the human genome, the increasing ability to screen for genetic diseases and disorders, the new reproductive technologies, and the new techniques of human genetic manipulation [...] establish the technological foundation for a commercial eugenics civilization.” This civilization will be more global with a different view of nature, that has yet to evolve.

2.4 Impact on the Global Environment

The previous discussion indicates that technological and scientific developments generate doubts about established beliefs while creating new views of nature. These views are incongruent with the social and institutional demands of the new technological establishment—give credence to changes in fortune and new ways of life. But the changes are no longer local. In the 21st century, these impacts radiate more and more globally. National governments, regardless of size or power cannot function in isolation. There is a need for a global democratic government that provides for minimum freedoms for all the global citizens. This is clearly a new historical experience. In the process, the meaning of society, personality, or culture is changing as well as the term citizenship. It is a challenge to define freedom for a citizen of a given country at the expense of the freedoms of citizens of other countries. For example, Hobbes defined freedom as the absence of external impediments to motion—freedom to move and act where the Laws do not interfere. This definition has two aspects, impediments and movements. But for sovereignty, there is no such limitation since the laws are instituted by the sovereign and could be changed if the sovereign so desire. According to Hobbes’ Leviathan, when David caused Uriah to be killed, he did no injury to Uriah, because Uriah was his subject, but he did an injury to God, because he was God’s subject and was disobeying God’s law. This leads to the concept of ‘sovereign’ and the prevailing view of ‘nature,’ especially in the context of the evolving global system. Indeed, even in Hobbes’s Leviathan, where the authority of the sovereign is absolute, Hobbes admits one limitation on the “duty” of submission to sovereigns: the right of self-preservation that he

regards as absolute—a right that is logically consistent with Hobbes’ motive for instituting government in the first place—self-preservation (for more details, see Russell on Hobbes, 1945: 541-557). The challenge is how to apply these basic principles in the context of a global system characterized by the presence of hegemony of a powerful “sovereign”, while views of ‘nature’ are being changed to justify the changing desires of the “sovereign,” in the absence, of a “super international Law” that is subject to the ideal of “isonomy,” in international governance—a Law and Ideal that should provide the necessary ‘Leviathan’ checks and balances.

The global system with its evolving regulatory rules and institutions and its hegemonic power structure, not only in finance, trade, and environmental issues, but also in the militarily, political and social arenas, plays a pivotal role in the development of human resources. It influences the distribution of employment opportunities and rewards within and across countries and regions. It not only influences the domain of national and local policies and the viability of social infra-structures, but also affects the structure and distribution of these actions and outcomes, while utilizing convenient views of nature to legitimize these outcomes. Yet, the emerging global institutional framework is a step towards a universal democratic system with a universal Rule of Law. It requires careful assessment, however, since the rules of the present global system are not necessarily equitable or consistent, or enforceable in the context of a recognized global Rule of Law and the ideal of isonomy.

The economic impact of the global environment could be substantial and accompanied by painful sociopolitical consequences. The experience of East Asia at the end of the 20th century provides an illustrative example of the economic consequences of the emerging global system. In East Asia, for three decades since the early 1970s, population growth experienced a rapid decline and the countries in the region undertook the appropriate socioeconomic reforms by emphasizing health, education quality, and institutional development. Their economies grew at high rates for decades until 1997-98, when there was a sudden collapse with immediate and enormous economic, social and political consequences even though their fiscal, monetary and moral hazard were relatively in order. Certain internal reasons for that collapse, including weak financial institutions and thinly veiled corporate monopolies that present market distortions, did exist. But the size, speed, and spread of the crisis across the whole region and beyond indicated the presence of external factors that were—and remain—common to all countries open to the forces of the global system. These forces included the presence of powerful, speculative activities with built-in global monopolies that destabilized the markets. National authorities could not be expected to deal independently with these global forces, while support from the international regulatory institutions was inadequate in both timing and content. In the absence of adequate international regulation, the global market with its built-in privatization of risk and its present system of conflict resolution

that lacks the ideal of isonomy, is bound to generate massive unemployment, poverty and destabilization of socio-political systems across the developing countries that aggravate the negative consequences brought about by demographic trends (cf. Eatwell and Taylor 2000, Sirageldin and Sirageldin 2001).

3. Human Diversity in Recent Times

The previous discussion illustrates that historical processes are not indicators of human destiny. These processes, including the present were neither destined nor necessarily right. They are guided by changing views of nature, depending on development in scientific knowledge and technological know how. In this part, we examine the current state of human development. That state reflects the impact of historical processes of many centuries. The profile that emerges may serve as a beginning of an analysis of 'history of the present,' what could we learn from the past, whether positive or negative, to improve the future?

