DISCUSSION PAPER
GEO 3 Regional Meetings, October-November 2000

GEO-3 Scenarios:

Preliminary Framework

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1 GEO-3 and Scenarios

Through the Global Environment Outlook series, UNEP provides a comprehensive assessment of the state of the global environment, a review of policy responses and an outlook on the future. At the November 1999 start-up meeting for GEO-3 it was agreed tentatively that the report would have four main chapters: Introduction, Retrospective (1972-2002), Outlook (2002-2032) and Synthesis and Action.

The development of the Outlook chapter is taking a scenario-based approach to illuminate the challenges and appropriate responses over the coming decades. Recognition of the important role of scenarios for scanning long-range prospects and synthesizing global and regional perspectives goes back to the very beginning of the GEO series.[1] Building on the experience of the previous two GEO reports, the GEO-3 process includes an intensive international effort to develop policy-relevant integrated global and regional scenario assessments.

An Expert Group meeting on the Outlook chapter was held June 2000 in Nairobi. This was followed by a Core Scenario Group Meeting in July 2000 in Boston, which included representatives from regional Collaborating Centers, region-based and headquarters staff from UNEP and global scenario experts. This was followed by a larger meeting in September 2000 in Cambridge, UK, in which regional groups began to craft regional scenarios in the context of a global scenario framework.

A draft of the present paper was discussed at the Boston meeting and a revised version served as the discussion paper for the Cambridge meeting. This second revision aims to synthesize these ongoing discussions. It presents a provisional global scenario framework, story lines and quantitative illustrations for GEO-3 global scenarios. It is offered as a background document for the next milestone for the GEO-3 scenario process, the Regional Outlook Meetings to be held during October/November 2000. These meetings will explore regional scenarios in the context of the global scenarios presented here, with an emphasis on issues and policy opportunities that are specific to each region. In addition, the feedback from the regional meetings also will provide the basis for further refinement of the global scenarios. Then, a small Chapter 3 Drafting Meeting will be held to synthesize results for inclusion in the first draft of GEO-3.

Section 2 of this paper introduces the scenario approach. Section 3 provides an overview of major scenario frameworks in the literature for structuring thinking about the future, and introduces a framework for GEO-3. Section 4 offers narratives for the GEO-3 scenarios and presents quantitative illustrations by region. Section 5 summarizes some of the main lessons of the scenarios. Annex 1 presents statistical summaries of two of the scenarios for each region. In a companion document prepared by RIVM, Annex 2 offers further insight into the environmental impacts of the illustrative scenarios.

[1] At that time, the Stockholm Environment convened the Global Scenario Group (GSG), with participants from a wide spectrum of regions and disciplines. The GSG served as the Scenario Working Group for both GEO-1 and GEO-2000, and remains an important resource for GEO-3.

2 The Scenario Approach

GEO's mandate to assess long-range environmental issues poses significant methodological challenges. As the time horizon expands from years to decades, conventional techniques, such as trend analysis and mathematical modeling, become inadequate. The long-range future cannot be extrapolated or predicted due to three types of indeterminacy — ignorance, surprise and volition.

First, insufficient information on both the current state of the system and on forces governing its dynamics lead to a classical statistical dispersion over possible future states. Second, even if precise information were available, complex systems are known to exhibit turbulent behavior, extreme sensitivity to initial conditions and branching behaviors at various thresholds — the possibilities for novelty, surprise and emergent phenomena make prediction impossible. Finally, the future is unknowable because it is subject to human choices that have not yet been made.

In the face of such indeterminacy, scenarios offer a means for examining the forces shaping our world, the uncertainties that lie before us and the implications for tomorrow of our actions today. A scenario is a story, told in words and numbers, concerning the manner in which future events could unfold and offering lessons on how to direct the flow of events towards sustainable pathways and away from unsustainable ones. While we cannot know what will be, we can tell plausible and interesting stories about what could be.

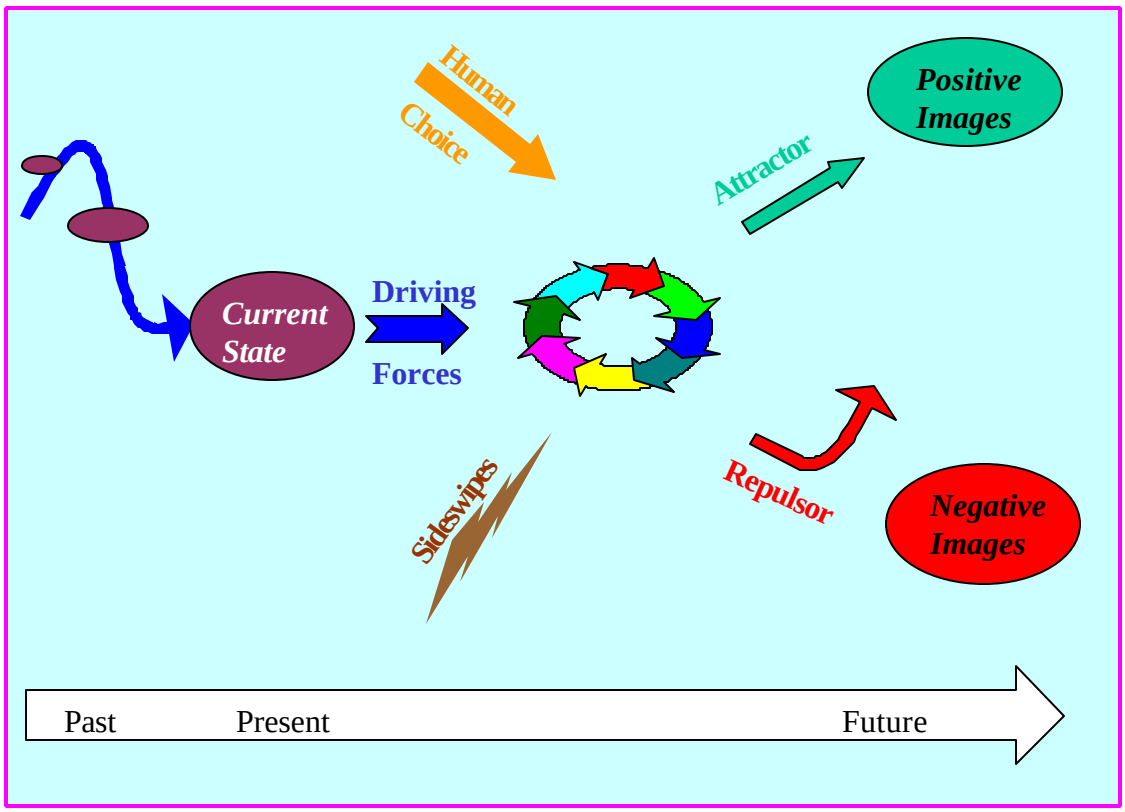
In the theater, a scenario is a summary of a play. Analogously, development scenarios are alternative stories about the future with a logical plot and narrative. Scenarios usually include images of the future — snapshots of the major features of interest at various points in time — and an account of the flow of events leading to such future conditions. Compelling scenarios need to be constructed with rigor, detail and creativity, and evaluated against the criteria of plausibility, self-consistency and sustainability, a process that requires thorough and intensive analysis.

Scenarios draw on both science — our understanding of historical patterns, current conditions, and physical and social processes — and the imagination to conceive, articulate and evaluate alternative pathways of development and the environment. In so doing, scenarios can illuminate the links between issues, the relationship between global and regional development, and the role of human actions in shaping the future. It is this added insight, leading to more informed and rational action, that is the foremost goal of scenarios, rather than prediction of the future.

Figure 1 sketches major features governing the dynamics of change of combined human and environmental systems. The *current state* of the system is the outcome of an historical process that is driven forward by a set of *driving forces*. These forces condition, but do not determine, the future trajectory of the system. Moreover, the capacity of human beings to imagine alternative futures and act intentionally means that images of the future can act as *attractive* and *repulsive forces* in shaping a scenario. Attracting attributes of future states might include their consistency with sustainability

principles. Negative images can play an important role, as well, in raising awareness and guiding efforts to redirect the evolution of the system away from perilous conditions. In addition, there is the possibility that surprising and extreme occurrences — called *sideswipes* in the figure — could effect development. Many unexpected events could matter (e.g., a breakdown of the climate system, a world war, cheap fusion power, a major natural disaster, a rampant global epidemic), but probabilities cannot be assigned, nor can all the possibilities be imagined. From a sustainable development perspective, scenarios would be encouraged that minimize vulnerability of societal and environmental systems to unfavorable events and enhance their resilience.

Figure 1. Scenario Dynamics



Scenario formulation generally involves the following steps:

- the *boundary* of the analysis is specified in several senses — spatially (e.g., global, regional, sub-regional), thematically (e.g., coverage of sectors, issues), and temporally (the time horizon of the analysis).
- *current state* is described across a range of dimensions — economic, demographic, environmental, institutional and so on.
- the important *driving forces and trends* that are currently conditioning and changing the system are introduced.
- a *narrative*, or story line, provides the plot by which the scenario stories unfold (often quantitative indicators are used to illuminate aspects of the scenarios).
- an *image of the future* paints a picture of conditions at one or more points in time.

Some scenarios are "forecasts" that describe how alternative futures might develop from current conditions and driving forces. Others, are "backcasts" that begin with an image of the future and seek to identify plausible development pathways for getting there. The *Policy Reform*, introduced in Section 3, is an example of a backcast.

Here, we will not review the "current state" of global and regional systems since that has been the focus of previous GEO reports and will again be taken up in Chapter 2 of GEO-3. Regarding driving forces, a number of significant trends and influences affect the initial direction for the global socio-ecological system and set the context for regional development.

Major driving forces at the global level include:

Demographics

Populations are growing larger, more crowded and older. Global population growth is stabilizing but total population will grow by about 50% by 2050 according to mid-range United Nations projections. Fully 95 percent of the additional population will be in developing countries. A massive transition from a predominately rural to a heavily urban society is underway. By 2050 nearly 3 billion new city dwellers may be added, posing great challenges for infrastructure development, the environment and social cohesion. Meanwhile, low fertility rates in rich countries and decreasing fertility rates elsewhere will lead gradually to an increase in the average age of populations. Societies will need to adjust to productive populations supporting a progressively greater population of the elderly. Although the linkages are not straightforward, in many instances population growth and urbanization can aggravate environmental and resource pressure.

Economics

Product, financial and labor markets are becoming increasingly integrated and interconnected in a global economy. Advances in information technology and international agreements to liberalize trade have catalyzed the process of globalization. Huge transnational enterprises operate increasingly in a planetary marketplace, posing challenges to the traditional prerogatives of the nation-state. A related factor is the resistance to these trends by nationally based economic interests, geopolitical

isolationists, and environmental and social advocates concerned about the impacts on environmental protection, labor conditions and community cohesion.

Social

Increasing inequality and persistent poverty characterize the contemporary global scene. As the world grows more affluent for some, life becomes more desperate for others left behind by global economic growth. Economic inequality between nations and within many nations is growing. This phenomenon combined with population growth leads to the persistence of poverty and human suffering for billions of people throughout the world. At the same time, the transition to market-driven development erodes traditional support systems and norms, leading to considerable social dislocation and scope for criminal activity. In some regions, rampant infectious diseases, such as AIDS are an important social driving force affecting development.

Culture

Consumer culture is rapidly permeating many societies in the wake of globalization and the penetration of information technology and electronic media. This process is both a result and a driver of economic globalization. At the same time, the advance toward a unified global marketplace triggers nationalist and religious reaction. In their own ways, both globalization, which leaves important decisions affecting the environment and social issues to transnational market actors, and the traditionalist reaction to globalization pose important challenges to democratic institutions.

Technology

Technology continues to transform the structure of production, the nature of work and the use of leisure time. The continued advance of computer and information technology is at the forefront of the current wave of technological innovation. Also, biotechnology could significantly affect agricultural practices, pharmaceuticals and disease prevention, while raising a host of ethical and environmental issues. Advances in miniaturized technologies could revolutionize medical practices, material science, computer performance and many other applications.

Environment

Global environmental degradation is another significant transnational driving force. International concern has grown about human impacts on the atmosphere, land, and water resources, the bioaccumulation of toxic substances, species loss, and the degradation of ecosystems. The realization that individual countries cannot insulate themselves from global environmental impacts is changing the basis of geo-politics and global governance.

Governance

There is a significant trend toward decentralization of authority and greater individual autonomy. On an individual level, there is increased emphasis on "rights" — human rights, women's rights, and so on. In the private sector, it is reflected in "flatter" corporate structures and decentralized decision-making. Some entities have no formal authority structure, such as the Internet or NGO networks. In the public sector, the trend is noticeable in the spread of democratic governments, in the devolution of governmental authority to

smaller and more local units, in separatist movements and in the emergence of civil society as an important voice in decision-making.

While these driving forces and persistent trends set the initial course for development, the complex global system, as we have argued, can rapidly change direction at critical thresholds of extreme turbulence and instability.

Scenarios can be told across multiple spatial levels — global, regional, national and local. While many issues cut across levels, specific aspects come into focus as one *zooms* in or out. For example, a planetary panorama is needed to reveal global economic, cultural, demographic and environmental phenomena. A regional perspective is required to analyze the problems of acid rain, water allocation, institutional patterns and certain migration patterns. A national focus sheds light on many policies, trade patterns and security issues. A local view often is appropriate for evaluating land-change patterns, biodiversity and ground level pollution. These alternative spatial scales provide complementary and mutually enriching windows for perception and understanding.

In an increasingly connected world, all levels of spatial resolution are needed to tell the scenario story fully and to illuminate the critical questions that scenarios address — where we might be going, where do we want to go and how do we get there. Global scenarios must reflect regional insights and patterns, while scenarios in various regions should be informed by common global assumptions. *In this spirit, scenarios at regional and global levels need to evolve in an iterative process of mutual clarification.*

Finally, it should be stressed that while scenarios certainly can offer quantitative insight, they are not primarily modeling exercises. The qualitative scenario narrative plays a critical role in giving voice to key aspects that are not quantifiable such as cultural influences, values, behaviors and institutions. Thus, scenarios can provide a broader perspective than model-based analyses, while at the same time making use of various quantitative tools such as accounting frameworks and mathematical simulation models. Quantitative analysis offers a degree of structure, discipline and rigor. Narrative can offer texture, richness and insight. The art is in the balance.

3 Scenario Framework

All scenario studies must reduce the immense range of possibilities to a few stylized story lines. Two competing considerations must be weighed. On the one hand, the goal of analytic rigor invites a comprehensive consideration of many scenario alternatives. On the other hand, the need to communicate to a wide audience of non-specialists dictates brevity and clarity. Generally scenario exercises organize the possibilities into a very few scenario alternatives.

Much of the scenario literature falls into two distinct streams of inquiry — one qualitative and narrative and the other quantitative and model-based. Each approach has strengths and limitations. Narrative scenarios can challenge the imagination, underscore critical

uncertainties and motivate actions for desirable futures. They are able to address qualitative factors (values, culture, behaviors, institutions), system shifts and surprise. But as largely literary exercises, they lack scientific rigor, and tend to reflect the biases and whims of the individual author.

Model-based scenarios can offer data-rich and systematic analysis. But quantitative models, since they assume structural continuity of the socio-ecological systems, are not easily adapted to address discontinuity and surprise. This sharply constrains the range of plausible futures that are considered. Moreover, important qualitative aspects of the problem are not addressed. Such studies are confined generally to a "business-as-usual" scenario and variations. For many non-specialists unfamiliar with such limitations, models have an aura of scientific precision that can lead to an unwarranted level of confidence in their predictive power and accuracy.

The cutting edge of scenario research today combines the strengths of the narrative and modeling traditions. The challenge is to retain scientific rigor while including a range of contrasting narratives on future possibilities. We introduce three recent efforts that take up this challenge: the work of the Global Scenario Group, SRES (Special Report on Emissions Scenarios of the IPCC) and the WBCSD (World Business Council on Sustainable Development).

3.1 Global Scenario Group

The Global Scenario Group uses a two-tier hierarchy to classify scenarios: *classes* and *variants*.[2] Classes are distinguished by fundamentally different social visions. Variants reflect a range of possible outcomes within each class. Three broad classes are *Conventional Worlds*, *Barbarization* and *Great Transitions*. These are characterized by, respectively, essential continuity with today's evolving development patterns, fundamental but undesirable social change, and fundamental and favorable social transformation.

Conventional Worlds envision the global system of the 21st century evolving without major surprises, sharp discontinuities or fundamental transformations in the basis for human civilization. The future is shaped by the continued evolution, expansion and globalization of the dominant values and socioeconomic relationships of industrial society. By contrast, the *Barbarization* and *Great Transitions* scenario classes relax the notion of the long-term continuity of dominant values and institutional arrangements. Indeed, these scenarios envision profound historical transformations over the next century in the fundamental organizing principles of society, perhaps as significant as the transition to settled agriculture and the industrial revolution.

For each of the three classes, we define two variants, for a total of six scenarios. The scenario structure is summarized in Figure 2. Also shown are indicative sketches of the behavior over time for six descriptive variables: population growth, economic scale, environmental quality, social and economic equity, technological change and degree of

[2] Source: Gallopin, G. A. Hammond, P. Raskin and R. Swart 1997. *Branch Points: Global Scenarios and Human Choice*. Stockholm, Sweden: Stockholm Environment Institute. The report is available from the Internet at http://www.gsg.org.

social and geopolitical conflict. The curves are intended as rough illustrations of the possible patterns of change only.

Within *Conventional Worlds*, the *Reference* variant incorporates mid-range population and development projections, and typical technological change assumptions. The *Policy Reform* scenario adds strong, comprehensive and coordinated government action, as called for in many policy-oriented discussions of sustainability, to achieve greater social equity and environmental protection. In this variant, the political will evolves for strengthening management systems and rapidly diffusing environmentally friendly technology. Whatever their differences, *Conventional Worlds* variants share the premises of the continuity of institutions and values, the rapid growth of the world economy and the convergence of global regions toward the norms set by highly industrial countries. In the business-as-usual *Reference* variant, the problem of resolving the social and environmental stress arising from global population and economic growth is left to the self-correcting logic of competitive markets. In the *Policy Reform* variant, sustainability is pursued as a proactive strategic priority.

Barbarization scenarios envision the grim possibility that the social, economic and moral underpinnings of civilization deteriorate, as emerging problems overwhelm the coping capacity of both markets and policy reforms. The *Breakdown* variant leads to unbridled conflict, institutional disintegration and economic collapse. The *Fortress World* variant features an authoritarian response to the threat of breakdown. Ensconced in protected enclaves, elites safeguard their privilege by controlling an impoverished majority and managing critical natural resources, while outside the fortress there is repression, environmental destruction, and misery.

Great Transitions explore visionary solutions to the sustainability challenge, including new socio-economic arrangements and fundamental changes in values. These scenarios depict a transition to a society that preserves natural systems, provides high levels of welfare through material sufficiency and equitable distribution, and enjoys a strong sense of social solidarity. Population levels are stabilized at moderate levels and material flows through the economy are radically reduced through lower consumerism and massive use of green technologies. The *Eco-communalism* variant incorporates the green vision of localism, face-to-face democracy, small technology and economic autarky. The *New Sustainability Paradigm* variant shares some of these goals, but would seek to change the character of urban, industrial civilization rather than replace it, to build a more humane and equitable global civilization rather than retreat into localism.

Conventional Worlds is where standard policy discussion occurs. But if environmental and social stresses are not resolved through incremental market and policy adaptations, development could veer toward some form of *Barbarization*. *Great Transitions* represent alternative forms of development in which the response to the sustainability challenge includes new values, consumption patterns and institutions.

3.2 Special Report on Emission Scenarios

The mandate for the IPCC Special Report on Emission Scenarios (SRES) was to develop greenhouse gas emissions scenarios to the year 2100 assuming that policies to mitigate

emissions are not implemented. The SRES team, unlike earlier IPCC scenario efforts, recognized the need for "multiple baselines" to reflect the fundamental uncertainty in basic long-range global development narratives. Modeling teams then computed greenhouse gas emissions for each of these scenarios. Thumbnail sketches of the four SRES scenario types follow.[3]

The four scenarios are constructed as different combinations of the following criteria: whether the world is integrated or fragmented and whether sustainability is a priority or not. In the SRES notation "A" and "B" signify unsustainable or sustainable, and "1" and "2" signify global integration or fragmentation. Thus, A1 is an integrated unsustainable world, A2 is a fragmented unsustainable world, B1 is an integrated sustainable world and B2 is a fragmented sustainable world.

The A1 storyline and scenario family describes a future world of very rapid economic growth, global population that peaks in mid-century and declines thereafter, and the rapid introduction of new and more efficient technologies. Major underlying themes are convergence among regions, capacity building, and increased cultural and social interactions, with a substantial reduction in regional differences in per capita income. The A1 scenario family develops into three groups that describe alternative directions of technological change in the energy system. The three A1 groups are distinguished by their technological emphasis: fossil intensive (A1FI), non-fossil energy sources (A1T), or a balance across all sources (A1B).