3.1 Demographic and Capabilities Diversities

Changes in population size, structure and movement are key forces in the present phase of the global transition. They present opportunities as well as challenges for development in every country, whether technologically developed or developing. World population reached 6.1 billion in mid-2000 and, according to the UN World Population Prospects: 2000 Revision (United Nations Population Division 2002), is currently growing at an annual rate of 1.2 per cent, resulting in an additional 77 million people per year. Six countries account for half this annual growth: India for 21 per cent; China for 12 per cent; Pakistan for 5 percent, Nigeria and Bangladesh for 4 per cent each; and Indonesia for 3 per cent. By 2050, world population is expected to be 9.3 billion according to the medium variant. As illustrated in Figure 1,⁴ all the growth is contributed by the less and least developed countries with the latter group contributing about 35 per cent of the growth, while the population of the more developed countries is anticipated to decrease slightly from 1.2 billion in 2000 to 1.1 billion in 2050. However, the populations of 39 countries in the more developed group are projected to be smaller by between 14 per cent (Japan and Germany) to 25

⁴ According to the United Nations Population Division (2002: xi), the more developed regions include Australia/New Zealand, Europe, Northern America and Japan. Less developed regions include all of the regions of Africa, Asia (excluding Japan), and Latin America and the Caribbean, as well as Melanesia, Micronesia, and Polynesia. The group of least developed countries comprises 48 countries: Afghanistan, Angola, Bangladesh, Benin, Bhutan, Burkina Faso, Burundi, Cambodia, Cape Verde, Central African Republic, Chad, Comoros, Democratic Republic of the Congo, Djibouti, Equatorial Guinea, Eritrea, Ethiopia, Gambia, Guinea, Guinea-Bissau, Haiti, Kiribati, Lao People's Democratic Republic, Lesotho, Liberia, Madagascar, Malawi, Maldives, Mali, Mauritania, Mozambique, Myanmar, Nepal, Niger, Rwanda, Samoa, Sao Tome and Principe, Sierra Leone, Solomon Islands, Somalia, Sudan, Togo, Tuvalu, Uganda, United Republic of Tanzania, Vanuatu, Yemen and Zambia.

percent (Italy and Hungary) to 28-40 per cent (Russian Federation, Georgia and Ukraine) by mid-century, although there are some accounting reservations about the size of the projected fertility decline in these countries.⁵ The developmental consequences of these demographic patterns are wide-ranging, serious and complex for both the developed and developing countries.

It is tempting to view these consequences in a simplistic or mechanistic way, since in an accounting framework the growth of output per capita is the difference between the growth of aggregate production (GNP) and population growth as given in Equation 1:

$$r(y) = [r(Y)] - [r(P)] = [r(Y)] - [CBR - CDR + NMR] \quad [1]$$

Where $r(y)$, $r(Y)$, $r(P)$, CBR, CDR, NMR refer to the rates of growth of percapita gross national product, gross national product and population, Crude Birth rate, Death rate and Net Migration rate respectively.

This accounting relationship may lead one to conclude that reducing population growth automatically improves per capita output. This is not a necessary conclusion and could lead to the wrong diagnosis and policies, since population growth and output growth are not independent in their effects. They both depend on a large number of factors, some exogenous, that influence their structure and dynamic path and, accordingly, their synergetic nature as illustrated in Equation 2 (Sirageldin 1996):

$$r(y) = [S/K] - \{[(N/P) \times \sum_i (N_i/N \times M_i \times F_i)] - [CDR] + [NMR]\} \quad [2]$$

Where, S , K , N , P , N_i , M_i , F_i , represent saving ratio, capital/output ratio, total number of women in the reproductive age, total population, number of women in age group i , proportion of women in age group i who are married, marital fertility in age group i , respectively.

It is evident from Equation 2, which is an approximate identity, that most of the socioeconomic consequences of population growth are channeled through changes in the age structure—mainly a result of age groups with different production and saving potential, dependency burden, and reproductive behavior growing at different rates and, accordingly, creating different opportunities and challenges for development that are rooted in long historical processes. It is more instructive to examine more closely projected changes in the age structure.

Figure 2, presents growth patterns in 2000 for four age groups (0-14, 15-59, 60+ and 80+); for the world as a whole; and for five broad regions: More Developed

⁵ Bongaarts (2001) makes adjustments for the effect of changes in the timing of childbearing, but concludes that "Countries with very low fertility and substantial tempo effects may well experience modest rises in fertility in the near future if the timing of child bearing stabilizes. Even if this happens, however, it seems highly unlikely that fertility will rebound to the replacement level."

(MDCs), Less Developed (LDCs), Least Developed (Least DCs), and for Africa and Europe. For all regions, the rates of growth among cohorts younger than 15 years of age were the lowest of all age groups. These rates were negative in the case of MDCs, especially for Europe. The rates of growth of the working age groups (15-59) were the second lowest in all regions and were negative in the MDCs, approaching an average annual decline of -1 percent in the case of Europe. That rate for the Least DCs exceeded 2 percent and was more than double that of LDCs. These patterns indicate varied socioeconomic prospects for countries and regions depending on their stage in the demographic transition. It also indicates the potential for increased socioeconomic synergies, especially through migration among countries and regions. The patterns also question some of the popular paradigms in the population and development field, as for example, the one-time “demographic window of development opportunity.” This paradigm provides comfort to those developing countries whose age structure is changing towards the transitional stage of a lower dependency pattern and accordingly enhances the potential for saving since the share of the population in the working age, who are the producers and savers in society, increases during this transitional period. The potential savings could then be channeled into investment to improve health, education and infrastructures, according to this scenario. We will examine below whether the developing countries have the potential to benefit from the demographic window of opportunity.

Figure 3 presents prospects for change in age distributions between 2000 and 2050 for three countries: Congo representing the Least DCs, Colombia representing the LDCs, and Japan the MDCs. The case of the demographic window of opportunity is exemplified by the case of the Congo. The share of the population in the working ages is expected to increase from below 50 percent in 2000 to over 60 percent in 2050. However, it is only the Least Developed regions that will experience an increase in the share of the population in the working ages in conformity with the “Window of Opportunity” paradigm. But the countries of the least developed regions (see fn. 1 for countries included) have the lowest per capita incomes, highest incidence of poverty, infant mortality and HIV. Although they fit the paradigm, they are not necessarily open to its potential. In the case of the LDCs where the bulk of the world population resides, the percentage of those of working age will be slightly lower in 2050 than in 2000 with no potential demographic benefit—increasing the dependency burden as their populations start the rapid aging process. In the case of the MDCs, the relative decline of the population of working age is large and significant, creating the potential for shortages in the labor force, whose output is needed to meet the demands of the growing elderly population, especially in the absence of immigration. On the other hand, that demand by the elderly has the potential to enhance economic activities and accordingly may ease the elderly dependency burden. However, it seems that welfare should decline when the growth in the burden of dependency

exceeds that of productive capacity, bounded by increases in productivity and immigration flows—reaching a threshold. Such a threshold may be reached for some MDCs in the present century. For example, in the case of MDCs, it is only the elderly population (60+) that will be growing in the 21st century and will exceed 40 percent of the total MDCs population. That population is expected to have a median age exceeding 50 years in some European countries in 2050.

The outcomes of these opportunities and challenges vary by country and depend on their demographic structures and technological progress, as illustrated by significant global inequalities in the production of, access to and use of digital technology, dubbed the “digital divide”. For example, by the end of 1997, “there were only 23 Internet hosts⁶ per 1,000 inhabitants in OECD countries as compared to 0.21 per 1,000 inhabitants outside the OECD area. By the end of 2000, the first figure jumped to 82 in the OECD area in contrast to 0.85 in the non-OECD countries. There are signs, however, that the Asian region recorded some increase. The “digital divide” is also a “gender divide.” Although the gender-digital divide in Internet use has been narrowing in the USA, only 25 percent of the users in the European Union are women, 18 percent in Japan and the Russian Federation, and 4 percent in the Middle East (ILO 2001:113-117).

Technological solutions—not all environmentally friendly—combined with population growth and consumption patterns influence the demand for natural resources that ultimately affect the quantity and quality of supply of these resources, and the overall quality of the environment. Yet, technological solutions, most of which are labor saving, combined with an unstable global economic system do not seem to generate enough employment around the world. A major challenge that confronts the global system is to generate employment opportunities for the 500 million men and women who are expected to enter the labor force over the next ten years. This challenge is intensified by the presence of worldwide unemployment figures that increased from 137 million in 1995 to 160 million at the end of 2000, 50 million of whom were in the industrialized countries where population aging is accelerating. These figures probably underestimate unemployment, particularly in the developing countries, and do not take into account levels of underemployment. The challenge is further exacerbated by the need to provide support for the growing elderly population with women constituting the majority of the elderly (ILO 2001, UNDP 1999). These are fundamental challenges that require a better allocation of world resources than the present allocation, which is largely wasted on the production of weapons. As Mark Bruzonsky (2002) noted, the world has been “squandering the best of its talent and wealth building ever new generations of ever more frightful weapons; rather than schools and hospitals and food for all.”

⁶ An Internet host is a computer connected to the Internet that can both access and be accessed.