The A2 storyline and scenario family describes a very heterogeneous world. The underlying theme is self-reliance and preservation of local identities. Fertility patterns across regions converge very slowly, which results in continuously increasing global population. Economic development is primarily regionally oriented and per capita economic growth and technological change are more fragmented and slower than in other storylines.

The B1 storyline and scenario family describes a convergent world with the same global population that peaks in mid-century and declines thereafter, as in the A1 storyline, but with rapid changes in economic structures toward a service and information economy, with reductions in material intensity, and the introduction of clean and resource-efficient technologies. The emphasis is on global solutions to economic, social, and environmental sustainability, including improved equity, but without additional climate initiatives.

The B2 storyline and scenario family describes a world in which the emphasis is on local solutions to economic, social, and environmental sustainability. It is a world with continuously increasing global population at a rate lower than A2, intermediate levels of economic development, and less rapid and more diverse technological change than in the

[3] Source: Special Report on Emission Scenarios (SRES). 2000. *Summary For Policymakers* and *Emission Scenarios*, Working Group III of the Intergovernmental Panel on Climate Change.

B1 and A1 storylines. While the scenario is also oriented toward environmental protection and social equity, it focuses on local and regional levels.

3.3 World Business Council on Sustainable Development

Consistent with its mission, the World Business Council on Sustainable Development's (WBCSD) scenario project is aimed at engaging its corporate members to reflect on the risks and opportunities posed for business by the sustainable development challenge. The WBCSD's three scenarios are summarized below.[4]

The world of *FROG!* is a familiar world — at least at first. Many nations experience a fair degree of economic success, and, for almost all, economic growth is the major concern, with sustainable development acknowledged to be important, but not pressing. As environmental NGOs continue to demand enforcement of standards that have been set in global summits, those nations who are striving to develop argue that if the developed nations insist on raising environmental standards, they should "First Raise Our Growth!" Indeed, in this scenario, some nations leapfrog from underdeveloped status to bench marker in particular areas of technology. People in western nations respond in uneven ways—sometimes by offering help in improving the environment, and sometimes in raising various cries of "FROG!" themselves, especially in response to perceived threats from underdeveloped nations in the areas of employment and copyright and patent infringement.

People value sustainable development in the *FROG!* scenario — but it is not top priority. In addition, in the early years, environmental health in many areas improves significantly. The improvement in local air quality, solid waste management, and environmental education leads to a perception that the environment is in much better shape than it was in the late 1990s. But at the global level, the picture is less clear. With economic growth and the increase in population, greenhouse gases are rising, unnoticed by most. The signals are difficult to read, and people disagree about what they mean — both the difficulty and the disagreement are good reasons, it is felt, to continue to "First Raise Our Growth!" But, by 2050 there is evidence that the darkest predictions about global warming are actually nearer to the truth than the more optimistic ones.

In *FROG!*, the habitual reliance on technology has not been sufficient to solve longer-term problems of either environmental or social health. Globalization and liberalization of markets along with the pressures of rapid urbanization have raised the degree of social inequity and unrest to a level that threatens basic survival of both human and environmental ecosystems. In this scenario, people react like the proverbial frog: when placed in boiling water, the frog leaped out of danger; but placed in cold water that was gradually heated to the boiling point, the complacent frog was boiled to death.

GEOpolity begins with a succession of signals in the first two decades — some real, some imagined — that an environmental and social crisis looms. The prevailing

4 Source: World Business Council for Sustainable Development (WBCSD). 1997. Exploring Sustainable Development. Summary Brochure. Geneva.

"economic myth" is increasingly viewed as dangerously narrow. This is particularly true in Asia, where rapid economic growth has meant that corners have been cut and traditions lost. Because many institutions, especially governments, have lost credibility as problem-solvers, people expect something from the new centers of power — multinationals. But the business sector seems unable or unwilling to respond adequately. Business is distrusted, and in some cases, because of its prevailing focus on narrow self-interest, is even perceived to be hindering solutions to problems. Its actions are not coordinated on a global level, and it seems to lack the will even to address the problems.

Because neither governments nor businesses are effective in providing leadership, people begin to look for new leaders and to demand new social institutions. Some of these involve the strengthening of government — for example, "sustainable cities," "sustainable national accounting," and comprehensive implementation of industrial ecology. Others are politically innovative. The perceived need for strong and certain responses leads to a new global consensus that welcomes technocratic solutions, sanctions, and more direct control of the market to ensure that environmental values and social cohesion are preserved. The impetus behind all these movements is the growing consensus that the market has no inherent incentives to protect the commons, social welfare, or any other non-economic values. In the absence of leadership from business and government to solve problems, people form new global institutions — such as the Global Ecosystem Organization (GEO), which has broad powers to design and enforce global standards and measures to protect the environment and preserve society—even if doing so requires economic sacrifice.

In *GEOpolity*, governments are rejuvenated as focal points of civil society. Governments seek to work with markets rather than to displace them. But they take the lead in shifting the structure of the economy towards sustainable development in conjunction with institutions such as GEO.

In the world of *Jazz*, diverse players join in ad hoc alliances to solve social and environmental problems in the most pragmatic possible way. The key note of this scenario is dynamic reciprocity. This is a world of social and technological innovations, experimentation, rapid adaptation, much voluntary interconnectedness, and a powerful and ever-changing global market.

What enables the quick learning and subsequent innovation in *Jazz* is high transparency — the widespread availability of information about ingredients of products, sources of inputs, company financial, environmental, and social data, government decision-making processes, and almost anything else concerned consumers want to know. Many players are involved, in part because the way information technology lowers barriers to entry allows new actors to step onto the economic stage. And that stage itself is characterized by a global free market, sound legal systems, and a respect for property rights.

To the extent that government is involved, it is most active at the local level, with ad hoc global institutions arising to solve particular problems. Agreements are reached through mediation in a world in which transparency is required, but particular "green" behaviors are not, even though such behaviors are rewarded. Achievement of the new

environmental and social standards occurs largely out of self-interest. The public is made aware of transgressions and quickly acts against companies or countries that violate standards. Companies have an interest in seeing that disputes do not escalate and indirectly harm them. They monitor relationships with customers and suppliers closely and drop risky partners quickly. In this highly competitive and interconnected world, businesses see strategic economic advantages in being perceived as environmentally and socially responsible, and many become pro-active leaders in responding to social and environmental challenges.

Jazz is a world in which NGOs, governments, concerned consumers, and businesses act as partners — or fail. Together, along with other players, they learn effective ways of incorporating environmental and social values into market mechanisms.

3.4 GEO-3 Framework

The point of departure for the GEO-3 scenarios is the Global Scenario Group framework described in Section 3.1 and listed in the first column in Table 1. For direct use in GEO, both the SRES and WBCSD efforts have significant limits. The SRES scenarios focus on the climate change issue. An integrated consideration of other major environmental and research issues was beyond its mandate, as were social dimensions of the scenarios, such as the implications international equity and poverty. The WBCSD work is focussed heavily on the business perspective. Also, the full description of the scenarios is only available to non-members at considerable cost. Nevertheless, we can learn from these efforts and, since they are variations on similar themes, they can be synthesized into a common framework. (see table below).

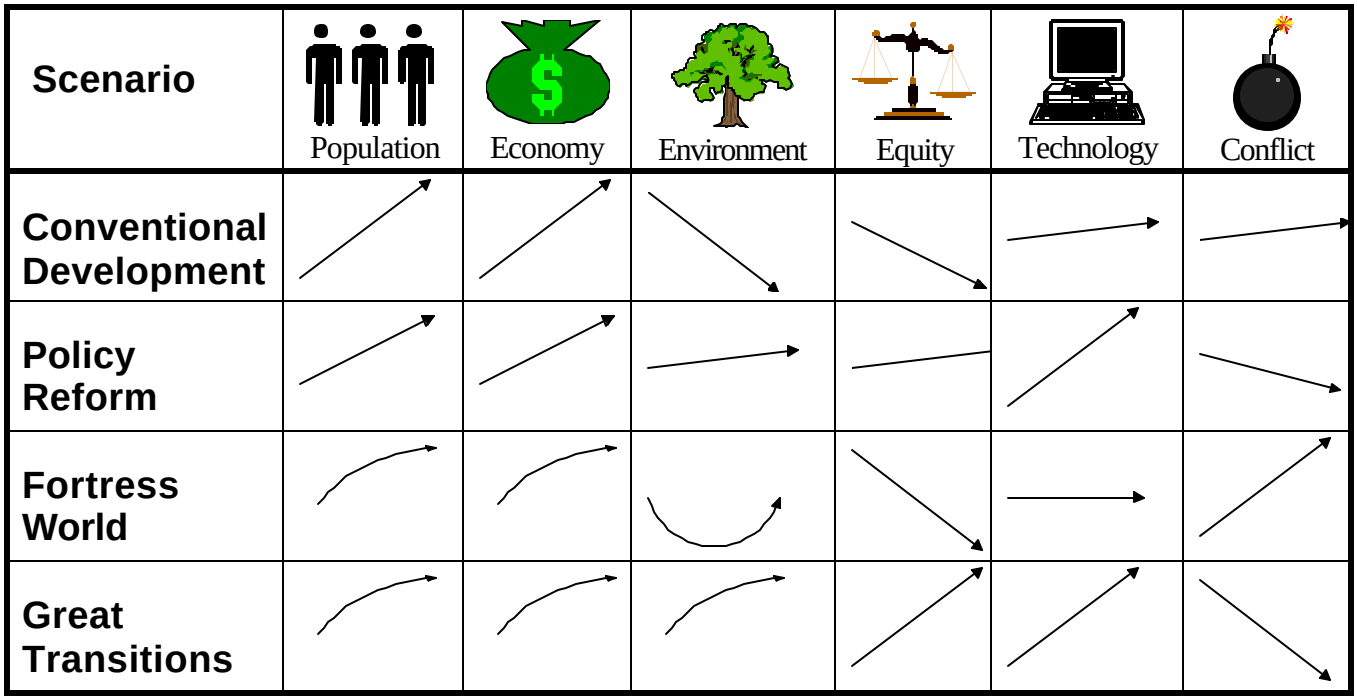
The final column of Table 1 introduces the proposed GEO-3 scenarios. Rather than the full structure, the GEO-3 scenarios will focus on the GSG's *Conventional Worlds-Reference*, *Conventional Worlds-Policy Reform*, *Barbarization-Fortress World* and *Great Transitions-New Sustainability* paradigm.

Table 1. Scenarios Compared

GSG	SRES	WBCSD	GEO-3
Conventional Worlds *Reference* *Policy Reform*	*A1* *B1*	*FROG!* *GEOpolity*	*Conventional Development* *Policy Reform*
Barbarization *Breakdown* *Fortress world*	*A2*		*Fortress World*
Great Transitions *Eco-communalism* *New sustainability paradigm*	*B2*	*Jazz*	*Great Transitions*

The scenarios are shown in Figure 2 with indicative sketches of their behavior over time for six descriptive variables: population growth, economic scale, environmental quality, social and economic equity, technological change and degree of social and geopolitical conflict. The curves are intended as rough illustrations only of the possible patterns of change.

Figure 2. Scenarios Structure with Illustrative Patterns of Change



3.5 Note on Scenario Names

The names of the GEO-3 scenarios are provisional. Participants are invited to propose alternative names that are more precise and/or evocative.

The name *Conventional Development,* in particular, has caused some confusion. Some take it to mean simply "business-as-usual", implying no major changes from current patterns. However, the *Conventional Development* scenario refers to a future governed by a *conventional development paradigm* of market-driven development, accelerated globalization, trade liberalization, and convergence of developing countries toward the development and institutional models of industrialized countries. Rather than "business-as-usual", *Conventional Development* is a normative future which would require substantial policy initiatives at global, regional and national levels to overcome the barriers to such a market-driven future, to foster the necessary institutional conditions and to bring the developing world into the global market system. GEO-3 participants have offered such alternative names for the scenario as *Market World* and, perhaps facetiously, the *IMF Dream*.

The *Policy Reform* scenario accepts the basic development and modernization model of C*onventional Development*, but envisions the successful imposition of policies to meet strong environmental sustainability and social goals. This perspective underlies tacitly much of the international discussion and negotiation on these issues, which seek to reduce ecological impacts and levels of poverty through better technology and management practices, but do not take up more fundamental questions of the conventional model of development. In light of this, the alternative names that have been

offered for the *Policy Reform* scenario are *Balanced Growth* (since the objective of economic growth is moderated by environmental and poverty-reduction targets) or *Brundtland's Dream*, since this worldview seems to underlying the seminal Brundtland Report.

The metaphor *Fortress World* is meant to connote a future of global polarization, extreme inequity and rampant conflict. An alternative name might simply be *Fragmented World*. (An interesting is that many scenario discussants seem to think of this dark future as the "business as usual" scenario, that is, the most likely outcome of current trends.)

The essence of the *Great Transitions* scenario is a values-driven and fundamental modification of conventional development paradigm and the long-range development model. Suggestions for alternative names would be welcome. While *Sustainable World* has been suggested, this may be inadequate since — with a likelihood depending on one's values — each of the scenarios may be thought to have the potential to meet sustainability criteria. Even in the authoritarian *Fortress World* some form of environmental sustainability may be imposed.

4 Scenario Narratives

The proposed GEO-3 framework provides a rich spectrum of possible futures for assessing the risks and opportunities:

- *Conventional Development*: market-driven global development leads to convergence toward dominant values and development patterns
- *Policy Reform*: incremental policy adjustments steer conventional development toward environmental and poverty-reduction goals
- *Fortress World*: as socio-economic and environmental stresses mount, the world descends toward fragmentation, extreme inequality and widespread conflict
- *Great Transitions:* a new development paradigm emerges in response to the challenge of sustainability, distinguished by pluralism, planetary solidarity, and new values and institutions

Story lines are sketched for each scenario below as they unfold to the year 2032, the time horizon for GEO-3. The *Conventional Development* and *Policy Reform* scenarios are further elaborated with quantitative illustrations of long-term patterns across selected economic, social and environmental indicators.[5]

4.1 Conventional Development

At the turn of the 21st Century, many people were apprehensive about the future. Would the momentum toward a global economy endure? Would institutional development evolve toward a common and integrated multilateral system? Would environmental distress eventually de-stabilize economic growth? Would social tensions induced by inequality, poverty and ethno-regional friction be contained?

But in the event, world development evolves without major discontinuities, change in dominant global values or other structural ruptures. The major trends and driving forces shaping world development at the end of the 20th Century dominate through the next decades. Population grows at mid-range projections, urbanization proceeds apace, economies grow steadily, and consumption and production practices in developing and transitional regions converge toward those of industrialized countries. The world becomes increasingly more integrated both economically and culturally. Competitive markets and private investment are the engines for economic growth and wealth allocation. Globalization of product and labor markets continues apace, catalyzed by free trade agreements, increasingly unregulated capital and financial flows, and advances in information technology. Transnational corporations dominate an increasingly borderless economy. Consumerism and possessive individualism endure and spread as primary human motives. The nation-state remains the dominant unit of governance although its capacity to control developments within its borders diminishes as global society becomes

[5] The analysis in Annex 1 relies on SEI's PoleStar scenario tool. PoleStar is a flexible, comprehensive and user-friendly system for representing quantitative aspects of alternative futures at global, regional and national levels (see http://www.seib.org/polestar).

more interconnected. Also, the political momentum for reduced government, privatization and de-regulation of the late 20th Century continues.

A number of important initiatives pave the way. The World Trade Organization provides the legal basis for the global trading system. A multilateral agreement on investment liberalizes investment regimes first in OECD countries and soon throughout the world. Barriers to trade and capital movements gradually vanish, as protectionism becomes a thing of the past. New institutional instruments promote market openness and global competition. Virtually all national governments advance a package of policy adjustments that include modernization of financial systems, investment in education to create a work force that is competitive in the emerging global market, privatization, reduced social safety nets, and, in general, reliance on market-based approaches.

While many are euphoric about fashioning a liberalized global market, a troubling counterpoint can be heard from those excluded from the new prosperity and those concerned about the environment, labor practices and the erosion of community. For at the heart of the *Conventional Development* scenario lies an unfulfilled promise — the international commitment at the 1992 Rio Earth Summit to the principles of sustainable development gradually dissipates. The ambitious intentions codified in *Agenda 21* remain largely rhetorical as the difficult political journey from good intentions to effective action is abandoned. Of course, initiatives continue — national sustainability studies, incremental progress on international climate and biodiversity agreements, countless local efforts and so on. But these are fragmented and insufficient.

It was widely hoped that "Rio+10" of 2002 would be a planetary opportunity to renew the spirit, energy and vision for a sustainable future. Indeed, a brief upsurge of activity and optimism does occur at that time. But gradually the political momentum for sustainable development ebbs amidst global fatigue with the sustainability issue. Social and environmental policy remains partial, inadequate and episodic, rather than the coordinated, comprehensive and continuous response required. By 2032, the era of sustainable development is over, remembered only by historians of the late twentieth-century and by nostalgic grandparents recalling their idealistic youth.

In this context, the rich get richer and, even though new social strata achieve affluence, poverty persists. Income distribution becomes more skewed both within most nations and between rich and poor countries. Environmental quality improves in some of the rich areas, but deteriorates in the poor areas while the cumulative effects on global scales are exacerbated. Social friction is aggravated by migration pressure, competition for natural resources and environmental deterioration.

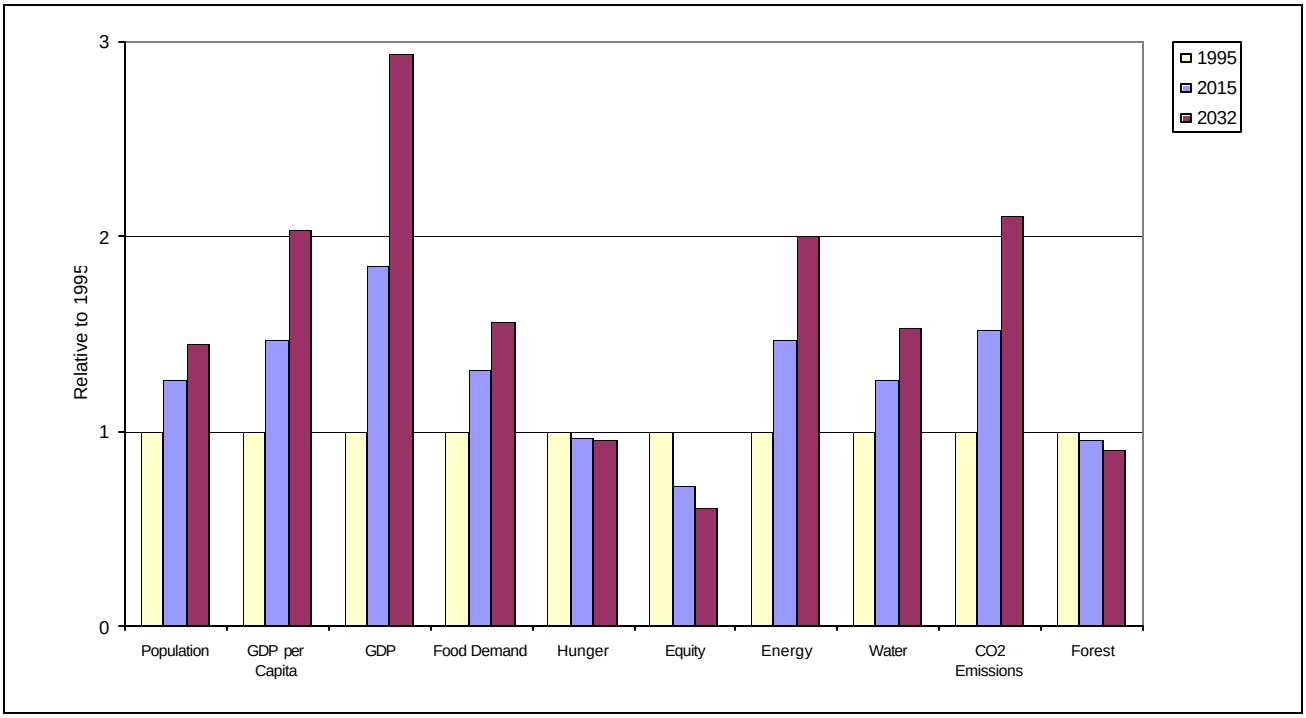
A quantitative sketch helps tell the story. An illustrative *Conventional Development* scenario incorporates current trends and policies, and synthesizes the "business-as-usual" assumptions of numerous international sectoral assessments.[6] The scenario adopts

6 Note that the *Conventional Development* and *Policy Reform* quantitative illustrations are updated versions of the scenarios in Raskin, P, G. Gallopin, P. Gutman, A. Hammond and R. Swart. 1998. *Bending the Curve: Toward Global Sustainability*. Stockholm, Sweden: Stockholm Environment Institute and Nairobi, Kenya: UNEP. The 10 regions in that report have been extended to 22 GEO-3 regions.

typical demographic and macro-economic drivers, and assumes the persistence of a number of underlying structural processes. The gradual shift continues in the composition of economic activity from industry to services in OECD countries (and eventually, other regions). In particular, the shares of material intensive industries decrease gradually, consistent with recent trends in industrialized countries. The penetration of new technology leads to more efficient use of energy and water, growing utilization of renewable energy resources, and cleaner industrial processes. In general, developing country patterns of consumption and production converge toward OECD patterns, thus leapfrogging toward modern technologies.

The aggregate global patterns of the scenario are illustrated in Figure 3. Note that total energy and water use grows far less rapidly than GDP due to the structural and technological changes described above. Despite reductions in the *throughput* per unit of GDP (throughput refers to the materials input to the economy and waste output), pressure on resources and the environment increase as the growth in the scale of human activity overwhelms the greater levels of efficiency. As a measure of environmental pressure, we see that carbon dioxide emissions (CO_2), the major contributor to the risk of global climate change, increase substantially. The scenario is also problematic with respect to meeting social goals as indicated by the persistence of the number of hungry people ("hunger" in Figure 3).

Figure 3. Global Overview of the *Conventional Development Scenario*



Please see Annex 1 for summaries of the scenario for each of the 22 GEO-3 regions and six major regional groupings.

The *Conventional Development* achieves much in terms of modernization, economic growth and opportunity for untold millions. But in fundamental ways, it is neither sustainable nor desirable. First, environmental degradation continues, including climate change, habitat destruction, biodiversity loss and the accumulation of toxic chemicals in the environment. Second, pressure on resources grows severe, including fresh water scarcity, conversion of forests and wetlands for agriculture and human settlements, continued loss of degraded arable land due to unsustainable farming practices and growing scarcity of oil with the risk of economic uncertainty and conflict. Third, social stress threatens socio-economic sustainability as persistent poverty and growing inequality, exacerbated by environmental degradation, undermines social cohesion, stimulates migration and weakens international security.

4.2 Policy Reform

In retrospect, the year 2002 stands out as a milestone in global development. The momentum for change had been brewing since the 1972 Stockholm Conference on the Human Environment. The 1987 Brundtland report crystallized the emerging concept of sustainable development, bringing it to the attention of the policy community and general public. The 1992 Rio Earth Summit converted the broad idea of sustainable development to an agenda for change that was endorsed by the nations of the world.

While this agenda languished for a time, the approach of the Rio+10 meeting galvanized a renewed commitment to action. A consensus emerged on the urgent need to temper what had come to be called the *Conventional Development* scenario, with policies to secure environmental resilience and to sharply reduce poverty. A reinvigorated NGO community became the channel through which citizens everywhere expressed their demands, a rising voice that political leaders could not ignore. The public grew increasingly concerned about passing an impoverished world to their children. The IPCC released its Third Assessment Report, which reinforced deep concerns about the integrity of the climate system. UNDP and other international organizations forcefully advocated action for poverty reduction and sustainable livelihoods. A notable contribution at this time was UNEP's GEO-3 report, which clearly portrayed long-range environmental perils, but more importantly offered a vision of an equitable and sustainable future. The political basis for implementing a comprehensive set of environmental and social policies was taking shape.

The *Policy Reform* scenario that emerges from this process is not a radical deviation from *Conventional Development*. The emphasis on economic growth, trade liberalization, privatization and modernization remains. The integration of the global economy proceeds apace, as poorer regions converge very gradually toward the model of development of the rich countries. The values of individualism and consumerism persist, transnational corporations continue to dominate the global economy and governments modernize their economies and social welfare structures.

The defining feature of the scenario is the emergence of the political will to constrain and guide market-driven growth with a comprehensive set of sustainability policies. The *Policy Reform* scenario is based on a set of social and environmental goals adopted by the international community. These guidelines are adjusted periodically in light of new information. Planners call this a "backcast", which begins with an image of desirable future conditions and seeks development trajectories to reach these future states. Social and environmental targets are set at global, regional and national levels. The policy initiatives for achieving the goals are regionally differentiated but include a mix of economic reform, regulatory instruments, voluntary actions, social programs and technology development.

Global social targets are expressed in terms of measures of poverty reduction. They are initially based on the goals set at a series of international conferences in the 1990s (Table 2). For example, the 1996 World Food Summit resolved that undernutrition was to be halved by the year 2015. To achieve this goal, the number of undernourished people must decline from over 800 million today to roughly 400 million over 20 years. This was an ambitious goal — the number undernourished fell only about 70 million between 1970 and 1990. Nevertheless, in this spirit a *Policy Reform* goal is set at cutting hunger in half by 2025 and half again by 2050. Similar targets are set for other social indicators.

Table 2. Global Social Targets for Policy Reform Scenario

Indicator		1995	2025	2050
Hunger	Millions of people	820	410	205
	% of 1995 value	-	50%	25%
	% of population	15%	5%	2%
Unsafe Water	Millions of people	1,360	680	340
	% of 1995 value	-	50%	25%
	% of population	24%	9%	4%
Illiteracy	Millions of people	1,380	690	345
	% of 1995 value	-	50%	25%
	% of population	24%	9%	4%
Life Expectancy	Years	66	> 70 in all countries	

At the same time, international agreement is reached on a set of environmental targets as summarized in Table 3. The indicators fall into two broad categories. Climate destabilization, eco-efficiency and toxic wastes relate primarily to industrial activities and the demands of modern lifestyles. Deforestation, degradation of land, over-exploitation of fisheries, and potential scarcity of freshwater relate, in addition, to poverty and growing populations. The targets call for substantial decreases in the environmental pressures from OECD economies. At the same time, the targets for developing countries acknowledge that the process of development and industrialization must continue in these regions, and generally propose that developing regions converge gradually toward the decreasing OECD targets.

Table 3. Environmental Targets for the Policy Reform Scenario

Region	Indicator	1995	2025	2050
Climate				
World	CO_2 concentration	360 ppmv	Stabilize at < 450 ppmv by 2100	
	Warming rate		Average 0.1°/decade, 1990-2100	
	CO_2 emissions		< 700 GtC cumulative, 1990-2100	
OECD	CO_2 emissions rate	various and rising	< 65% of 1990 (< 90% of 1990 by 2010)	<35% of 1990
non-OECD	CO_2 emissions rate	various and rising	increases slowing, energy efficiency rising	reach OECD per capita rates by 2075
Resource Use				
OECD	Eco-efficiency	$100 GDP/300 kg*	4-fold increase ($100 GDP/75 kg)	10-fold increase ($100 GDP/30 kg)
	Materials use/capita	80 tonnes*	< 60 tonnes	< 30 tonnes
non-OECD	Eco-efficiency	various but low	converge toward OECD practices	
	Materials use/capita	various but low	converge toward OECD per capita values	
Toxics				
OECD	Releases of persistent organic pollutants & heavy metals	various but high	< 50% of 1995	< 10% of 1995
non-OECD	Releases of persistent organic pollutants & heavy metals	various and rising	increases slowing	Converge to OECD per capita values
Freshwater				
World	Use-to-Resource ratio	various and rising	reaches peak values	0.2-0.4 maximum (in countries>.4 in 1995, less than 1995 values)
	Population in water stress	1.9 billion (34%)	less than 3 billion (<40%)	less than 3.5 billion, begins decreasing (<40%)
Ecosystem Pressure				
World	Deforestation	various but high	no further deforestation	net reforestation
	Land degradation	various but high	no further degradation	net restoration
	Marine over-fishing	fish stocks declining	over-fishing stopped	Healthy fish stocks

***** Includes direct inputs of minerals, metals, construction materials, and biomass along with material that is moved or discarded in the process of extraction and processing.

The criterion for climate is that warming should occur no faster than 0.1°C/decade on average between 1990 and 2100, a value that will allow most ecosystems to adapt. This implies that the concentration of carbon dioxide in the atmosphere should stabilize at less than 450 parts per million by volume (ppmv) by 2100. This constraint, in turn, places limits on the cumulative carbon dioxide emissions from human activities of about 700 billion tonnes of carbon (GtC). The aggregate global emissions must be allocated to regions and countries. The targets introduced here take into account equity and burden-sharing considerations in the allocation of emission rights. The OECD regions are assumed to decrease emissions, with all regions approach a common emissions per capita target by 2075. The approach to equity is shown in Figure 4, which shows emissions per capita. The total emissions pattern is shown in Figure 5.

Figure 4. Energy-Related CO_2 Emissions per Capita in *Policy Reform*

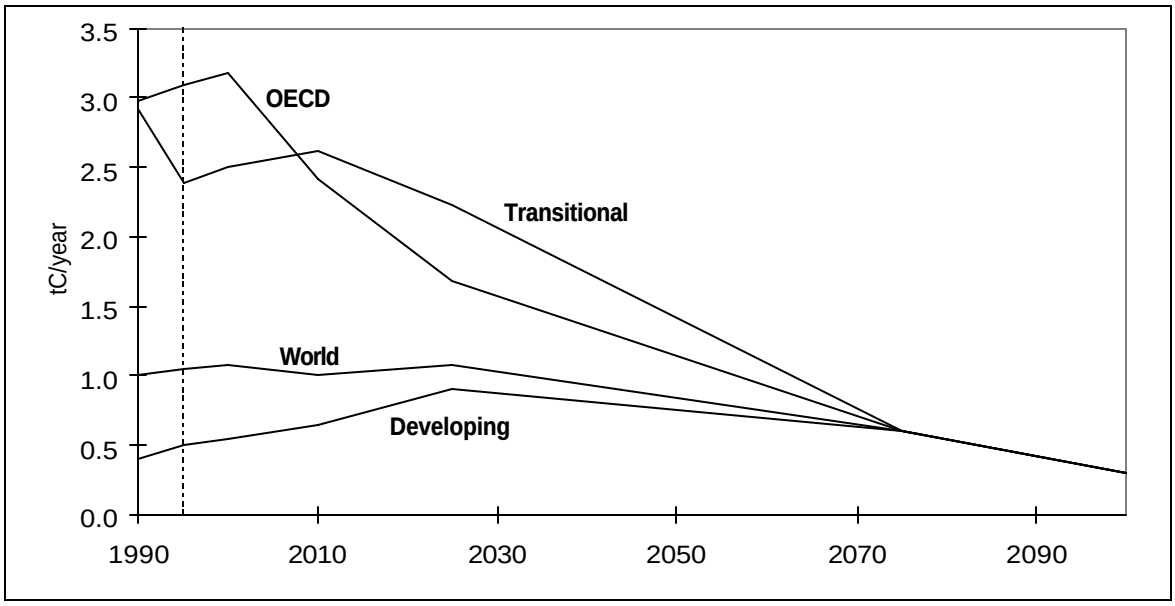
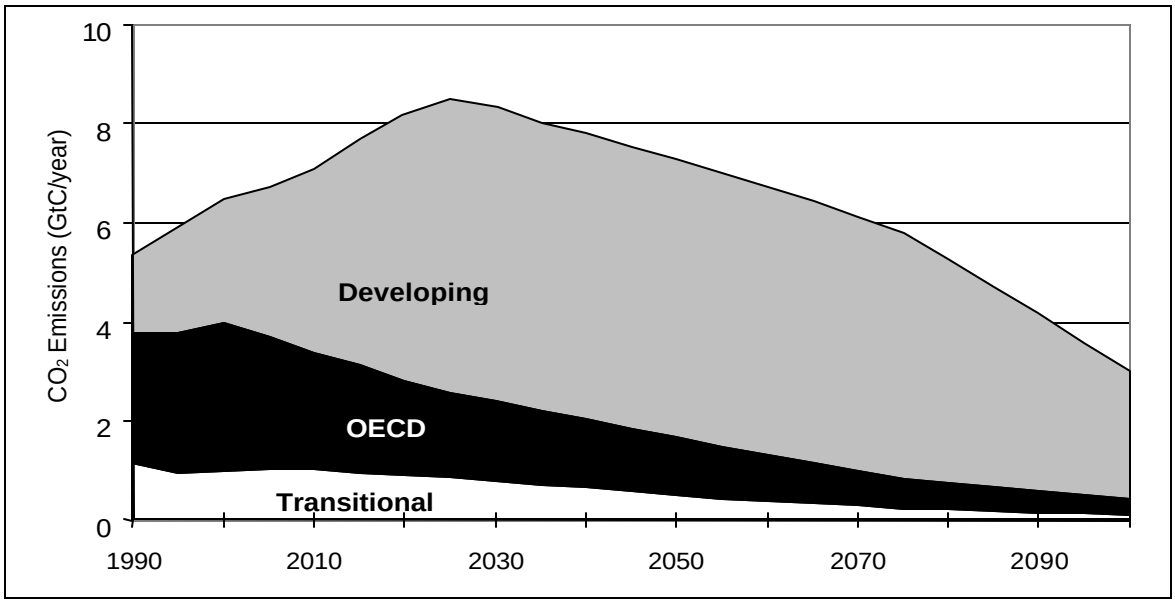


Figure 5. Annual CO_2 Emissions in *Policy Reform*



Regarding resource use, the goal is rapid dematerialization of the economy. The target for OECD countries is a 10-fold increase in the eco-efficiency ratio (economic output per unit of material input) by 2050. An ambitious but achievable interim goal is a 4-fold increase in the eco-efficiency ratio by 2025. Allowing for economic growth, these targets correspond roughly to a 25% reduction in materials use per capita by 2025 and an additional 50% decrease by 2050. The sustainability target for developing countries is to converge toward OECD practices in the course of economic growth.

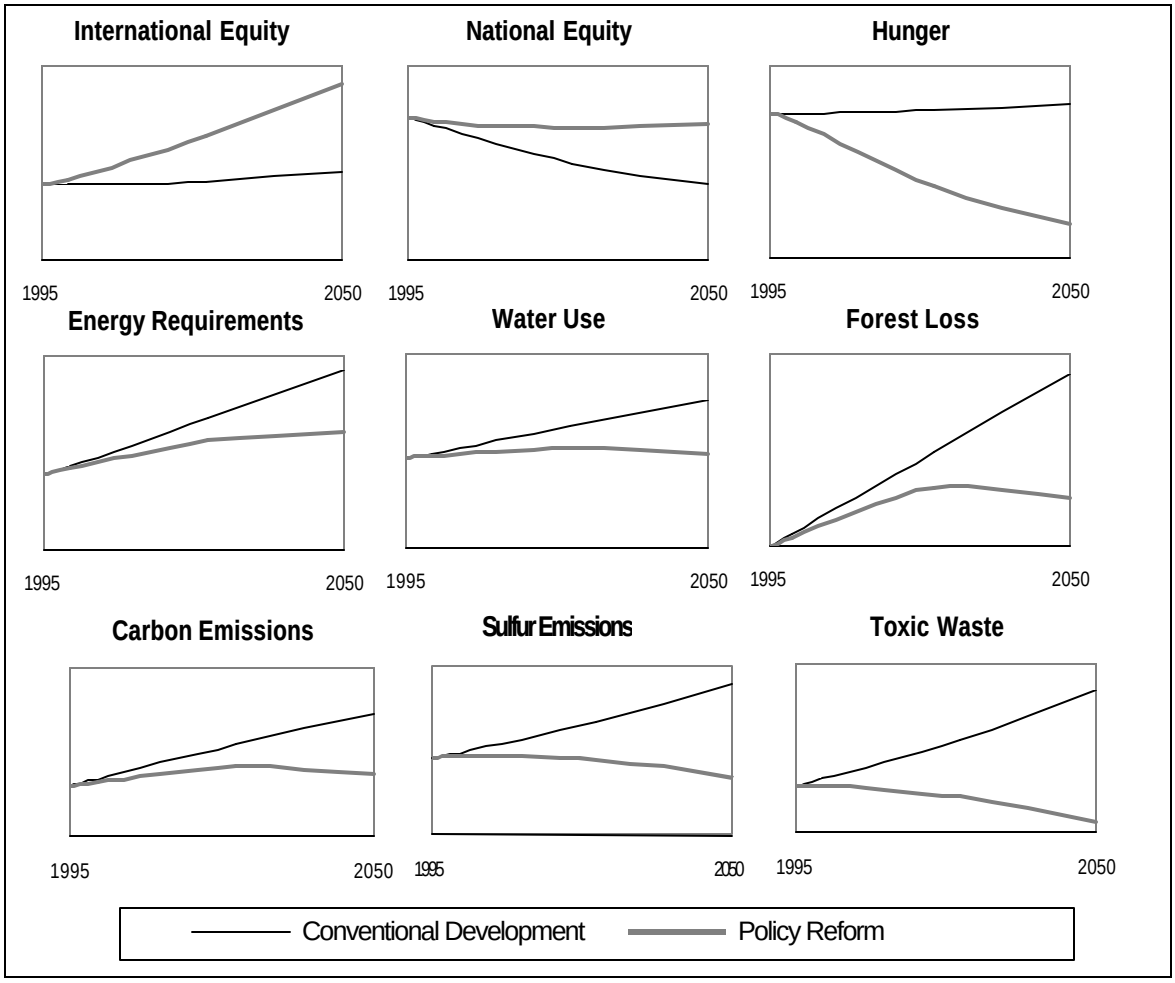
The provisional sustainability target for toxic substances is a reduction of emissions by 50% by 2025 and 90% reduction by 2050. Use and emissions of toxic substances in developing countries are far below OECD levels on a per capita basis but are rising rapidly and are likely to increase further as industrial activity intensifies. The target set here is that these increases begin to slow by 2025 and converge toward OECD per capita levels by 2050.

Building on a series of freshwater assessments in the 1990s and the World Water Vision of 2000, freshwater sustainability is identified as one of the major challenges. While the assessments showed that there is no easy or quick fix, they do indicate that well-designed policies can gradually moderate this deepening problem. The targets adopted for the *Policy Reform* development scenario recognize the inevitability of continuing water stress in many regions. A program to increase water-use efficiency, reduce losses and enhance dependable resources are set in motion which guarantee that in areas where freshwater is scarce, withdrawal requirements are substantially moderated and begin to decrease after 2025.

Three indicators represent ecosystem targets: the rate of deforestation, the rate of land degradation and the extent of over-fishing in the major marine fisheries. The target is for deforestation rates (the net forests lost per year) to reach zero before 2025 in all regions. Land degradation rates (e.g., the land lost to agriculture per year as a result of chemical or physical erosion) should also slow to zero by 2025. Finally, over-fishing should be curtailed so that the world's fish stocks can rebuild themselves to healthy levels.

These social and environmental goals are achieved through a comprehensive set of initiatives to address poverty and income distribution, increase the eco-efficiency of agriculture and production systems, facilitate the deployment of renewable resources and improved end-use technology, and improve management systems. The *Policy Reform* scenario is highlighted in Figure 6 where global patterns are compared to the *Conventional Development* scenario.

Figure 6. *Conventional Development* and *Policy Reform* Compared



Detailed results for the *Conventional Development* and *Policy Reform* scenarios are presented in the Annex 1 for each GEO-3 region and six major regional groupings.

4.3 Fortress World

In the wake of the failure of Rio+10, the momentum for sustainable development fizzles. The voices for a strong policy response are not heeded. The world grows complacent about the issues of the global environment and equity. As a matter of philosophy or convenience, the belief spreads that free markets alone are sufficient to stimulate appropriate adaptations. Gradually governments retreat from social concerns as the ideology of individualism supplants the last vestiges of civic commitment. In any case, the scope for governmental action contracts with the ascendancy of global market forces. Development aid declines, poverty rises and the gulf between rich and poor widens. Tantalized by media images of opulence and dreams of affluence, the excluded billions grow restive and emigrate in waves. The poison of social polarization deepens.

Meanwhile, environmental conditions deteriorate. Multiple stresses — pollution, climate change, land change, ecosystem degradation — interact and amplify the crisis. Disputes over scarce water resources feed conflict in regions with shared river basins. Environmental degradation, food insecurity and emergent diseases foster a vast health crisis. Alarmed by rampant migration, terrorism and disease, the affluent minority fears that they too will be engulfed.

In this atmosphere of deepening social and environmental tension, violence is endemic, feeding off old ethnic, religious and nationalist conflict. Poor countries begin to fragment as civil order collapses and various forms of criminal anarchy fill the vacuum. Even some of the more prosperous nations feel the sting as infrastructure decays, technology fails and institutions weaken. The global economy sputters and international institutions weaken, while the bite of climate breakdown and environmental devastation grows fiercer. The global crisis spins out of control.

To stem the tide of collapse, the forces of order react with sufficient cohesion and strength to impose an authoritarian *Fortress World*. The wealthy flourish in protected enclaves in rich nations, and in strongholds in poor nations, as well. The fortresses are bubbles of privilege amidst oceans of misery, descendants of the "gated cities" of our own time. The majority is mired in poverty outside the fortress, denied basic freedoms. Draconian police measures control social unrest, prevent migration and protect the environment. The elite has halted barbarism at their gates and enforced a kind of environmental sustainability.