The experience of the last fifty years makes it evident that sustainable development cannot proceed based on foreign aid alone. It cannot be achieved without production that contributes surplus to enhance productivity through better education and health—economic growth with equity. Internal economic and social transformations are necessary conditions. Sufficient conditions include stability, good national and international governance, a favorable external environment and a sustainable resource base. What is the prospect for economic growth with equity in the developing countries? The record has been mixed in the last decades of the 20th century.

The economic performance of the developing countries in general has deteriorated in the decades of the 1980s and 1990s. Recent findings from a dynamic model of poverty, growth and distribution developed to explain the observed experiences of a sample of countries in the Arab, Asian, Latin American and SSA regions illustrate that economic performances in the period 1975-96 compared to 1965-74 were adversely affected by conflict, inequality and poverty to a greater degree than that caused by economic policies. Only the Asian region shows improvement in economic growth, a result of low inequality and poverty⁷. During the period from 1975-1996, poverty increased in all the regions as a result of increased inequality, except in the East Asian countries, where the average rate of economic growth outpaced increases in inequality. For the other regions, growth was limited, if it registered at all—it was negligible in the SSA region—while inequality increased significantly. It is becoming increasingly evident that to achieve sustainable development in the less developed countries, economic growth is a necessary, but not sufficient, condition. Socioeconomic policies that promote equity and justice on the national and global levels are also needed for sustainable human development. The global system has witnessed remarkable adaptive capacity through institutional developments, market adjustments and technical innovations. However, the LDCs, especially the Least DCs seem to have been the least adaptive. It is essential to examine how much of that lack of adaptive capacity is internal and how much is a consequence of the external global environment.

3.2 Diversity in Resource Endowments

The economy cannot be viewed as an isolated box with inputs coming from nowhere and outputs going nowhere. Such views do not make sense in the context of sustainability. As Herman Daly (1993) indicated, inputs are limited by their presence in a larger box, the environment or the ecosystem. And outputs from the economic subsystem must return to that larger box, whether recycled or

in the form of pollutants, as illustrated schematically in **Figure 4**. The economic system, as a physical subset of the natural ecosystem, cannot grow beyond the scale of the latter. Furthermore, the functioning of the economic subsystem and its socioeconomic consequences and externalities are influenced by another subsystem that comprises culture, knowledge and institutions, as illustrated in Figure 4. This latter subset is vital to human development but will not be examined beyond the brief remarks presented in Part I. (For more details and references see Sirageldin, 2001). Despite the significant impact of production and consumption patterns and behavior on future production and consumption—which have serious implications for the sustainability of human development and welfare as illustrated above—many developed and less-developed countries are oblivious of this relationship. In their attempt to maintain or enhance the scale and style of their consumption, a result of growth in population or in per capita consumption, many countries consume their natural capital and, incongruously, count it as income, which is clearly a non-sustainable process. As the late Kenneth Boulding taught, production is destruction. Not only the cost of repairing the destruction should be counted as a debit in the national account, but societies should also anticipate whether the damage is beyond repair given the present scientific knowledge. But to be meaningful, such accounting requires a clear notion of that for which we are accounting. Such notions are not necessarily clear. The case of water and food—the most fundamental basic human needs—is a clear example of the necessity for such careful accounting, especially in the context of unequal distribution, non-optimal consumption patterns, and technological developments that expand, diminish, or make uncertain the scale of availability in the ecosystem domain. Because of its complexity and the extensive literature that is widely available on the subject, this discussion will be limited to a few observations.

Water

The concept of sustainable water use is often defined in the context of growing human populations and, accordingly, a basic water requirement (BWR) for human needs has been identified, quantified and recommended. In a recent analysis, Gleick (1997) recommended a standard of 50 liters per person per day (1/p/d) of clean water as the BWR independent of economic, social or political status. Less than the minimum allocation results in large-scale human misery and suffering. The BWR is a minimum in moderate climate conditions and excludes water required to grow food and for industrial use. According to 1990 data, in 55 countries, domestic water withdrawals fell below the amount recommended. Nearly a billion people were affected, mainly in Africa, Asia and Central America. In contrast to these countries with water stress (below the BWR), domestic water use in all the industrialized countries far exceed the BWR. For example, in Western Europe the BWR was 25 percent of total use and less than

⁷ The model allows poverty and growth to depend on distribution in the short-to-longer run. In the short-run the model also accounts for the joint effects on growth of shocks, social conflicts and the society's capacity for mediating conflicts among social groups within a society (Ali and Badawi 2002).

10 percent in the USA and Canada, reflecting greater availability and different patterns of scale and use.

There have been varied projections of water availability, some at the extreme sides of the optimism-pessimism continuum. Although recent analyses indicate that humanity now (2000) uses only one-half of the total accessible freshwater runoff and projected growth rates in irrigated areas are considerably lower than in the recent past (1982-1993), inequalities in availability and access are significant, creating serious political conflict (Swaminathan 2001; Sirageldin 1996). Population rich and land hungry countries like India and China, however, have no option but to produce more food from less per capita arable land and irrigated water in the coming decades. Much of the required irrigated water comes from groundwater that is becoming increasingly exploited at an unsustainable rate. Other serious water-management issues include competing demand, drought and salinity stress. It is a fallacy to indicate that population growth alone is responsible for water scarcity or water stress. Population growth rarely, if ever, acts alone. Equally important are consumption levels, the form of resource use and pollution management, and the roles of economics, technology and culture.

Food

Forecasting food security should go beyond interpolating current outputs and consumption or nutritional intake per capita. It has to search deeper into the connections and determinants of the basic triangle of food policy analysis: nutrition, food and agriculture. In this perspective, food policy attempts to influence the decision-making environment of food producers, food consumers and food marketing for more rapid growth in domestic food production and improved nutrition, especially for inadequately nourished citizens. It requires a closer look into agro-production and distribution systems to improve efficiency as well as into the use of appropriate technologies. It also examines the socioeconomic and political context, which influence entitlements, consumption patterns and nutritional intake, and may have built-in gender biases in many communities. There are two levels of policy analysis in the context of this triangle that are designed to influence producers and consumers: macro and micro.

Macro policies deal with markets and prices, resource allocation and their maintenance (water, labor and land), and the politics of urban-rural subsidies and international trade and finance. For example, the new important global issue of safeguarding agrobiodiversity and its associated current debate about farmers' rights, particularly in developing countries, within the context of the World Trade Agreement (WTA) on Trade Related Aspects of Intellectual Property Rights (TRIPS) has the potential to adversely impinge on the freedom and fortunes of millions of poor farmers in Africa, Asia and Latin America (cf. Swaminathan

2001). In the 21st Century, biotechnology and the new rules of World Trade will radically influence food production and distribution with significant implications to the welfare of farmers and consumers around the globe. Basically, international trade in agricultural inputs, especially petroleum-based and genetically engineered inputs, connects the agricultural, industrial and financial economies around the world, creating global interdependence that makes food policies more difficult on the national and local level. This unequal interdependence is increasing with periodic shortages and price volatility.

It is a well-known fact that the world has always produced more and, more often than not, significantly more than the aggregate daily caloric requirements to meet human needs. But hunger continues to be an epidemic in many parts of the world. The puzzle has to do with grain conversion (40 percent of world grain is being fed to livestock), waste (10-20 percent of grain is lost in storage in developing countries), capabilities and effective demand (large incidence of poverty and vulnerable groups prevent access to food since they lack exchange entitlement), and the volatility of international prices and supplies, which is especially painful for countries depending on food imports such as grain. This takes place especially as the value of the national currency is deteriorating. However, many analysts believe that solutions to food policy issues are likely to be found not by attempts to dismantle this new and growing interdependence but by a better understanding and utilization of its positive potential at the national and international levels.

Micro policy focuses on individual capabilities and the behavior of producers and consumers. It deals with family income, the home environment, nutritional knowledge, health, education, intra-household allocation and the identification of vulnerable groups to reduce poverty and hunger. Policies could, however, have contradictory results. For example, reducing food prices is good for consumers but acts as a disincentive for producers. Subsidies may reduce hunger in the short term but may deepen dependency and generate intergenerational poverty in the longer term.

The discussion of food and its relation to agro-business and nutrition may not lead to concrete policies to alleviate hunger, reduce socioeconomic differentials, and promote better health practice, especially in the absence of a wider view of public health concerns and human development in general. One approach is to focus on the determinants of poverty. In a recent analysis, it was suggested that a policy that promotes economic growth with 'productive equity' is probably the most effective approach to poverty alleviation if not its elimination in the longer term. Productive equity implies that policies targeted for poverty alleviation should not promote dependency. It should build the concept of 'entitled entitlements' for the majority of the poor. For the rest who are either disabled or mentally handicapped, income and in-kind transfers are necessary as part of the

social contract. The necessary condition for such an approach is that the MDCs should reduce drastically their hidden protection against imports from the LDCs, especially the Least developed. The global society should encourage labor-intensive production in these developing countries, while economic growth policies in the LDCs should minimize inequality (Sirageldin 2000).