4.4 Great Transitions

The first years of the new millennium witness a remarkable shift in human history. The most visible manifestation is the initiation of a process of *Policy Reform* to redirect development toward sustainability. But an even more profound set of changes was quietly unfolding. Gradually, people everywhere begin to embrace the idea of a "new sustainability paradigm" that would transcend fundamentally the values and lifestyles embodied in the conventional development paradigm.

Partly this emergent worldview is stimulated by fear that the *Policy Reform* approach to sustainable development is insufficient to counteract the environmental uncertainties and social inequities of the conventional development paradigm. Increasingly the global free market is seen as an environmentally and socially costly engine for economic growth. The conviction spreads that the weakening of governance systems, begun in the late twentieth century, must be reversed.

But the growing global movement is animated, as well, by a positive vision of a better basis for planetary culture. The new sustainable paradigm has a powerful personal and philosophical dimension that complements the concern about economic and political issues. Among the affluent, disillusionment with consumerism spawns a search for more fulfilling and ethical ways of living that can provide a renewed sense of meaning and purpose to life. The values of simplicity, tranquillity and community begin to displace those of consumerism, competition and individualism. Voluntary reduction in work hours frees time for study, art and hobbies.

In developing regions, a new generation of thinkers, leaders and activists join and shape the global dialog. A fresh debate on the future is launched within the developing world that engages an expanding circle of stakeholders. Gradually a consensus emerges that the conventional development wisdom is both insufficient and undesirable. With the support of the rich countries, a process of social and economic renewal unleashes a spiral of positive change. In what comes to be called the Great Transitions, the quality of life improves at rates unprecedented in the historical record. The re-invention of development rests on effective governance, vastly improved educational opportunity and socially inclusive participation.

But no less important is a cultural renaissance, rooted in a pride in and respect for tradition and an appreciation of local human and natural resources. The sense of possibility and optimism spreads. Youth from all regions and cultures rediscover idealism as they join together in the project of forging a global community. The Internet is the natural medium for the new consciousness, providing a sense of immediacy and unity to a diverse and pluralistic movement.

The momentum for change grows. A global federation of diverse constituencies forms to advance the alternative agenda. Policy networks address pressing issues of public health, environment, social equity and corporate responsibility. Measures of development success increasingly focus on equity, sustainability and the quality of life, rather than the discredited metric of economic growth. Gradually, the new sustainability paradigm finds expression in a growing number of communities that opt for alternative economic practices and lifestyles that become simpler materially and richer qualitatively. The old obsession with things gives way to intellectual and artistic pursuits. Forward-looking corporations advocate a new business ethic based on meeting human needs instead of multiplying human wants. Meanwhile, an explosion of technological innovation responds to the new demand for sustainability and efficiency. Eventually, politicians that are responsive to the ferment for a new sustainability paradigm enter government, and the process of change accelerates.

A new metropolitan vision begins to reorganize urban life built around integrated settlement patterns that place home, work, commerce and leisure activity in closer proximity. For many, the town-within-the-city provides the ideal balance of a human scale with cosmopolitan cultural intensity. Others find dispersed small towns attractive as communication and information technology increasingly allow for the decentralization of activities. With attractive urban and rural alternatives, the mall culture — so ascendant in the phase of *Conventional Development* — begins to fade as new urban and rural options underscore the sterility, hidden costs and isolation of suburbia.

In the new sustainability paradigm, markets remain critical for achieving efficiency in the production and allocation of goods. But well-designed policies constrain the level and structure of economic activity to be compatible with social, cultural and environmental goals. A variety of mechanisms enforce these principles, including regulation, international negotiation and market signals such as revised tax systems that discourage the production of environmental "bads" and reward restorative practices. Environmental,

economic and social indicators track real progress at all scales — business, regional, national and global — giving the public an informed basis for seeking change.

Environmental protection is addressed by radically reducing material flows through the economy. Three primary factors drive de-materialization: rapid stabilization of population levels, universal adoption of an ethos of material sufficiency to displace consumerism, and a swift transition to renewable resources and clean technology. While the material economy stabilizes, development flourishes in the non-material realm of services, culture, art, sports and research. At the same time, a labor-intensive craft economy rises spontaneously on the platform of the high technology base, providing a rewarding outlet for creative expression and a dizzying diversity of highly esthetic goods and services.

Governance evolves toward a nested system in which regions and communities have considerable control over socio-economic decisions and approaches to environmental preservation. Indeed, there is tremendous variation in development patterns and choices. But each level must conform to constraints imposed by governance of larger-scale environmental and political systems. For example, local energy systems vary greatly, but must meet guidelines for greenhouse gas emissions that are negotiated through global-level agreements. Similarly, local water strategies must be compatible with allocation rules and ecosystem goals set at the river basin level.

Global governance relies on a rejuvenated and re-organized United Nations to express the politics of diversity-through-global-unity of the new sustainability paradigm. A New International Deal redistributes wealth and assures strong environmental protection. A mobilization for education, economic opportunity and poverty reduction leads to a rapid demographic transition and stabilization of populations everywhere. Arms spending is drastically decreased and a massive peace dividend helps restore ecosystems and further reduce poverty.

In 2032, pockets of poverty remain, geopolitical conflicts occasionally flare up and residual environmental and resource stress require concerted attention. But the world community looks back over the previous decades with justifiable pride on the immense achievements in human development, global solidarity and ecological resilience. An engaged citizenry looks forward to the challenge of forging a sustainable civilization of unprecedented creativity, freedom and sense of shared destiny.

5 Discussion

The *Conventional Development* scenario would be a risky bequest to our 21st century descendants. The increasing pressure on environmental systems — the combined effects of growth in the number of people, the scale of the economy and the throughput of natural resources — is environmentally unsustainable. The scenario would flirt with major ecosystem changes and unwelcome surprises. Indeed, environmental feedbacks could undermine a fundamental premise of the scenario: perpetual economic growth on a global scale.

The scenario also fails to address the social goals for sustainability. Absolute poverty persists, as nearly one billion people remain hungry in the middle of the next century. The rapid average income growth assumed for all regions, which tends to reduce poverty, is negated by population expansion and the continued, even deepening, pattern of large income disparities. The desire to migrate to rich areas would grow stronger as would the resistance to such migration. Interregional inequity also could aggravate geopolitical tensions. Beyond failing the ethical imperative to sharply reduce human deprivation, the link between human desperation and environmental stress would be maintained.

Economic and social polarization could compromise social cohesion and make liberal democratic institutions more fragile. Resource and environmental pressures would magnify domestic and international tensions: conflict over water, regional concentration of petroleum supplies, scarcity of land, climate change impacts, biodiversity loss. The desire to migrate to rich areas would grow stronger as would the resistance to such migration. Interregional inequity also could aggravate geopolitical tensions. The backlash to the process of global cultural homogenization would be reinforced.

The *Policy Reform* scenario shows that these perils are not inevitable. The technologies and policy instruments are available for redirecting development towards sustainability goals. But meeting these in the context of market-driven and growth-oriented development poses daunting challenges. Nevertheless, sustained adjustments in social, technological and resource-use patterns can become cumulatively significant over the coming decades. But a critical uncertainty to the *Policy Reform* path to sustainability remains: can sufficient political will be mobilized for such a sustained effort?

Conventional Development relies on market adaptations to resolve problems. *Policy Reform* adds an array of policy adjustments. But what if an expanding web of socio-ecological stresses overwhelms the capacity of both markets and policy to cope? Then the social, economic and moral bases of modern civilization could erode and the global development trajectory could veer toward conflict and chaos. Cascading events could eventually de-stabilize institutions. If social frictions and environmental degradation are allowed to fester, the path of history could branch toward a xenophobic and isolationist *Fortress World* scenario.

Such dark futures are possible, but certainly not inevitable. But in addition to policy responses, more fundamental changes in values and lifestyles may be needed. The *Great Transitions* scenario envisions the gradual emergence of a caring civilization based on the values of respect for the community of life, equity within and between generations and social solidarity.

This scan of GEO-3 global scenarios presented in this paper is intended to provide context for the forthcoming regional scenario discussions. Against the backdrop of the alternatives global possibilities, regional scenarios will elaborate region-specific issues, narratives and policy implications. At the same time, the regional discussions will provide feedback for further revision of the global storylines and quantitative illustrations. Ultimately the goal is to glean the lessons that compelling scenarios hold for policy and action at global and regional levels — to offer vision and guidance to policy-makers and stakeholders on the requirements for sustainable development.

Annex 1. Illustrative Scenarios: Global and Regional Patterns

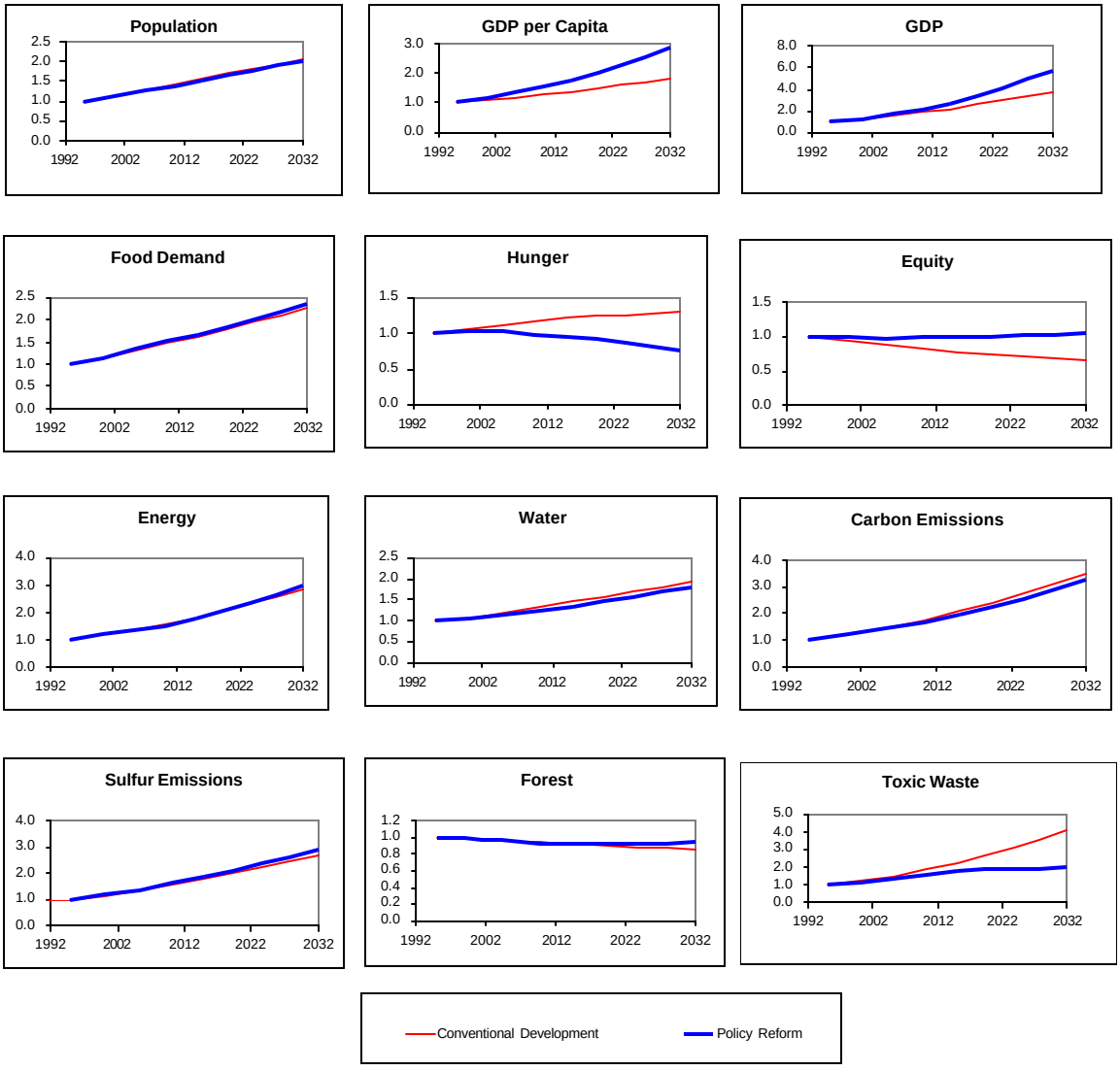
Quantitative representations of the *Conventional Development* and *Policy Reform* scenarios are presented in this Annex for:

- 6 UNEP regions
- 21 UNEP subregions
- World

For each, a graphical overview is presented of key indicators followed by more detailed numerical summaries.

This is followed by a *Notes* section that discusses major data sources and assumptions for the scenarios.

AFRICA



Note: Values indexed to 1 in 1995.

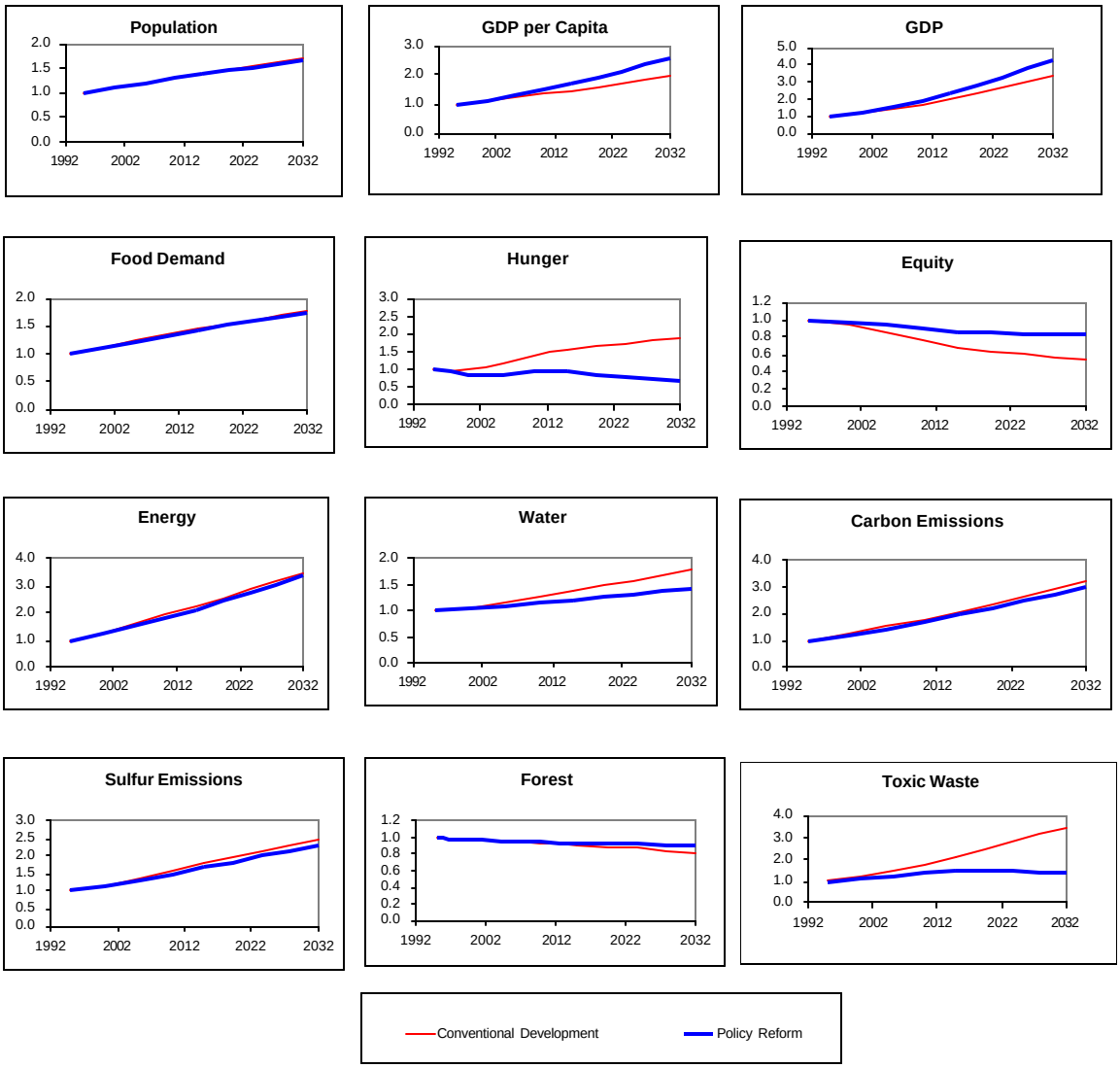
Africa	1995	2015		2032	
		Conventional Development	Policy Reform	Conventional Development	Policy Reform
DEMOGRAPHY					
Population (million)	697	1,079	1,063	1,447	1,406
Urbanization (%)	34	47	47	57	57
ECONOMY AND SOCIETY					
GDP (billion US$ PPP)	1,376	2,928	3,711	5,170	7,923
Agriculture (%)	21	16	12	12	8
Industry (%)	29	29	29	29	28
Services (%)	48	56	59	60	64
GDP per capita (1995 US$ PPP)	1,974	2,714	3,491	3,573	5,635
Hunger Incidence (% of population)	28	22	17	17	10
National Equity (L20%/H20%)	0.11	0.09	0.11	0.08	0.12
ENERGY					
Primary Energy Requirement (EJ)	17	30	30	48	50
Coal	3	5	5	8	7
Crude Oil	6	9	9	15	14
Natural Gas	2	5	6	10	14
Uranium	0	0	0	1	0
Hydropower	0	0	0	0	0
Renewables	6	10	10	14	14
Final Fuel Demand (EJ)	12	18	22	35	38
Agriculture	0	1	0	1	0
Households	7	7	11	16	17
Industry	3	6	6	10	12
Services	0	1	1	1	2
Transport	2	4	4	7	6
FOOD AND AGRICULTURE					
Avg. Daily Consumption (kcal/cap)	2,333	2,454	2,560	2,550	2,724
Share from Animal Products (%)	8	9	9	10	11
Meat and Milk Production (Mt)	34	60	62	92	93
Fraction of Meat from Feedlots (%)	6	15	20	26	30
Fish Production (Mt)	5	8	8	11	10
Crop Production (Mt)	424	782	759	1,127	941
Total Cropland (Mha)	186	220	224	242	217
Irrigated Cropland (Mha)	12	14	14	16	16
Potential Cultivable Land (Mha)	1,065	1,031	1,039	1,000	1,026
Cereal Harvest Yield (t/ha)	1.23	1.96	2.47	2.53	3.56
Meat and Milk SSR	0.78	0.76	0.70	0.76	0.64
Fish SSR	0.82	0.87	0.87	0.82	0.83
Crop SSR	0.84	0.89	0.81	0.87	0.70
ENVIRONMENTAL PRESSURES					
Total Water Withdrawals (billion m^3)	151	219	205	293	269
Agriculture (%)	86	79	82	74	76
Industry (%)	6	10	3	14	5
Households (%)	9	11	14	14	18
Water Use/Resource Ratio (%)	3	4	4	6	5
Population in Water Stress (million)	188	305	293	429	409
Carbon Emissions (MtC)	176	366	345	613	571
Sulfur Emissions (MtS)	2	4	4	6	7
Total Land Area (Mha)	2,937	2,937	2,937	2,937	2,937
Built Environment (%)	2	2	2	3	3
Cropland (%)	6	8	8	8	7
Forest (%)	24	22	23	21	23
Pasture (%)	30	30	30	30	30
Protected (%)	5	5	5	5	5
Other (%)	33	33	32	32	31
Forest Exploitation* (%)	55	76	81	88	99
Nitrogen Fertilizer Consumption (Mt)	4	10	8	15	9
Toxic Waste (Mt)	0.8	1.8	1.4	3.3	1.6

t: metric tonnes; ha: hectare; J: Joules; SSR: Self-Sufficiency Ratio = Production/Requirements

Mt = 10^6 t; Mha = 10^6 ha; EJ = 10^{18} J

*Commercial off take divided by annual increment on commercial forest areas.

NORTHERN AFRICA



Note: Values indexed to 1 in 1995.