4. Concluding Remarks

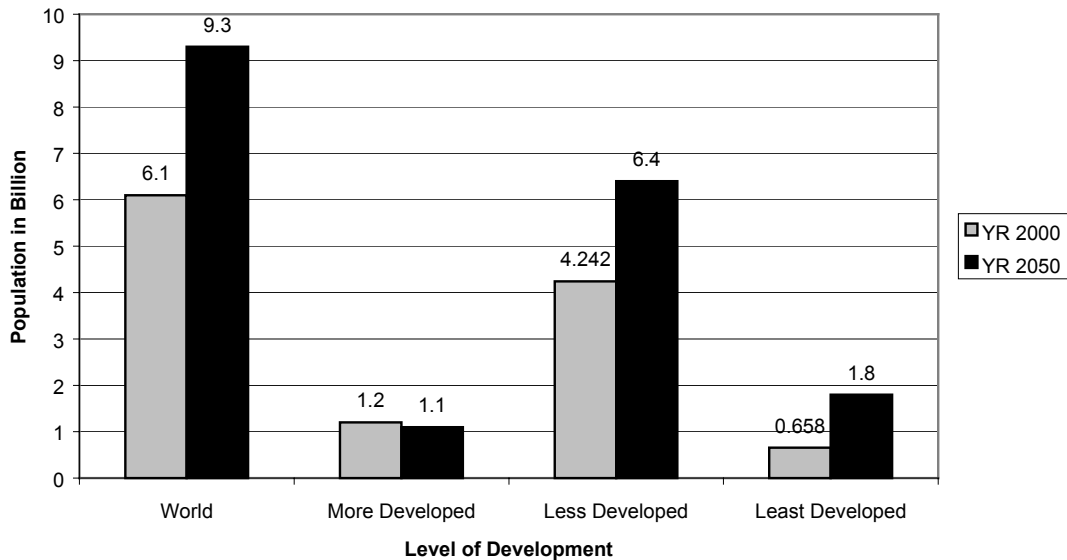
The future of human development in the 21st century, characterized by many as the era of globalization, is full of promise and uncertainty. A review of the historical processes that led to the present state of human diversities and differentiations has not been optimistic. Technological changes promote new knowledge as well as new socioeconomic inequalities. It also introduces new views of nature that, in many cases deepen inequalities and diversities. Historical processes are also reflected in long-term demographic trends that reduce the potential for human development for a large part of humanity. There is room for optimism. Negative trends are slowing down or checked, while technological advances provide promise for enhanced food production at lower resource use. But for the majority of humanity, the central challenge remains unanswered: namely, how to reach a sustainable level of development? For more than three decades, the development establishment has been occupied in efforts and programs around the world to enhance human capabilities, opportunities and the overall quality of life. Yet, views and paradigms about development processes and strategies have changed little, if any, even while the world system and its political and technological bases have changed dramatically. Also unchanged are the marginal conditions of human life in most of the developing countries, especially the least developed. Careful assessments of our approach to human development together with continuous monitoring are needed.

References

- Ali, A.A. and I.A. Elbadawi. 2002, forthcoming. "Poverty in the Arab World: The Role of Inequality and Growth," in I. Sirageldin (Ed.), *Population Challenges in the Middle East and North Africa: Towards the 21st Century*. London, UK: I.B. Tauris (UK) and Cairo, Egypt: AUC Press (Cairo).
- Barbu, Z. 1971. *Society, Culture and Personality*. New York: Schooken Books (183 pages).
- Bongaarts, J. 2001. "The End of the Fertility Transition in the Developed World." Working Paper, 2001, No. 152. New York: Population Council. (32 pages).
- Bruzonsky, M. 2002. Keynote Address, University of Chicago Model United Nations - Palmer House Hilton Ballroom, 31 January, Chicago, Ill.
- Davies, P. 1992/93. *The Mind of God: The Scientific Basis for a Rational World*. New York: Touchstone (254 pages).
- Derry, T.K. and T.I. Williams. 1960. *A Short History of Technology: from the earliest times to A.D. 1900*. New York: Dover Publications (782 pages).
- Diamond, J. 1999. *Guns, Germs, and Steel*. New York: W. W. Norton & Company (480 pages).
- Eatwell, J. and L. Taylor. 2000. *Global Finance at Risk: The Case for International Regulation*. New York: The New Press (258 pages).
- Frankfort, H., Frankfort, Henri, J.A. Wilson and T. Jacobsen. 1951. *Before Philosophy*. Harmondsworth, Middlesex: Penguin Books (273 pages).
- Foucault, M. 1971. *The Archaeology of Knowledge & the Discourse in Language*. New York: Pantheon Books (245 pages).
- Gleick, P.H. 1997. "Human Population and Water: Meeting Basic Needs in the 21st Century" in R. K. Pachauri and Lubina F. Qureshy (eds.) (1997): 105-121.
- Gutting, G (ed.). 1994. *The Cambridge Companion to Foucault*. Cambridge, UK: Press Syndicate of the University of Cambridge (360 pages).
- Hawking, Stephen W. 1988. *A Brief History of Time*. London and New York: Bantam (212 pages). [A classic about science and nature].
- Hayek, F. A. 1955. *The Political Ideal of the Rule of Law*. National Bank of Egypt: Fiftieth Anniversary Commemoration Lectures. Cairo, Egypt: National Bank of Egypt (75 pages).
- IBN Khaldun. (1377/1967). *The Muqaddimah: An Introduction to History*. Translated from the Arabic by Franz Rosenthal, abridged and edited by N. J. Dawood. London and Henley: Routledge and Kegan Paul (465 pages).
- ILO. 2001. "The Digital Divide: Employment and Development Implications." Special Issue, *International Labor Review*. Vol. 140, no. 2.