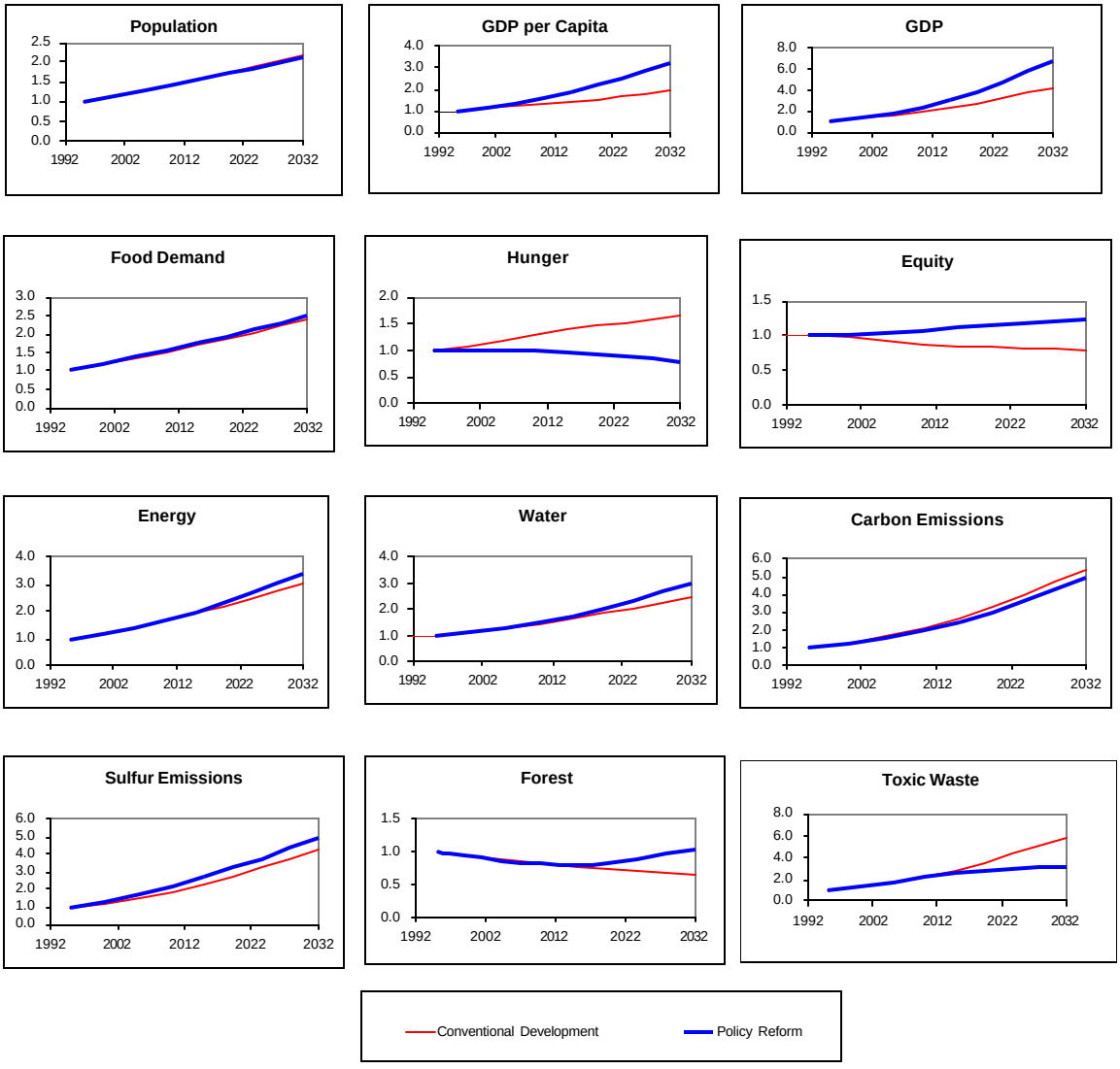
Northern Africa	1995	2015		2032	
		Conventional Development	Policy Reform	Conventional Development	Policy Reform
DEMOGRAPHY					
Population (million)	157	220	217	267	259
Urbanization (%)	46	58	58	66	66
ECONOMY AND SOCIETY					
GDP (billion US$ PPP)	575	1,166	1,345	1,932	2,474
Agriculture (%)	16	11	9	8	6
Industry (%)	27	28	28	27	27
Services (%)	53	61	63	65	67
GDP per capita (1995 US$ PPP)	3,662	5,300	6,198	7,236	9,552
Hunger Incidence (% of population)	7	8	5	7	3
National Equity (L20%/H20%)	0.18	0.12	0.15	0.10	0.15
ENERGY					
Primary Energy Requirement (EJ)	4	9	9	14	14
Coal	0	0	0	0	0
Crude Oil	2	5	4	6	5
Natural Gas	1	4	3	7	7
Uranium	0	0	0	0	0
Hydropower	0	0	0	0	0
Renewables	0	0	1	1	2
Final Fuel Demand (EJ)	3	5	6	9	9
Agriculture	0	0	0	0	0
Households	1	1	2	3	3
Industry	1	2	2	3	3
Services	0	0	0	0	0
Transport	1	1	1	2	2
FOOD AND AGRICULTURE					
Avg. Daily Consumption (kcal/cap)	2,991	3,064	3,091	3,117	3,157
Share from Animal Products (%)	10	11	11	12	13
Meat and Milk Production (Mt)	14	22	23	29	30
Fraction of Meat from Feedlots (%)	11	11	16	15	21
Fish Production (Mt)	1	2	2	3	3
Crop Production (Mt)	93	140	140	187	187
Total Cropland (Mha)	41	41	41	41	41
Irrigated Cropland (Mha)	8	9	9	10	10
Potential Cultivable Land (Mha)	128	123	124	118	122
Cereal Harvest Yield (t/ha)	1.52	2.19	2.56	2.72	3.23
Meat and Milk SSR	0.80	0.76	0.76	0.74	0.74
Fish SSR	1.01	1.50	1.50	1.41	1.41
Crop SSR	0.65	0.69	0.68	0.74	0.73
ENVIRONMENTAL PRESSURES					
Total Water Withdrawals (billion m^3)	96	133	115	169	136
Agriculture (%)	87	82	92	81	92
Industry (%)	6	9	1	12	1
Households (%)	7	8	7	10	7
Water Use/Resource Ratio (%)	33	46	40	58	47
Population in Water Stress (million)	112	175	163	224	202
Carbon Emissions (MtC)	70	145	138	227	210
Sulfur Emissions (MtS)	1	1	1	2	1
Total Land Area (Mha)	811	811	811	811	811
Built Environment (%)	1	2	2	2	2
Cropland (%)	5	5	5	5	5
Forest (%)	7	6	7	6	6
Pasture (%)	22	22	22	22	22
Protected (%)	3	3	3	3	3
Other (%)	62	62	62	62	62
Forest Exploitation* (%)	100	100	100	100	100
Nitrogen Fertilizer Consumption (Mt)	2	3	3	4	3
Toxic Waste (Mt)	0.4	0.8	0.5	1.3	0.5

t: metric tonnes; ha: hectare; J: Joules; SSR: Self-Sufficiency Ratio = Production/Requirements

Mt = 10^6 t; Mha = 10^6 ha; EJ = 10^{18} J

*Commercial off take divided by annual increment on commercial forest areas.

WESTERN AFRICA



Note: Values indexed to 1 in 1995.

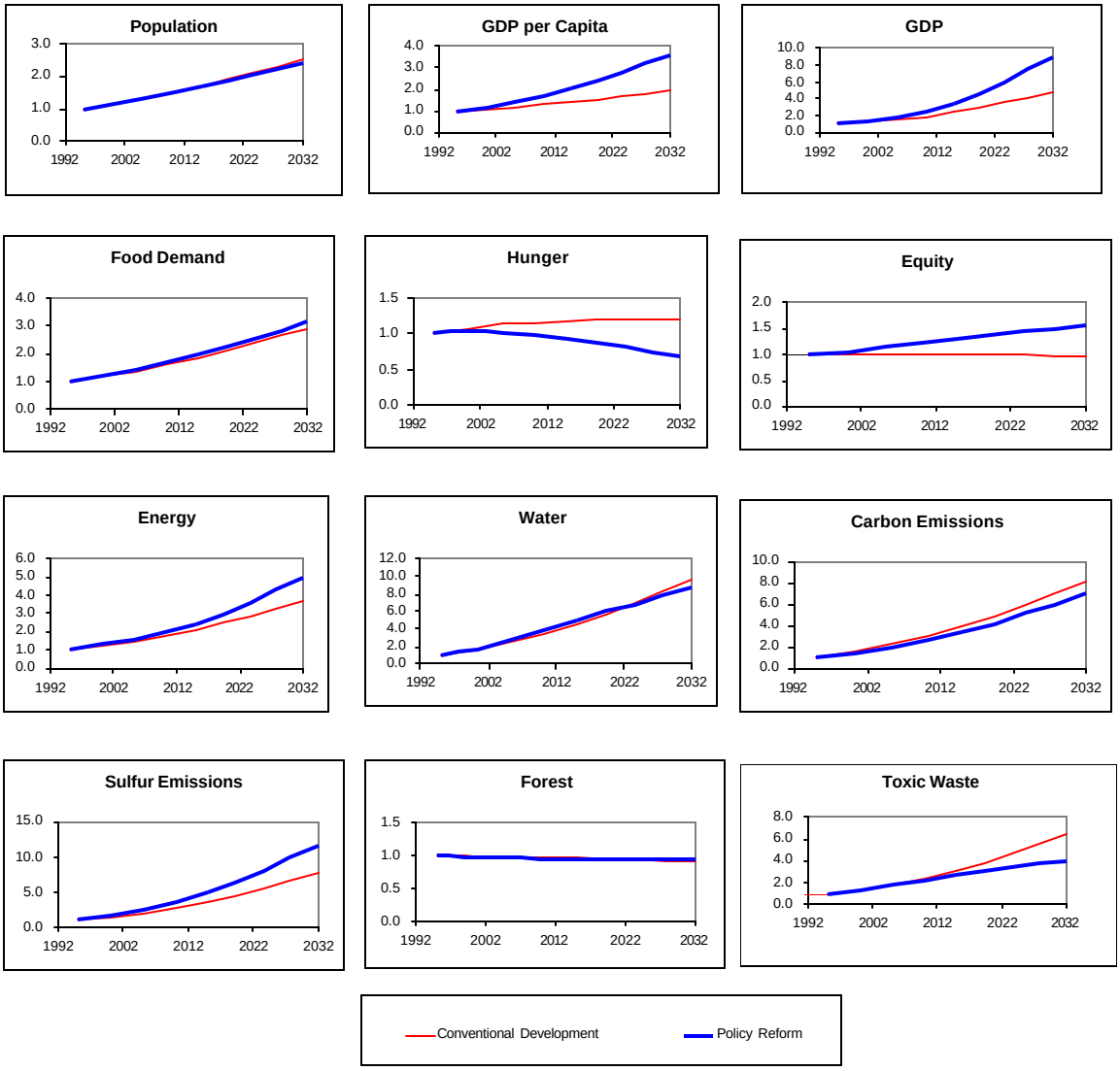
Western Africa	1995	2015		2032	
		Conventional Development	Policy Reform	Conventional Development	Policy Reform
DEMOGRAPHY					
Population (million)	196	315	310	428	416
Urbanization (%)	36	51	51	64	64
ECONOMY AND SOCIETY					
GDP (billion US$ PPP)	271	620	811	1,143	1,837
Agriculture (%)	32	23	17	17	10
Industry (%)	37	37	36	36	36
Services (%)	30	41	46	47	54
GDP per capita (1995 US$ PPP)	1,383	1,968	2,616	2,671	4,416
Hunger Incidence (% of population)	16	14	10	12	6
National Equity (L20%/H20%)	0.09	0.07	0.10	0.07	0.11
ENERGY					
Primary Energy Requirement (EJ)	3	7	7	10	12
Coal	0	0	0	0	0
Crude Oil	0	1	1	2	2
Natural Gas	0	1	1	1	3
Uranium	0	0	0	0	0
Hydropower	0	0	0	0	0
Renewables	3	5	5	7	6
Final Fuel Demand (EJ)	3	4	6	9	9
Agriculture	0	0	0	0	0
Households	3	3	4	6	6
Industry	0	1	1	2	2
Services	0	0	0	0	0
Transport	0	1	0	1	1
FOOD AND AGRICULTURE					
Avg. Daily Consumption (kcal/cap)	2,372	2,517	2,623	2,631	2,796
Share from Animal Products (%)	4	5	6	6	7
Meat and Milk Production (Mt)	5	10	12	17	22
Fraction of Meat from Feedlots (%)	7	18	30	23	40
Fish Production (Mt)	1	2	2	3	3
Crop Production (Mt)	146	267	265	359	214
Total Cropland (Mha)	59	71	71	73	42
Irrigated Cropland (Mha)	1	1	1	1	1
Potential Cultivable Land (Mha)	200	189	191	178	187
Cereal Harvest Yield (t/ha)	0.91	1.52	1.58	1.96	1.65
Meat and Milk SSR	0.90	0.95	0.95	0.98	0.98
Fish SSR	0.76	0.73	0.73	0.71	0.71
Crop SSR	0.94	0.94	0.82	0.88	0.44
ENVIRONMENTAL PRESSURES					
Total Water Withdrawals (billion m^3)	11	19	20	28	34
Agriculture (%)	76	63	58	54	44
Industry (%)	7	13	14	18	7
Households (%)	17	23	28	28	49
Water Use/Resource Ratio (%)	1	1	2	2	3
Population in Water Stress (million)	0	2	2	5	6
Carbon Emissions (MtC)	12	33	30	65	60
Sulfur Emissions (MtS)	0	0	0	1	1
Total Land Area (Mha)	606	606	606	606	606
Built Environment (%)	2	3	3	5	4
Cropland (%)	10	12	12	12	7
Forest (%)	17	13	13	11	17
Pasture (%)	29	29	29	29	29
Protected (%)	4	4	4	4	4
Other (%)	38	39	38	39	38
Forest Exploitation* (%)	99	100	100	100	100
Nitrogen Fertilizer Consumption (Mt)	0	3	2	4	2
Toxic Waste (Mt)	0.1	0.3	0.3	0.7	0.4

t: metric tonnes; ha: hectare; J: Joules; SSR: Self-Sufficiency Ratio = Production/Requirements

Mt = 10^6 t; Mha = 10^6 ha; EJ = 10^{18} J

*Commercial off take divided by annual increment on commercial forest areas.

CENTRAL AFRICA



Note: Values indexed to 1 in 1995.

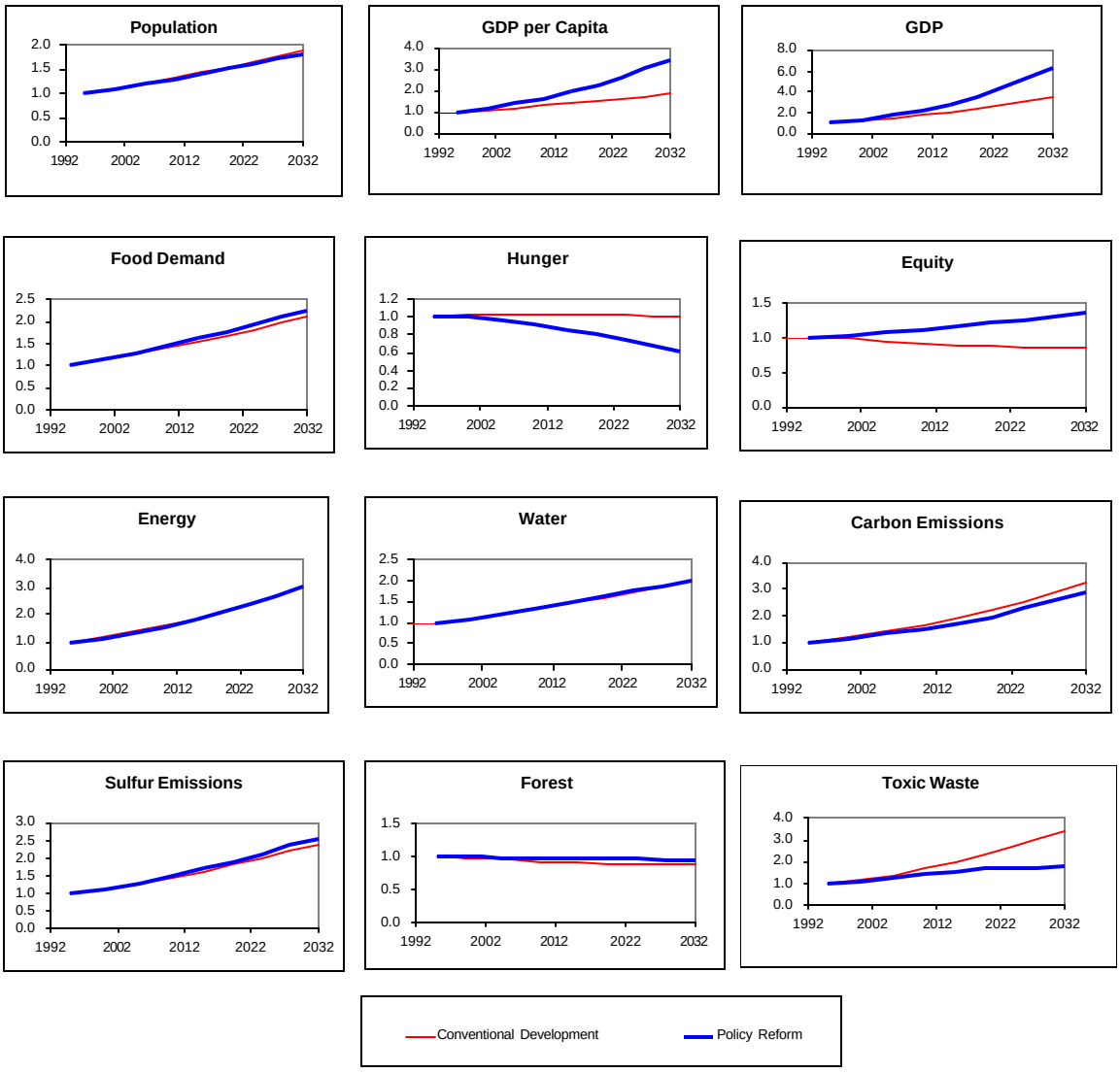
Central Africa	1995	2015		2032	
		Conventional Development	Policy Reform	Conventional Development	Policy Reform
DEMOGRAPHY					
Population (million)	73	125	123	184	179
Urbanization (%)	33	46	46	58	58
ECONOMY AND SOCIETY					
GDP (billion US$ PPP)	66	160	226	318	587
Agriculture (%)	33	24	17	18	10
Industry (%)	29	28	28	28	28
Services (%)	39	48	55	54	62
GDP per capita (1995 US$ PPP)	904	1,280	1,837	1,728	3,279
Hunger Incidence (% of population)	48	33	26	23	13
National Equity (L20%/H20%)	0.06	0.06	0.08	0.06	0.09
ENERGY					
Primary Energy Requirement (EJ)	1	2	2	3	4
Coal	0	0	0	0	0
Crude Oil	0	0	0	1	1
Natural Gas	0	0	0	0	0
Uranium	0	0	0	0	0
Hydropower	0	0	0	0	0
Renewables	1	1	1	2	2
Final Fuel Demand (EJ)	1	1	2	3	3
Agriculture	0	0	0	0	0
Households	1	1	1	2	2
Industry	0	0	0	1	1
Services	0	0	0	0	0
Transport	0	0	0	0	1
FOOD AND AGRICULTURE					
Avg. Daily Consumption (kcal/cap)	1,937	2,106	2,257	2,246	2,493
Share from Animal Products (%)	5	5	6	6	8
Meat and Milk Production (Mt)	1	2	3	4	5
Fraction of Meat from Feedlots (%)	3	13	23	28	40
Fish Production (Mt)	0	1	1	1	1
Crop Production (Mt)	42	81	90	133	149
Total Cropland (Mha)	21	28	31	36	40
Irrigated Cropland (Mha)	0	0	0	0	0
Potential Cultivable Land (Mha)	312	308	309	303	306
Cereal Harvest Yield (t/ha)	0.83	1.41	1.93	1.81	2.74
Meat and Milk SSR	0.85	0.77	0.74	0.71	0.66
Fish SSR	0.70	0.66	0.66	0.64	0.64
Crop SSR	0.92	0.92	0.92	0.92	0.92
ENVIRONMENTAL PRESSURES					
Total Water Withdrawals (billion m^3)	1	5	6	11	10
Agriculture (%)	38	11	10	7	7
Industry (%)	17	66	4	72	22
Households (%)	45	23	86	21	71
Water Use/Resource Ratio (%)	0	0	0	0	0
Population in Water Stress (million)	0	0	0	0	0
Carbon Emissions (MtC)	3	11	9	22	19
Sulfur Emissions (MtS)	0	0	0	0	0
Total Land Area (Mha)	524	524	524	524	524
Built Environment (%)	1	2	2	2	2
Cropland (%)	4	5	6	7	8
Forest (%)	59	57	57	54	56
Pasture (%)	15	15	15	16	15
Protected (%)	6	6	6	6	6
Other (%)	15	15	15	15	13
Forest Exploitation* (%)	19	41	51	64	99
Nitrogen Fertilizer Consumption (Mt)	0	0	0	1	1
Toxic Waste (Mt)	0.0	0.1	0.1	0.2	0.1

t: metric tonnes; ha: hectare; J: Joules; SSR: Self-Sufficiency Ratio = Production/Requirements

Mt = 10^6 t; Mha = 10^6 ha; EJ = 10^{18} J

*Commercial off take divided by annual increment on commercial forest areas.

SOUTHERN AFRICA



Note: Values indexed to 1 in 1995.

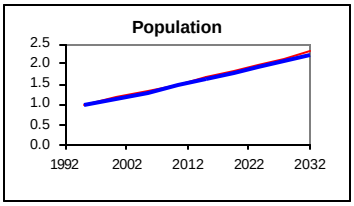
Southern Africa	1995	2015		2032	
		Conventional Development	Policy Reform	Conventional Development	Policy Reform
DEMOGRAPHY					
Population (million)	130	186	184	244	237
Urbanization (%)	35	48	48	59	59
ECONOMY AND SOCIETY					
GDP (billion US$ PPP)	325	655	905	1,160	2,051
Agriculture (%)	12	9	7	7	4
Industry (%)	30	30	29	29	29
Services (%)	56	61	64	64	67
GDP per capita (1995 US$ PPP)	2,500	3,522	4,918	4,754	8,654
Hunger Incidence (% of population)	39	28	23	21	13
National Equity (L20%/H20%)	0.08	0.07	0.09	0.07	0.10
ENERGY					
Primary Energy Requirement (EJ)	6	10	10	17	17
Coal	3	5	4	7	7
Crude Oil	1	3	3	5	5
Natural Gas	0	0	1	1	4
Uranium	0	0	0	1	0
Hydropower	0	0	0	0	0
Renewables	2	2	2	3	1
Final Fuel Demand (EJ)	4	7	7	12	13
Agriculture	0	0	0	0	0
Households	2	2	3	3	4
Industry	1	3	3	4	5
Services	0	0	1	1	1
Transport	1	2	1	3	3
FOOD AND AGRICULTURE					
Avg. Daily Consumption (kcal/cap)	2,161	2,319	2,462	2,448	2,674
Share from Animal Products (%)	9	10	11	11	13
Meat and Milk Production (Mt)	7	13	13	22	19
Fraction of Meat from Feedlots (%)	7	15	14	30	22
Fish Production (Mt)	2	2	2	3	3
Crop Production (Mt)	88	170	142	243	200
Total Cropland (Mha)	35	36	36	33	39
Irrigated Cropland (Mha)	2	2	2	2	2
Potential Cultivable Land (Mha)	320	314	316	308	314
Cereal Harvest Yield (t/ha)	1.54	2.64	4.74	3.25	7.37
Meat and Milk SSR	0.98	1.06	0.86	1.15	0.77
Fish SSR	0.87	0.84	0.84	0.82	0.82
Crop SSR	1.07	1.30	1.06	1.22	1.06
ENVIRONMENTAL PRESSURES					
Total Water Withdrawals (billion m^3)	20	30	30	41	41
Agriculture (%)	77	72	70	67	66
Industry (%)	7	9	6	11	10
Households (%)	16	19	24	23	24
Water Use/Resource Ratio (%)	3	4	4	5	5
Population in Water Stress (million)	19	27	27	47	46
Carbon Emissions (MtC)	87	166	150	276	250
Sulfur Emissions (MtS)	1	2	2	3	4
Total Land Area (Mha)	680	680	680	680	680
Built Environment (%)	1	2	2	2	2
Cropland (%)	5	5	5	5	6
Forest (%)	25	23	25	22	24
Pasture (%)	49	49	49	49	49
Protected (%)	8	8	8	8	8
Other (%)	12	11	12	10	11
Forest Exploitation* (%)	100	100	100	100	100
Nitrogen Fertilizer Consumption (Mt)	1	2	2	3	2
Toxic Waste (Mt)	0.3	0.5	0.4	0.9	0.5

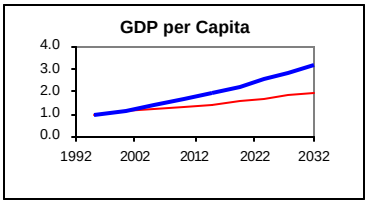
t: metric tonnes; ha: hectare; J: Joules; SSR: Self-Sufficiency Ratio = Production/Requirements

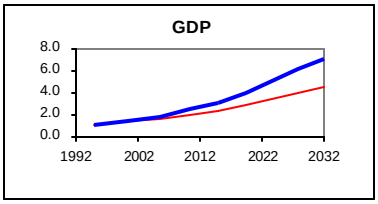
Mt = 10^6 t; Mha = 10^6 ha; EJ = 10^{18} J

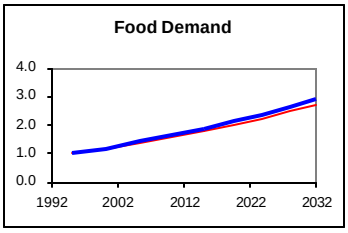
*Commercial off take divided by annual increment on commercial forest areas.

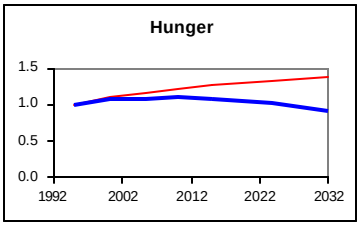
EASTERN AFRICA

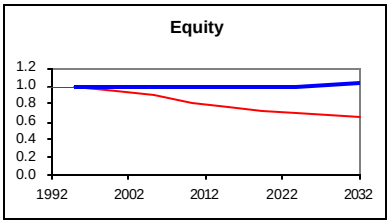


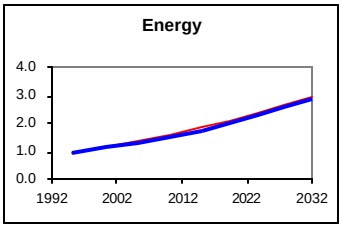


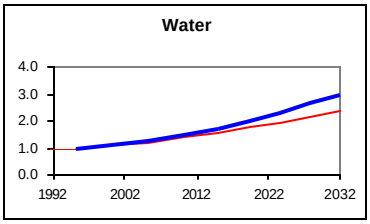


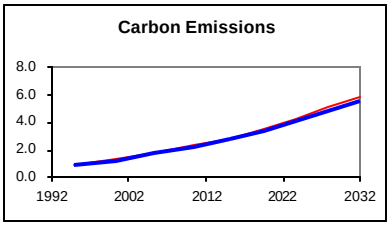


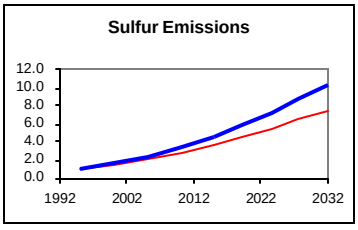


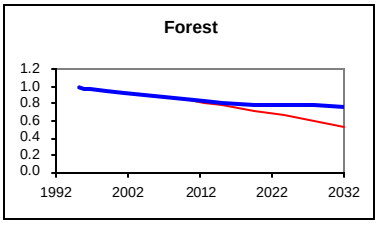


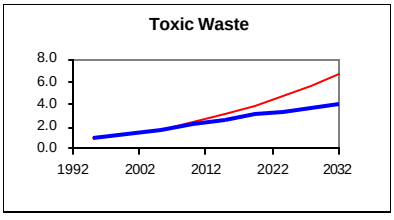












Note: Values indexed to 1 in 1995.

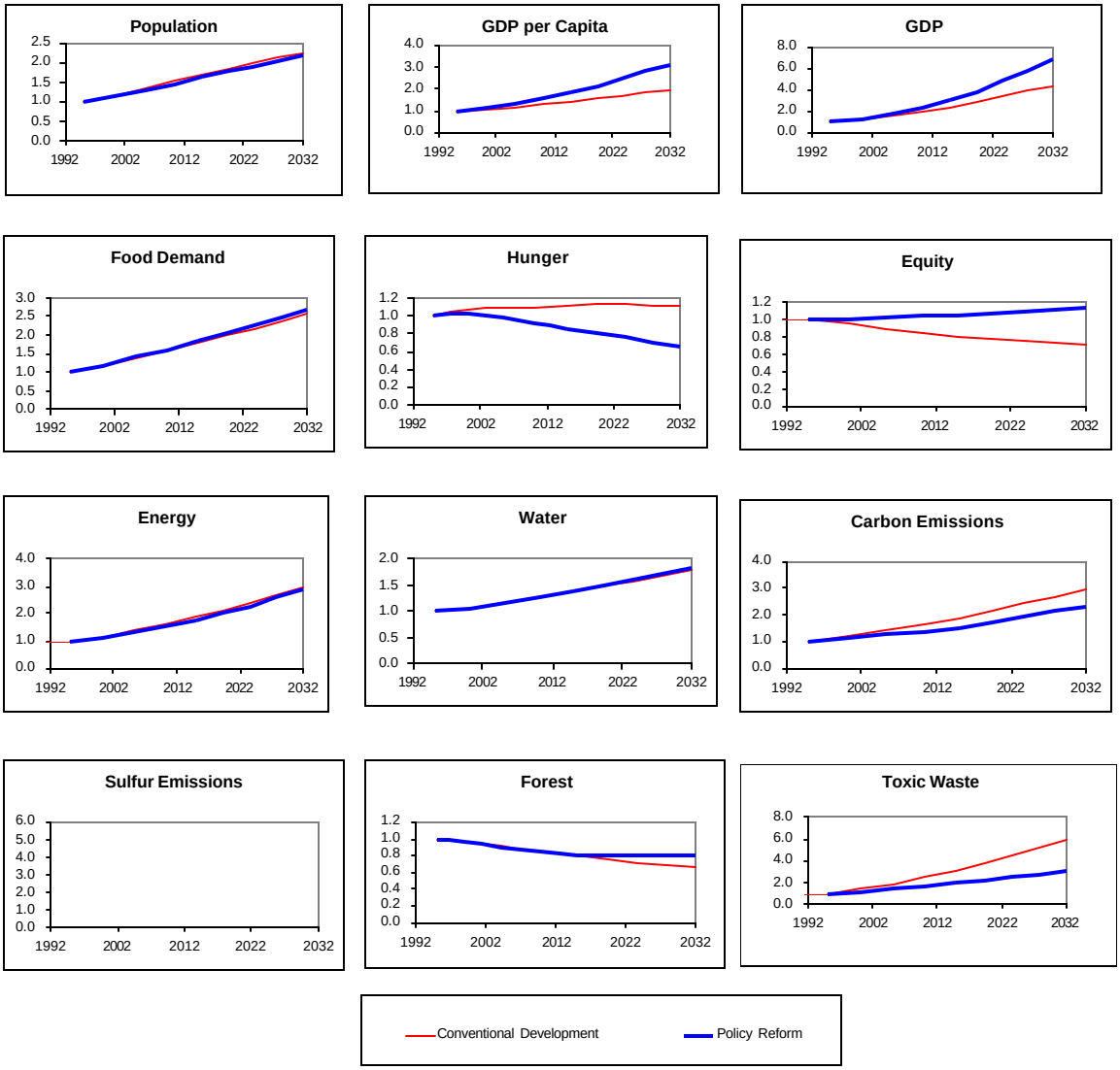
Eastern Africa	1995	2015		2032	
		Conventional Development	Policy Reform	Conventional Development	Policy Reform
DEMOGRAPHY					
Population (million)	125	206	203	288	280
Urbanization (%)	17	28	28	36	36
ECONOMY AND SOCIETY					
GDP (billion US$ PPP)	112	263	342	499	791
Agriculture (%)	44	31	23	23	14
Industry (%)	14	14	15	15	15
Services (%)	42	55	62	62	70
GDP per capita (1995 US$ PPP)	896	1,277	1,685	1,733	2,825
Hunger Incidence (% of population)	47	36	31	28	19
National Equity (L20%/H20%)	0.13	0.10	0.12	0.08	0.13
ENERGY					
Primary Energy Requirement (EJ)	1	2	2	3	3
Coal	0	0	0	0	0
Crude Oil	0	0	0	1	1
Natural Gas	0	0	0	0	0
Uranium	0	0	0	0	0
Hydropower	0	0	0	0	0
Renewables	1	2	1	2	2
Final Fuel Demand (EJ)	1	1	2	3	3
Agriculture	0	0	0	0	0
Households	1	1	1	2	2
Industry	0	0	0	0	0
Services	0	0	0	0	0
Transport	0	0	0	0	0
FOOD AND AGRICULTURE					
Avg. Daily Consumption (kcal/cap)	1,882	2,058	2,189	2,203	2,420
Share from Animal Products (%)	12	13	14	14	16
Meat and Milk Production (Mt)	6	11	10	18	13
Fraction of Meat from Feedlots (%)	3	17	15	32	22
Fish Production (Mt)	0	1	1	1	1
Crop Production (Mt)	39	82	82	138	122
Total Cropland (Mha)	26	37	37	48	43
Irrigated Cropland (Mha)	1	1	1	1	1
Potential Cultivable Land (Mha)	76	70	71	64	68
Cereal Harvest Yield (t/ha)	1.43	2.41	2.64	3.10	2.99
Meat and Milk SSR	0.55	0.51	0.42	0.49	0.30
Fish SSR	0.64	0.61	0.61	0.59	0.59
Crop SSR	0.55	0.56	0.56	0.56	0.56
ENVIRONMENTAL PRESSURES					
Total Water Withdrawals (billion m^3)	6	10	10	14	18
Agriculture (%)	85	73	67	63	49
Industry (%)	2	8	10	14	22
Households (%)	13	19	22	24	29
Water Use/Resource Ratio (%)	5	8	8	12	15
Population in Water Stress (million)	57	101	101	152	154
Carbon Emissions (MtC)	3	8	8	17	16
Sulfur Emissions (MtS)	0	0	0	0	0
Total Land Area (Mha)	257	257	257	257	257
Built Environment (%)	3	5	5	7	7
Cropland (%)	10	14	14	19	17
Forest (%)	22	18	18	12	17
Pasture (%)	37	37	37	39	37
Protected (%)	5	5	5	5	5
Other (%)	22	21	20	18	17
Forest Exploitation* (%)	100	100	100	100	100
Nitrogen Fertilizer Consumption (Mt)	0	1	1	2	1
Toxic Waste (Mt)	0.0	0.1	0.1	0.2	0.1

t: metric tonnes; ha: hectare; J: Joules; SSR: Self-Sufficiency Ratio = Production/Requirements

Mt = 10^6 t; Mha = 10^6 ha; EJ = 10^{18} J

*Commercial off take divided by annual increment on commercial forest areas.

WESTERN INDIAN OCEAN



Note: Values indexed to 1 in 1995.

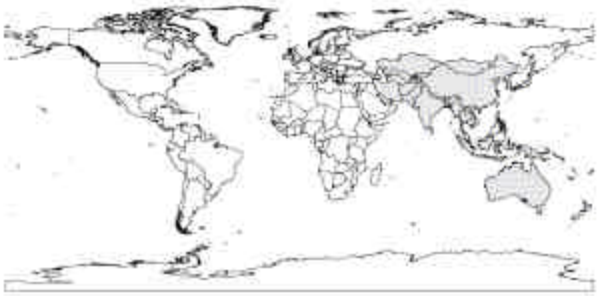
W Ind Ocean	1995	2015		2032	
		Conventional Development	Policy Reform	Conventional Development	Policy Reform
DEMOGRAPHY					
Population (million)	16	27	26	36	35
Urbanization (%)	31	44	44	56	56
ECONOMY AND SOCIETY					
GDP (billion US$ PPP)	27	64	82	118	183
Agriculture (%)	19	14	11	10	7
Industry (%)	26	25	26	25	25
Services (%)	56	61	63	64	68
GDP per capita (1995 US$ PPP)	1,688	2,370	3,154	3,278	5,229
Hunger Incidence (% of population)	37	25	20	18	11
National Equity (L20%/H20%)	0.10	0.08	0.11	0.07	0.12
ENERGY					
Primary Energy Requirement (EJ)	0.10	0.18	0.17	0.28	0.27
Coal	0.00	0.00	0.00	0.01	0.00
Crude Oil	0.09	0.17	0.14	0.26	0.21
Natural Gas	0.00	0.00	0.00	0.00	0.00
Uranium	0.00	0.00	0.00	0.00	0.00
Hydropower	0.00	0.01	0.00	0.01	0.01
Renewables	0.00	0.00	0.03	0.00	0.05
Final Fuel Demand (EJ)	NA	NA	NA	NA	NA
Agriculture	NA	NA	NA	NA	NA
Households	NA	NA	NA	NA	NA
Industry	NA	NA	NA	NA	NA
Services	NA	NA	NA	NA	NA
Transport	NA	NA	NA	NA	NA
FOOD AND AGRICULTURE					
Avg. Daily Consumption (kcal/cap)	2,129	2,294	2,408	2,426	2,609
Share from Animal Products (%)	11	13	14	14	16
Meat and Milk Production (Mt)	1	2	2	3	3
Fraction of Meat from Feedlots (%)	4	20	28	38	48
Fish Production (Mt)	0	0	0	0	0
Crop Production (Mt)	16	42	40	68	69
Total Cropland (Mha)	3	9	8	12	12
Irrigated Cropland (Mha)	1	1	1	1	1
Potential Cultivable Land (Mha)	29	28	28	27	28
Cereal Harvest Yield (t/ha)	1.88	2.77	2.66	3.27	2.89
Meat and Milk SSR	0.79	0.74	0.73	0.70	0.69
Fish SSR	0.91	0.87	0.87	0.84	0.84
Crop SSR	1.50	1.83	1.53	1.79	1.55
ENVIRONMENTAL PRESSURES					
Total Water Withdrawals (billion m^3)	17	23	23	30	30
Agriculture (%)	99	98	97	98	95
Industry (%)	0	0	0	0	1
Households (%)	1	2	3	3	5
Water Use/Resource Ratio (%)	5	7	7	9	9
Population in Water Stress (million)	0	0	0	1	1
Carbon Emissions (MtC)	7	13	10	20	16
Sulfur Emissions (MtS)	NA	NA	NA	NA	NA
Total Land Area (Mha)	59	59	59	59	59
Built Environment (%)	2	3	3	4	4
Cropland (%)	6	14	14	20	21
Forest (%)	39	31	31	25	31
Pasture (%)	41	41	41	41	41
Protected (%)	2	2	2	2	2
Other (%)	11	9	9	8	1
Forest Exploitation* (%)	14	27	33	44	63
Nitrogen Fertilizer Consumption (Mt)	0	0	0	0	0
Toxic Waste (Mt)	0.0	0.0	0.0	0.1	0.0

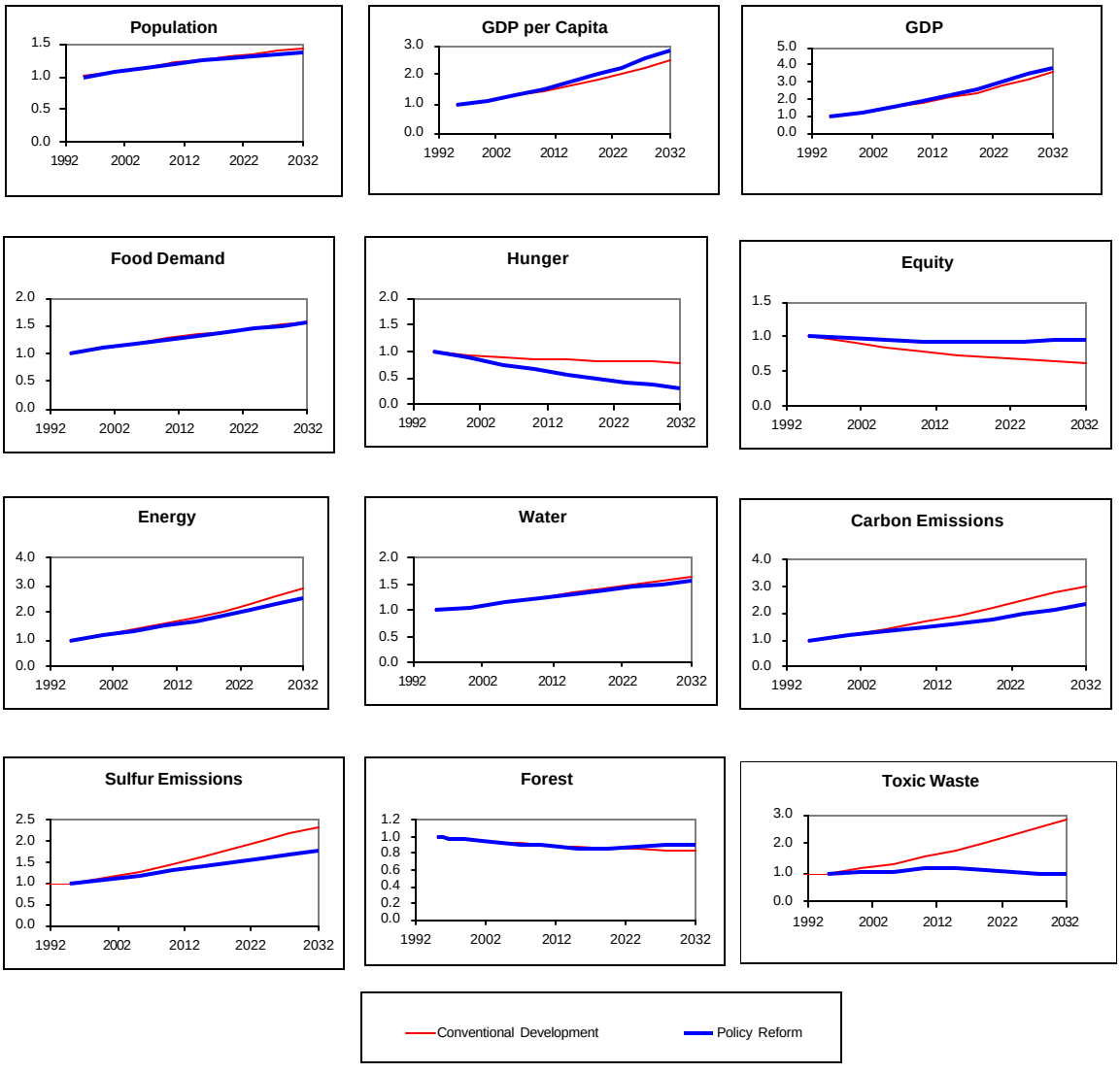
t: metric tonnes; ha: hectare; J: Joules; SSR: Self-Sufficiency Ratio = Production/Requirements

Mt = 10^6 t; Mha = 10^6 ha; EJ = 10^{18} J

*Commercial off take divided by annual increment on commercial forest areas.