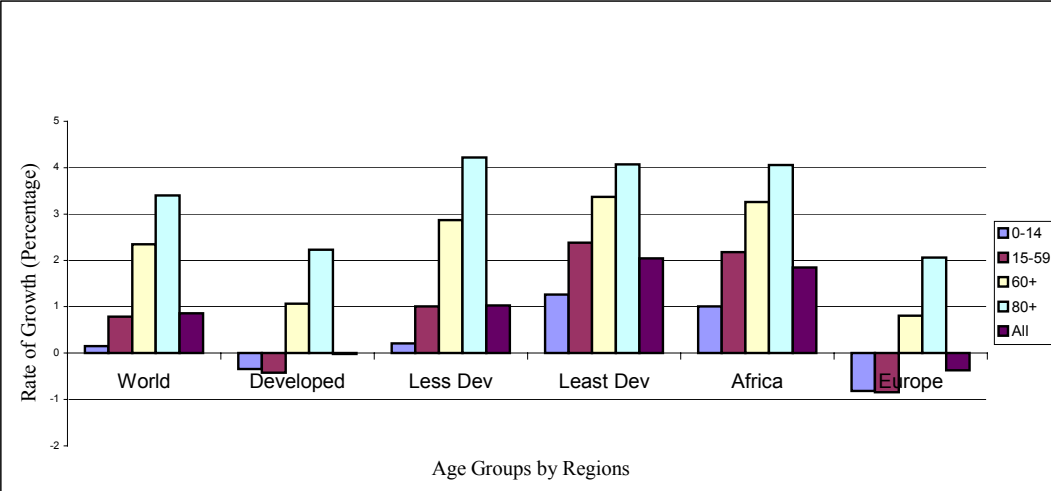
- Mayr, E. 1997. *Evolution and the Diversity of Life: Selected Essays*. Cambridge, Massachusetts: The Belknap Press of Harvard University Press (721 pages).
- Morici, P. 2002. *Reconciling Trade and the Environment in the World Trade Organization*. Washington, D.C.: Economic Strategy Institute (130 pages).
- Pachuri, R.K. and L. F. Qureshy (eds.). 1997. *Population, Environment and Development*. New Delhi: Tata Energy Research Institute.
- Pangle, T. L. 1989. "Introduction" in L. Strauss (ed.). *The essays were selected by Pangle*.
- Reader, J. 1997. *A Biography of the Continent Africa*. New York: Vintage Books, A Division of Random House, INC. (802 pages).
- Rifkin, J. 1998. *The Biotech Century: Harnessing the Gene and Remaking the World*. New York: Penguin Putnam Inc. (272 pages).
- Russel, B. 1945. *A History of Western Philosophy*. New York: Simon & Schuster, INC. (895 pages).
- Sirageldin, I. 2002. "Population Challenges for the 21st Century in the MENA Region: Introduction to the Issues" in I.Sirageldin (ed.), *Population Challenges for the 21st Century in the MENA Region*. London, UK: I.B. Tauris (UK) and Cairo, Egypt: AUC Press (Cairo).
- . 2001. "Sustainable Human Development in the Twenty-first Century: An evolutionary perspective" in UNESCO-EOLSS, 2001: 695-721. Also, a slightly edited version of the article will be available as a background document for the World Summit Conference in Johannesburg, August 2002.
- . 2001b. "Culture and Development in the Arab World." Public Lecture, Arab Planning Institute, Kuwait, October 2, 2001 (in Arabic).
- . 1998. "Globalization, Regionalization, and Recent Trade Agreements: Impact on Arab Economies: Rapid Exogenous Change -- Slow endogenous Response" in A. Al-Kawaz (ed.), *New Economic Developments and their Impact on Arab Economies*. Amsterdam: North Holland:15-56.
- . 1996. "Population Dynamics, Environment, and Conflict" in Sirageldin and Al-Rahmani (eds.), *Population and Development Transformations in the Arab World*. Greenwich and London: JAI Press Inc.: 185-217.
- Sirageldin, I. and S. Serageldin. 2002. "Global Interdependence, Privatization of Risk, and Human Insecurity" in UNESCO-EOLSS *Encyclopedia of Life Support Systems*. Oxford and Paris: EOLSS (Forthcoming and also available on the WEB).
- Simpson, G. G. 1956. *The Meaning of Evolution*. New York: Mentor Books. (192 pages).
- Squire, V. 2001. "The Role of Food, Agriculture, Forestry, and Fisheries in Human Nutrition" in UNESCO-EOLSS, 2001: 563-577.
- Stebbins, G. L. 1982. *Darwin to DNA, Molecules to Humanity*. San Francisco: H. W. Freeman and Company (491 pages).
- Strauss, L. 1989. *The Rebirth of Classical Political Rationalism: Essays and Lectures by Leo Strauss*. Chicago: University of Chicago Press (285 pages).
- Swaminathan, M. S. 2001. "Sustainable Food and Water Security," in UNESCO-EOLSS, 2001: 579-597.
- United Nations Development Program (UNDP). 1999. *Human Development Report 1999*. New York: Oxford University Press, For the UNDP.
- United Nations Population Division. 2002. *World Population Prospects: The 2000 Revision*. New York: United Nations.
- UNESCO-EOLSS (M. K. Tolba, Ed.. 2001). *Our Fragile World: Challenges and Opportunities for Sustainable Development*. Forerunner to the *Encyclopedia of Life Support Systems*. Oxford and Paris: EOLSS-UNESCO.
- West, D. 1996. "The Contribution of Continental Philosophy" in R. E. Goodin and P. Pettit (eds.), *A Companion to Contemporary Political Philosophy*. Oxford, UK: Blackwell Publishers.