ASIA AND THE PACIFIC





Note: Values indexed to 1 in 1995.

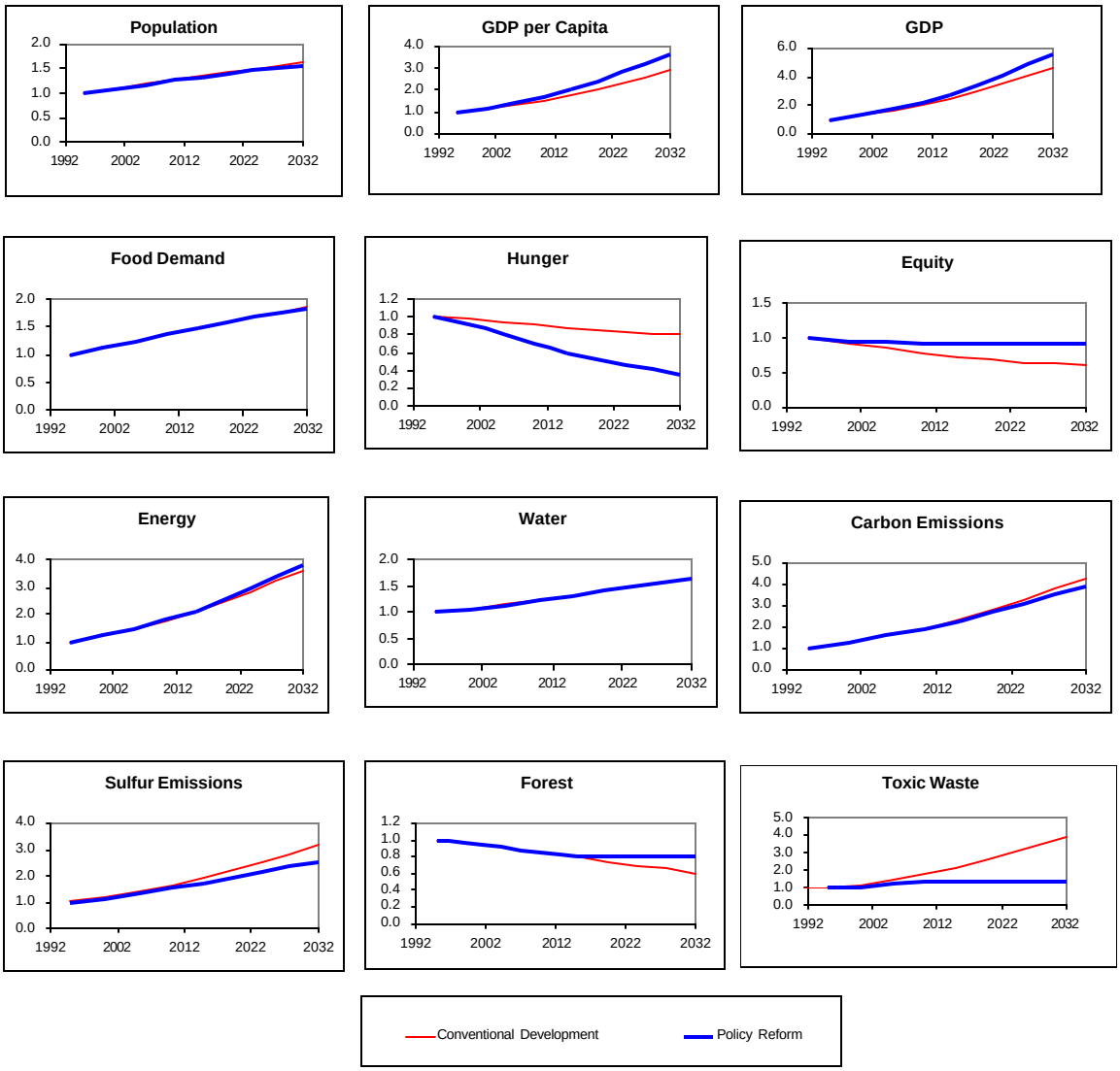
Asia&Pacific	1995	2015		2032	
		Conventional Development	Policy Reform	Conventional Development	Policy Reform
DEMOGRAPHY					
Population (million)	3,289	4,121	4,068	4,644	4,516
Urbanization (%)	33	47	47	58	58
ECONOMY AND SOCIETY					
GDP (billion US$ PPP)	12,142	25,226	26,210	42,909	46,840
Agriculture (%)	16	9	9	6	5
Industry (%)	38	36	36	34	33
Services (%)	45	54	55	60	62
GDP per capita (1995 US$ PPP)	3,692	6,121	6,443	9,240	10,372
Hunger Incidence (% of population)	16	11	7	9	4
National Equity (L20%/H20%)	0.14	0.10	0.13	0.09	0.14
ENERGY					
Primary Energy Requirement (EJ)	124	225	207	354	312
Coal	46	79	69	114	82
Crude Oil	37	78	48	133	71
Natural Gas	12	29	37	51	82
Uranium	5	10	7	22	4
Hydropower	2	4	4	6	6
Renewables	22	26	41	27	67
Final Fuel Demand (EJ)	94	155	156	261	238
Agriculture	3	4	4	6	6
Households	31	31	46	62	63
Industry	42	72	65	107	92
Services	5	11	11	19	19
Transport	14	37	30	68	58
FOOD AND AGRICULTURE					
Avg. Daily Consumption (kcal/cap)	2,561	2,741	2,765	2,869	2,902
Share from Animal Products (%)	12	14	14	15	16
Meat and Milk Production (Mt)	250	377	387	492	511
Fraction of Meat from Feedlots (%)	17	20	25	24	34
Fish Production (Mt)	58	68	67	73	71
Crop Production (Mt)	2,152	3,121	3,209	3,674	3,885
Total Cropland (Mha)	522	542	581	487	564
Irrigated Cropland (Mha)	161	180	180	196	196
Potential Cultivable Land (Mha)	792	750	758	710	734
Cereal Harvest Yield (t/ha)	2.85	3.91	3.95	4.72	4.50
Meat and Milk SSR	1.01	0.96	0.96	0.93	0.93
Fish SSR	0.87	0.87	0.87	0.87	0.87
Crop SSR	0.97	1.04	1.05	1.03	1.05
ENVIRONMENTAL PRESSURES					
Total Water Withdrawals (billion m^3)	1,524	2,014	1,981	2,531	2,381
Agriculture (%)	87	82	83	76	80
Industry (%)	7	10	6	13	5
Households (%)	6	9	11	11	15
Water Use/Resource Ratio (%)	9	12	12	15	15
Population in Water Stress (million)	787	1,351	1,302	2,017	1,786
Carbon Emissions (MtC)	1,983	3,818	3,230	6,030	4,614
Sulfur Emissions (MtS)	28	46	40	66	50
Total Land Area (Mha)	3,463	3,463	3,463	3,463	3,463
Built Environment (%)	3	4	4	5	5
Cropland (%)	15	16	17	14	16
Forest (%)	18	16	16	15	17
Pasture (%)	38	40	40	41	41
Protected (%)	7	7	7	7	7
Other (%)	19	17	16	16	14
Forest Exploitation* (%)	38	63	63	84	85
Nitrogen Fertilizer Consumption (Mt)	37	52	43	58	40
Toxic Waste (Mt)	11.7	21.1	13.3	33.1	11.2

t: metric tonnes; ha: hectare; J: Joules; SSR: Self-Sufficiency Ratio = Production/Requirements

Mt = 10^6 t; Mha = 10^6 ha; EJ = 10^{18} J

*Commercial off take divided by annual increment on commercial forest areas.

SOUTH ASIA



Note: Values indexed to 1 in 1995.

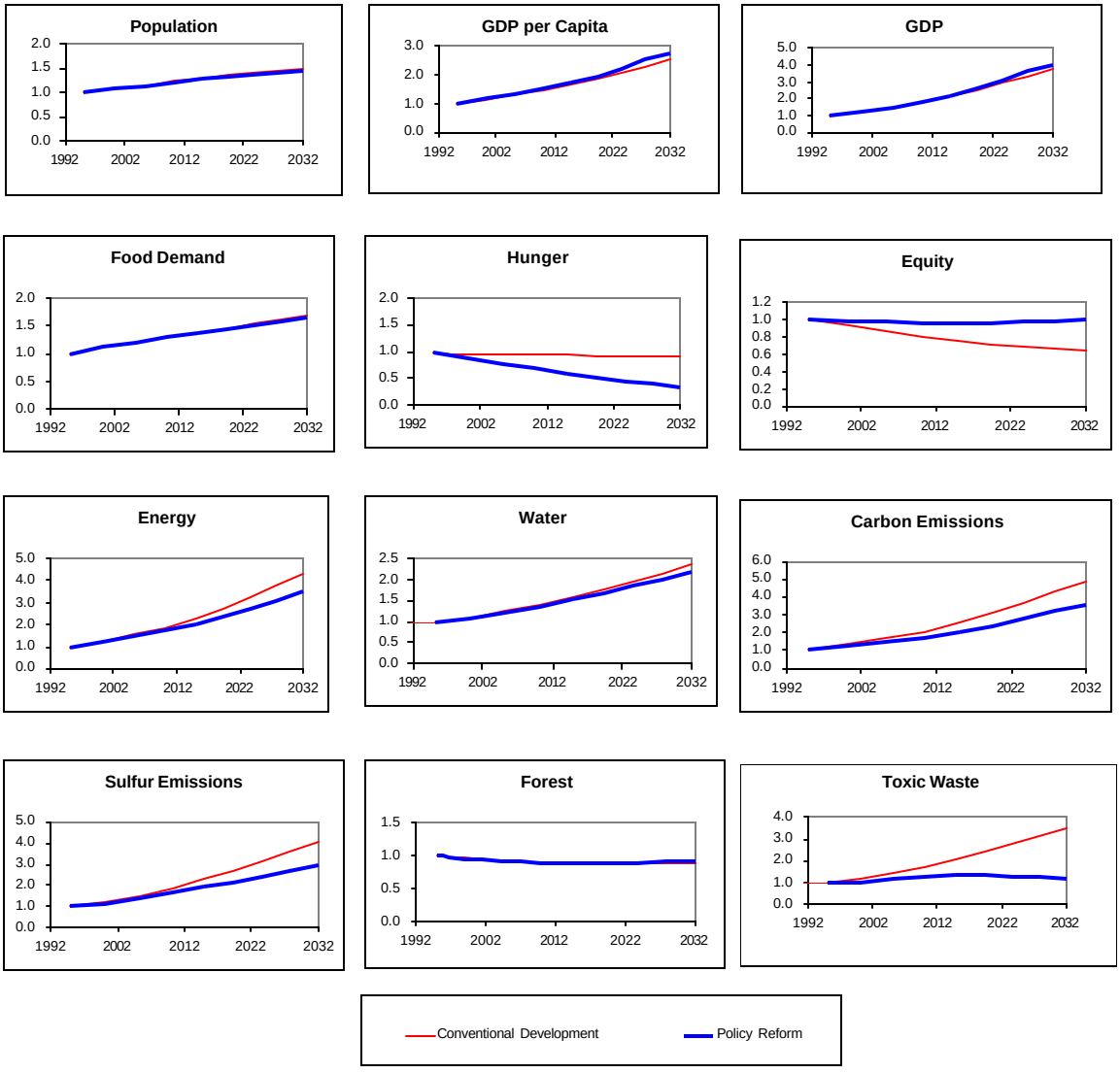
South Asia	1995	2015		2032	
		Conventional Development	Policy Reform	Conventional Development	Policy Reform
DEMOGRAPHY					
Population (million)	1,312	1,774	1,750	2,102	2,042
Urbanization (%)	28	41	41	53	53
ECONOMY AND SOCIETY					
GDP (billion US$ PPP)	2,283	5,471	6,139	10,479	12,770
Agriculture (%)	29	16	14	10	8
Industry (%)	27	27	27	27	27
Services (%)	43	57	59	63	65
GDP per capita (1995 US$ PPP)	1,740	3,084	3,508	4,985	6,254
Hunger Incidence (% of population)	23	15	10	11	5
National Equity (L20%/H20%)	0.15	0.11	0.14	0.09	0.14
ENERGY					
Primary Energy Requirement (EJ)	27	56	57	99	103
Coal	6	12	11	19	15
Crude Oil	7	20	16	39	25
Natural Gas	3	9	13	17	33
Uranium	0	2	0	6	1
Hydropower	0	1	1	2	2
Renewables	10	14	16	15	28
Final Fuel Demand (EJ)	22	38	46	76	81
Agriculture	1	1	1	2	2
Households	11	11	17	23	24
Industry	7	15	16	28	29
Services	0	1	1	3	3
Transport	3	9	10	20	22
FOOD AND AGRICULTURE					
Avg. Daily Consumption (kcal/cap)	2,345	2,577	2,608	2,744	2,787
Share from Animal Products (%)	8	9	10	11	12
Meat and Milk Production (Mt)	103	178	185	253	267
Fraction of Meat from Feedlots (%)	4	7	14	14	36
Fish Production (Mt)	7	9	9	10	10
Crop Production (Mt)	774	1,131	1,122	1,436	1,393
Total Cropland (Mha)	231	228	225	214	202
Irrigated Cropland (Mha)	80	90	90	98	98
Potential Cultivable Land (Mha)	250	235	237	221	226
Cereal Harvest Yield (t/ha)	2.10	3.06	2.89	3.82	3.35
Meat and Milk SSR	0.99	0.93	0.93	0.89	0.89
Fish SSR	0.98	0.95	0.95	0.94	0.94
Crop SSR	0.94	0.94	0.90	0.94	0.84
ENVIRONMENTAL PRESSURES					
Total Water Withdrawals (billion m^3)	666	879	888	1,099	1,099
Agriculture (%)	94	90	89	87	85
Industry (%)	3	5	6	7	1
Households (%)	3	5	5	7	14
Water Use/Resource Ratio (%)	12	16	16	20	20
Population in Water Stress (million)	417	642	638	938	909
Carbon Emissions (MtC)	350	810	793	1,491	1,359
Sulfur Emissions (MtS)	5	9	8	15	12
Total Land Area (Mha)	640	640	640	640	640
Built Environment (%)	6	9	9	12	12
Cropland (%)	36	36	35	33	32
Forest (%)	14	11	11	8	11
Pasture (%)	15	16	17	21	22
Protected (%)	5	5	5	5	5
Other (%)	25	23	23	21	20
Forest Exploitation* (%)	17	36	30	61	39
Nitrogen Fertilizer Consumption (Mt)	14	20	17	25	16
Toxic Waste (Mt)	2.1	4.5	3.0	8.0	3.0

t: metric tonnes; ha: hectare; J: Joules; SSR: Self-Sufficiency Ratio = Production/Requirements

Mt = 10^6 t; Mha = 10^6 ha; EJ = 10^{18} J

*Commercial off take divided by annual increment on commercial forest areas.

SOUTHEAST ASIA



Note: Values indexed to 1 in 1995.

Southeast Asia	1995	2015		2032	
		Conventional Development	Policy Reform	Conventional Development	Policy Reform
DEMOGRAPHY					
Population (million)	480	620	612	719	699
Urbanization (%)	34	49	49	61	61
ECONOMY AND SOCIETY					
GDP (billion US$ PPP)	2,305	4,911	5,161	8,656	9,373
Agriculture (%)	15	9	8	5	5
Industry (%)	39	37	37	34	33
Services (%)	45	55	55	61	62
GDP per capita (1995 US$ PPP)	4,802	7,921	8,433	12,039	13,409
Hunger Incidence (% of population)	13	9	6	8	3
National Equity (L20%/H20%)	0.13	0.10	0.12	0.08	0.13
ENERGY					
Primary Energy Requirement (EJ)	12	28	25	53	42
Coal	1	2	1	4	2
Crude Oil	6	13	10	23	16
Natural Gas	3	7	6	16	13
Uranium	0	1	0	4	0
Hydropower	0	0	0	0	0
Renewables	3	5	7	6	11
Final Fuel Demand (EJ)	9	16	19	34	32
Agriculture	0	1	1	1	1
Households	4	4	7	11	11
Industry	2	6	5	12	9
Services	0	1	1	2	2
Transport	3	5	6	9	10
FOOD AND AGRICULTURE					
Avg. Daily Consumption (kcal/cap)	2,461	2,650	2,659	2,787	2,799
Share from Animal Products (%)	8	9	10	11	11
Meat and Milk Production (Mt)	12	20	21	28	29
Fraction of Meat from Feedlots (%)	23	30	32	36	38
Fish Production (Mt)	12	16	16	18	18
Crop Production (Mt)	384	653	737	775	998
Total Cropland (Mha)	90	116	137	107	155
Irrigated Cropland (Mha)	15	17	17	19	19
Potential Cultivable Land (Mha)	141	135	135	127	130
Cereal Harvest Yield (t/ha)	3.03	4.27	4.53	5.07	5.27
Meat and Milk SSR	0.73	0.70	0.70	0.68	0.68
Fish SSR	0.98	0.95	0.95	0.94	0.94
Crop SSR	1.15	1.40	1.58	1.35	1.76
ENVIRONMENTAL PRESSURES					
Total Water Withdrawals (billion m^3)	120	190	182	284	263
Agriculture (%)	76	63	65	51	55
Industry (%)	11	21	13	29	23
Households (%)	13	17	22	20	22
Water Use/Resource Ratio (%)	2	3	3	5	5
Population in Water Stress (million)	16	70	65	136	120
Carbon Emissions (MtC)	157	396	322	768	568
Sulfur Emissions (MtS)	2	4	3	7	5
Total Land Area (Mha)	436	436	436	436	436
Built Environment (%)	3	5	5	7	7
Cropland (%)	21	27	31	25	35
Forest (%)	41	36	36	36	39
Pasture (%)	4	4	4	5	5
Protected (%)	11	11	11	11	11
Other (%)	19	16	11	15	3
Forest Exploitation* (%)	46	81	77	100	100
Nitrogen Fertilizer Consumption (Mt)	3	6	5	8	6
Toxic Waste (Mt)	1.6	3.4	2.1	5.7	1.9

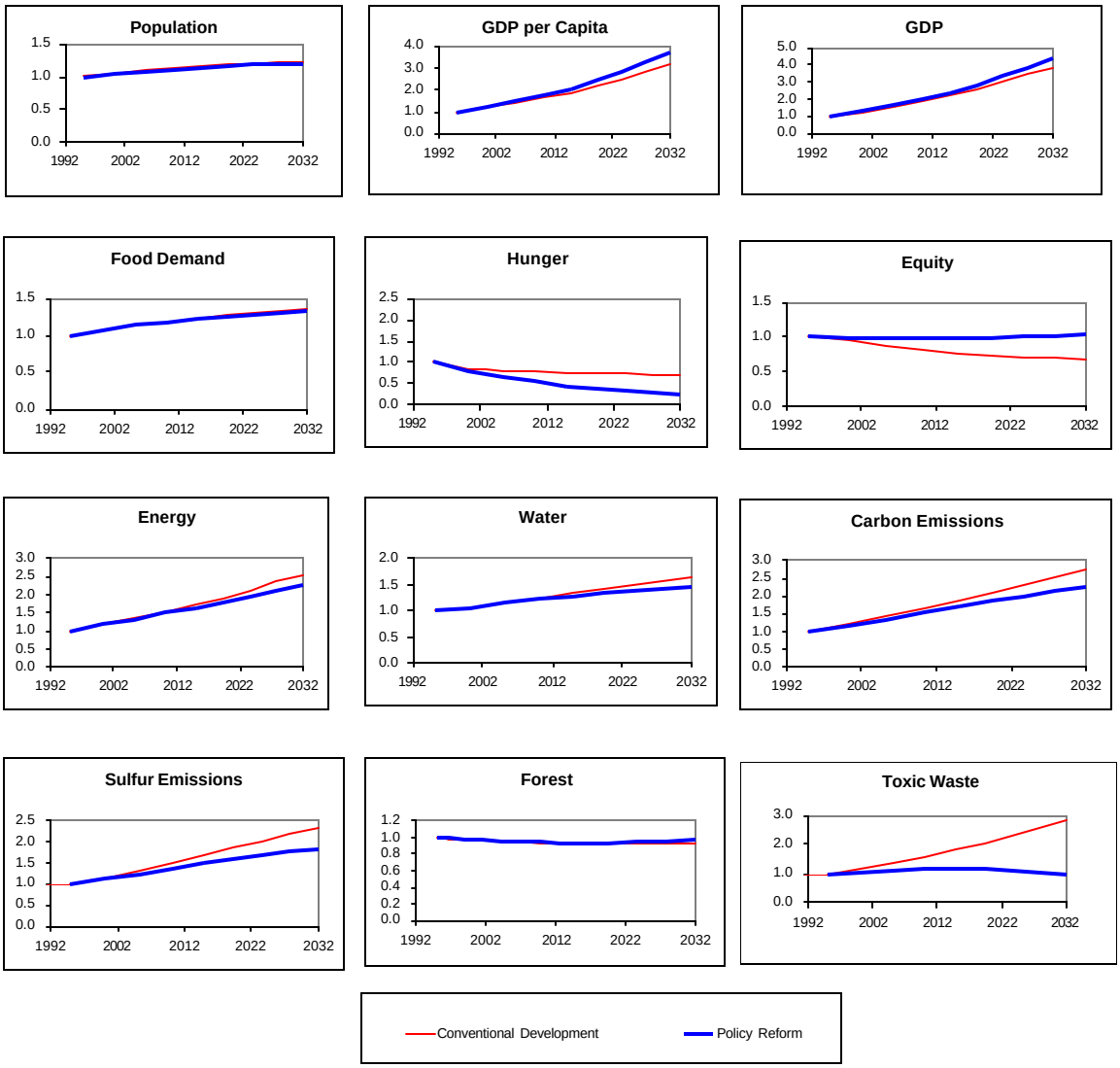
t: metric tonnes; ha: hectare; J: Joules; SSR: Self-Sufficiency Ratio = Production/Requirements

Mt = 10^6 t; Mha = 10^6 ha; EJ = 10^{18} J

*Commercial off take divided by annual increment on commercial forest areas.