Figure 1: World Population Growth between 2000 and 2050 by Level of Development



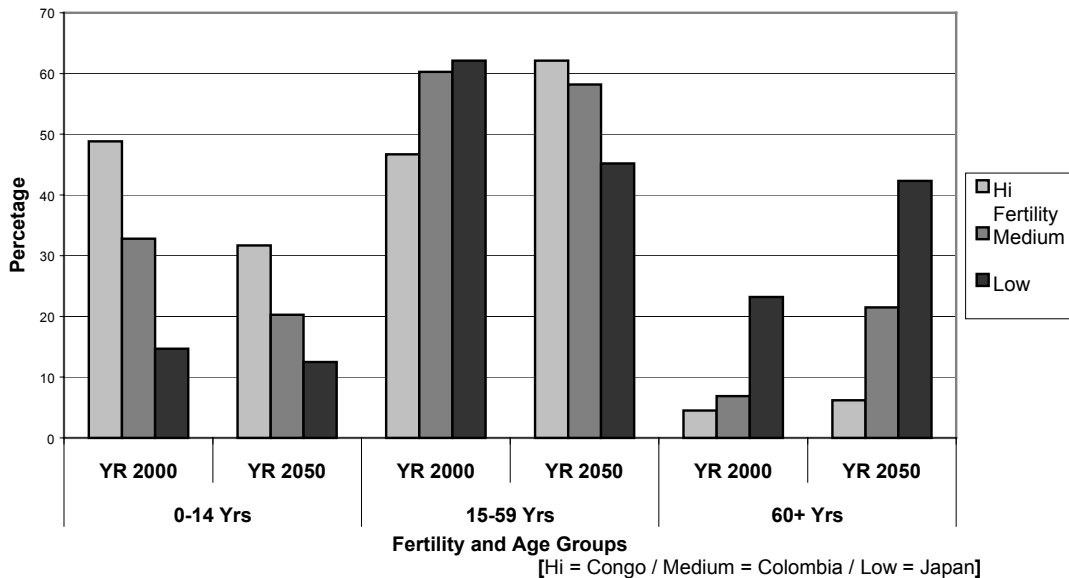
Source: UN Population Division, *World Population Prospects: 2000 Revision*

Figure 2: Average Annual Population Growth Rates by Broad Regions and Age Groups (Medium Scenario)



Source: UN population Division, *World Population Prospects: 2000 Revision*

Figure 3: Change in Age Structure between 2000 and 2050 For Hi, Medium and Low Fertility Profiles



Source: UN Population Division, *World Population Prospects: 2000 Revision*

Figure 4: The Economic Subsystem and the “Scale” of the Ecosystem