NORTHWEST PACIFIC AND EAST ASIA

Asia and the Pacific
Northwest Pacific and East Asia



Note: Values indexed to 1 in 1995.

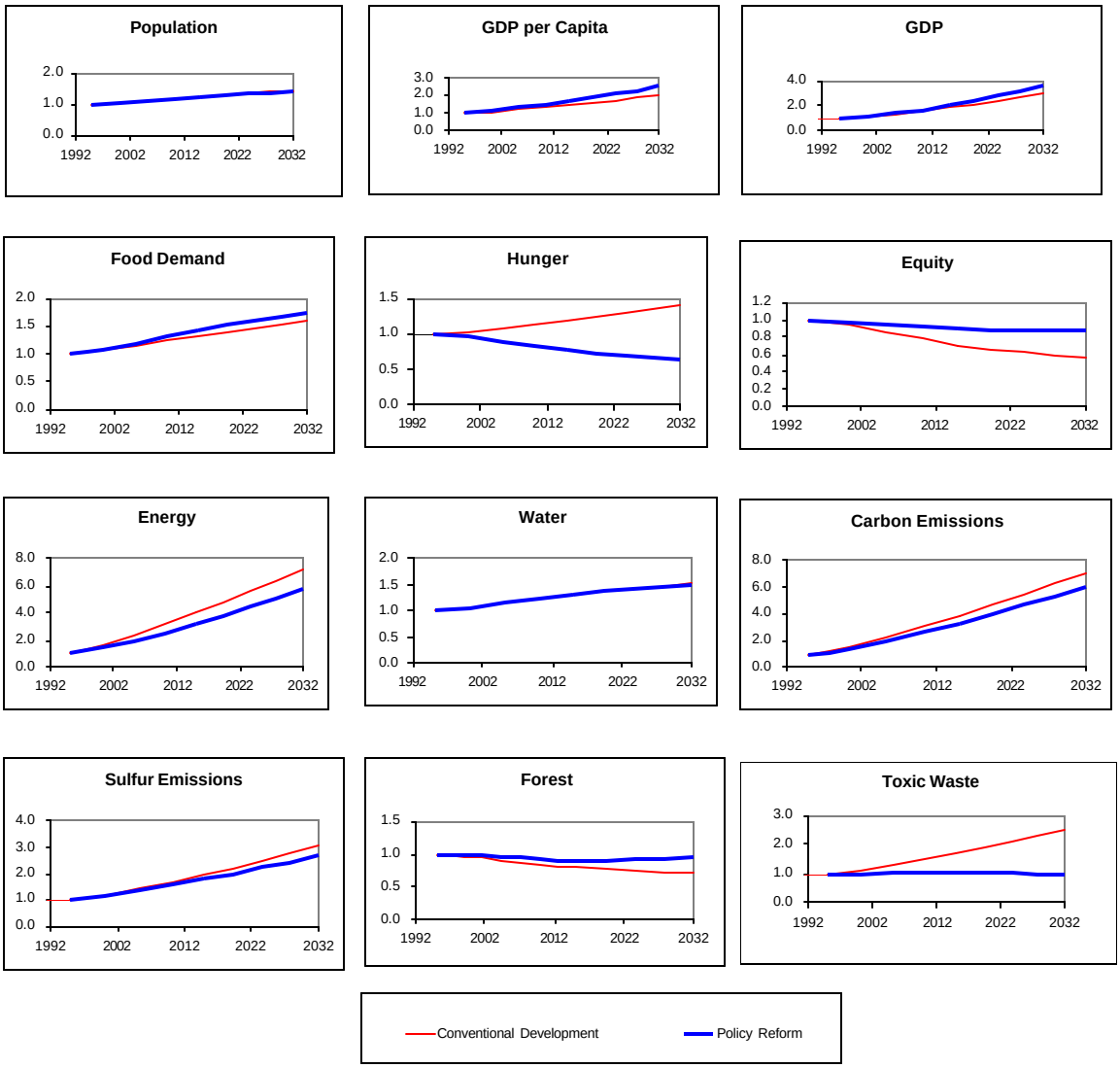
NW Pac + E Asia	1995	2015		2032	
		Conventional Development	Policy Reform	Conventional Development	Policy Reform
DEMOGRAPHY					
Population (million)	1,290	1,499	1,479	1,587	1,542
Urbanization (%)	33	48	48	61	61
ECONOMY AND SOCIETY					
GDP (billion US$ PPP)	4,220	9,165	9,984	16,252	18,815
Agriculture (%)	19	10	9	6	5
Industry (%)	46	43	42	39	37
Services (%)	33	47	49	56	58
GDP per capita (1995 US$ PPP)	3,271	6,114	6,751	10,241	12,202
Hunger Incidence (% of population)	14	9	5	8	3
National Equity (L20%/H20%)	0.12	0.10	0.12	0.08	0.13
ENERGY					
Primary Energy Requirement (EJ)	56	96	93	144	129
Coal	33	58	51	82	60
Crude Oil	12	22	14	37	21
Natural Gas	2	5	12	10	28
Uranium	1	4	3	7	2
Hydropower	1	2	2	3	3
Renewables	8	6	11	5	15
Final Fuel Demand (EJ)	42	67	69	106	98
Agriculture	1	2	2	3	3
Households	13	13	19	25	25
Industry	24	40	37	56	46
Services	2	5	5	9	11
Transport	3	7	6	14	14
FOOD AND AGRICULTURE					
Avg. Daily Consumption (kcal/cap)	2,790	2,956	2,973	3,062	3,086
Share from Animal Products (%)	16	18	19	20	21
Meat and Milk Production (Mt)	81	111	112	132	133
Fraction of Meat from Feedlots (%)	30	35	36	36	37
Fish Production (Mt)	29	33	33	35	34
Crop Production (Mt)	838	1,102	1,099	1,183	1,167
Total Cropland (Mha)	101	92	92	66	64
Irrigated Cropland (Mha)	52	57	57	61	61
Potential Cultivable Land (Mha)	177	158	163	140	155
Cereal Harvest Yield (t/ha)	4.53	5.96	5.89	7.56	7.56
Meat and Milk SSR	0.98	0.95	0.94	0.93	0.93
Fish SSR	0.88	0.86	0.87	0.86	0.86
Crop SSR	0.94	1.00	1.00	1.00	1.00
ENVIRONMENTAL PRESSURES					
Total Water Withdrawals (billion m^3)	507	669	648	841	735
Agriculture (%)	85	78	80	68	81
Industry (%)	8	12	3	16	3
Households (%)	6	10	17	13	16
Water Use/Resource Ratio (%)	17	23	22	28	25
Population in Water Stress (million)	283	560	523	854	673
Carbon Emissions (MtC)	992	1,833	1,693	2,741	2,267
Sulfur Emissions (MtS)	15	25	22	35	27
Total Land Area (Mha)	1,111	1,111	1,111	1,111	1,111
Built Environment (%)	3	5	5	6	6
Cropland (%)	9	8	8	6	6
Forest (%)	13	12	12	12	13
Pasture (%)	47	48	48	48	48
Protected (%)	6	6	6	6	6
Other (%)	22	21	21	22	22
Forest Exploitation* (%)	28	53	57	78	86
Nitrogen Fertilizer Consumption (Mt)	18	21	17	19	13
Toxic Waste (Mt)	5.6	10.1	6.5	15.8	5.4

t: metric tonnes; ha: hectare; J: Joules; SSR: Self-Sufficiency Ratio = Production/Requirements

Mt = 10^6 t; Mha = 10^6 ha; EJ = 10^{18} J

*Commercial off take divided by annual increment on commercial forest areas.

CENTRAL ASIA



Note: Values indexed to 1 in 1995.

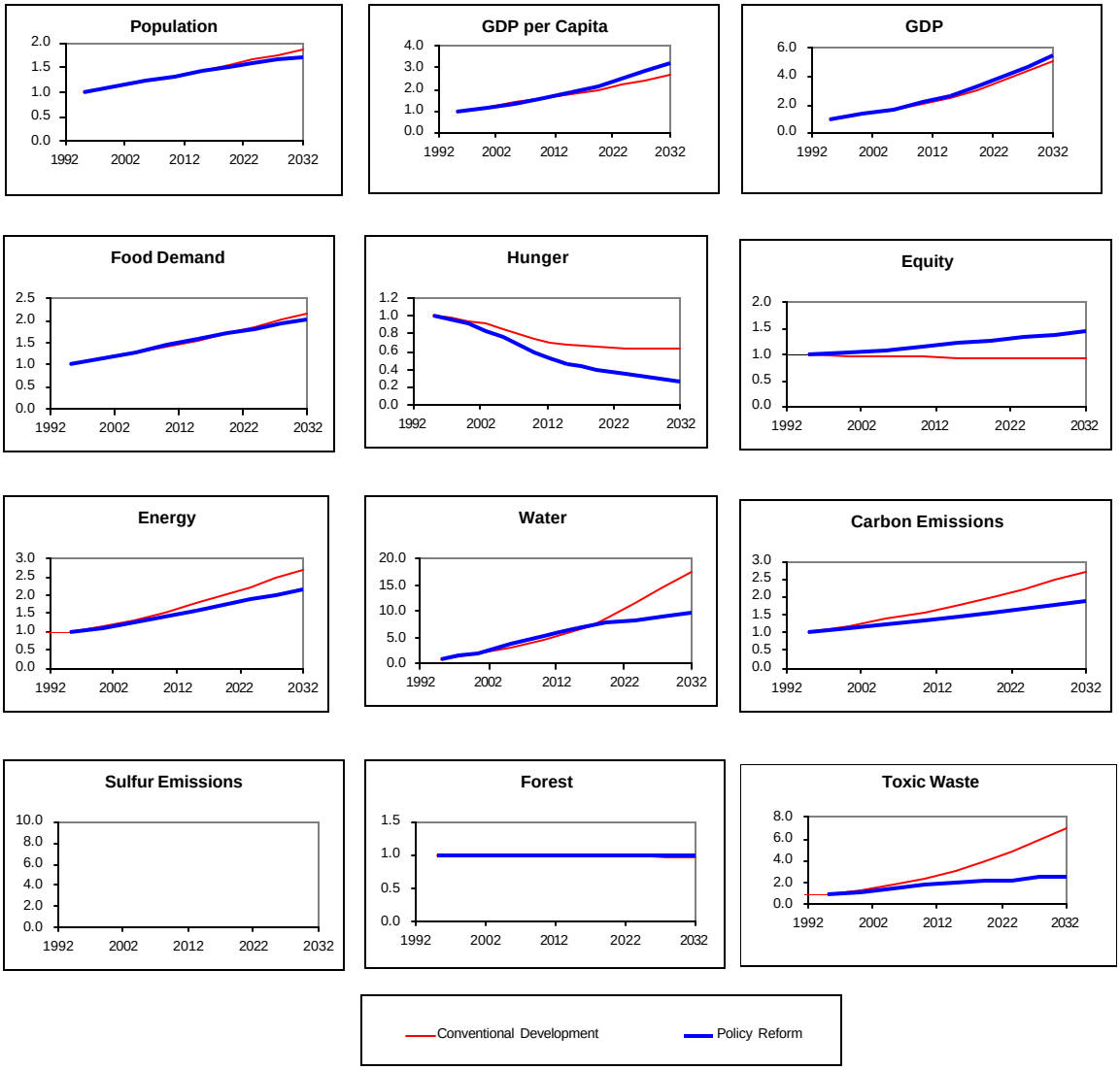
Central Asia	1995	2015		2032	
		Conventional Development	Policy Reform	Conventional Development	Policy Reform
DEMOGRAPHY					
Population (million)	53	66	65	77	75
Urbanization (%)	47	56	56	62	62
ECONOMY AND SOCIETY					
GDP (billion US$ PPP)	134	244	271	394	475
Agriculture (%)	25	17	15	12	10
Industry (%)	31	31	31	31	31
Services (%)	43	52	54	57	60
GDP per capita (1995 US$ PPP)	2,528	3,697	4,169	5,117	6,333
Hunger Incidence (% of population)	12	11	7	11	5
National Equity (L20%/H20%)	0.16	0.11	0.15	0.09	0.14
ENERGY					
Primary Energy Requirement (EJ)	4	14	11	25	20
Coal	2	3	3	4	4
Crude Oil	1	7	1	17	3
Natural Gas	1	4	3	3	5
Uranium	0	0	0	1	0
Hydropower	0	0	0	0	0
Renewables	0	0	4	0	9
Final Fuel Demand (EJ)	3	11	8	21	15
Agriculture	0	0	0	0	0
Households	1	1	1	1	1
Industry	1	2	2	3	4
Services	1	1	1	2	2
Transport	0	7	4	15	8
FOOD AND AGRICULTURE					
Avg. Daily Consumption (kcal/cap)	2,486	2,634	2,882	2,742	3,091
Share from Animal Products (%)	20	22	22	23	23
Meat and Milk Production (Mt)	14	19	20	23	26
Fraction of Meat from Feedlots (%)	17	21	30	29	40
Fish Production (Mt)	0	0	0	0	0
Crop Production (Mt)	46	72	69	85	83
Total Cropland (Mha)	43	45	44	44	44
Irrigated Cropland (Mha)	9	10	10	12	12
Potential Cultivable Land (Mha)	45	45	45	44	44
Cereal Harvest Yield (t/ha)	0.92	1.65	1.66	2.08	2.07
Meat and Milk SSR	0.98	0.95	0.94	0.92	0.91
Fish SSR	1.02	1.50	1.50	1.41	1.42
Crop SSR	0.83	0.97	0.75	0.88	0.68
ENVIRONMENTAL PRESSURES					
Total Water Withdrawals (billion m^3)	132	173	172	203	197
Agriculture (%)	95	95	95	95	97
Industry (%)	2	2	2	3	1
Households (%)	3	3	3	3	3
Water Use/Resource Ratio (%)	60	78	78	92	89
Population in Water Stress (million)	46	60	59	74	71
Carbon Emissions (MtC)	69	266	230	485	420
Sulfur Emissions (MtS)	1	2	2	3	3
Total Land Area (Mha)	389	389	389	389	389
Built Environment (%)	1	1	1	1	1
Cropland (%)	11	11	11	11	11
Forest (%)	4	3	4	3	4
Pasture (%)	64	66	64	67	64
Protected (%)	0	0	0	0	0
Other (%)	20	18	19	18	19
Forest Exploitation* (%)	0	0	0	0	0
Nitrogen Fertilizer Consumption (Mt)	2	3	2	3	2
Toxic Waste (Mt)	0.2	0.3	0.2	0.4	0.1

t: metric tonnes; ha: hectare; J: Joules; SSR: Self-Sufficiency Ratio = Production/Requirements

Mt = 10^6 t; Mha = 10^6 ha; EJ = 10^{18} J

*Commercial off take divided by annual increment on commercial forest areas.

SOUTH PACIFIC



Note: Values indexed to 1 in 1995.

South Pacific	1995	2015		2032	
		Conventional Development	Policy Reform	Conventional Development	Policy Reform
DEMOGRAPHY					
Population (million)	7	10	10	13	12
Urbanization (%)	14	30	30	38	38
ECONOMY AND SOCIETY					
GDP (billion US$ PPP)	45	114	118	224	247
Agriculture (%)	18	9	8	4	3
Industry (%)	40	36	36	29	28
Services (%)	44	56	57	67	69
GDP per capita (1995 US$ PPP)	6,429	11,400	11,800	17,231	20,583
Hunger Incidence (% of population)	22	10	7	8	3
National Equity (L20%/H20%)	0.07	0.06	0.08	0.06	0.10
ENERGY					
Primary Energy Requirement (EJ)	0.16	0.29	0.26	0.44	0.35
Coal	0.01	0.01	0.01	0.02	0.01
Crude Oil	0.15	0.26	0.21	0.40	0.27
Natural Gas	0.00	0.01	0.01	0.01	0.01
Uranium	0.00	0.00	0.00	0.00	0.00
Hydropower	0.00	0.01	0.01	0.01	0.01
Renewables	0.00	0.00	0.03	0.00	0.05
Final Fuel Demand (EJ)	NA	NA	NA	NA	NA
Agriculture	NA	NA	NA	NA	NA
Households	NA	NA	NA	NA	NA
Industry	NA	NA	NA	NA	NA
Services	NA	NA	NA	NA	NA
Transport	NA	NA	NA	NA	NA
FOOD AND AGRICULTURE					
Avg. Daily Consumption (kcal/cap)	2,308	2,531	2,548	2,693	2,735
Share from Animal Products (%)	14	16	16	17	18
Meat and Milk Production (Mt)	0	0	0	1	1
Fraction of Meat from Feedlots (%)	8	12	14	17	20
Fish Production (Mt)	0	0	0	0	0
Crop Production (Mt)	10	20	16	26	21
Total Cropland (Mha)	1	2	1	2	2
Irrigated Cropland (Mha)	0	0	0	0	0
Potential Cultivable Land (Mha)	13	13	13	13	13
Cereal Harvest Yield (t/ha)	2.36	3.26	3.57	3.86	4.31
Meat and Milk SSR	0.41	0.38	0.38	0.37	0.37
Fish SSR	0.74	0.71	0.71	0.70	0.70
Crop SSR	1.58	1.94	1.58	1.87	1.57
ENVIRONMENTAL PRESSURES					
Total Water Withdrawals (billion m^3)	0	1	1	2	1
Agriculture (%)	57	12	11	5	9
Industry (%)	14	24	25	32	10
Households (%)	30	64	64	63	81
Water Use/Resource Ratio (%)	0	0	0	0	0
Population in Water Stress (million)	0	0	0	0	0
Carbon Emissions (MtC)	11	20	16	31	21
Sulfur Emissions (MtS)	NA	NA	NA	NA	NA
Total Land Area (Mha)	54	54	54	54	54
Built Environment (%)	0	1	1	1	1
Cropland (%)	2	3	3	4	3
Forest (%)	85	83	84	82	84
Pasture (%)	1	1	1	1	1
Protected (%)	3	3	3	3	3
Other (%)	8	8	8	8	7
Forest Exploitation* (%)	86	92	100	100	100
Nitrogen Fertilizer Consumption (Mt)	0	0	0	0	0
Toxic Waste (Mt)	0.0	0.0	0.0	0.1	0.0

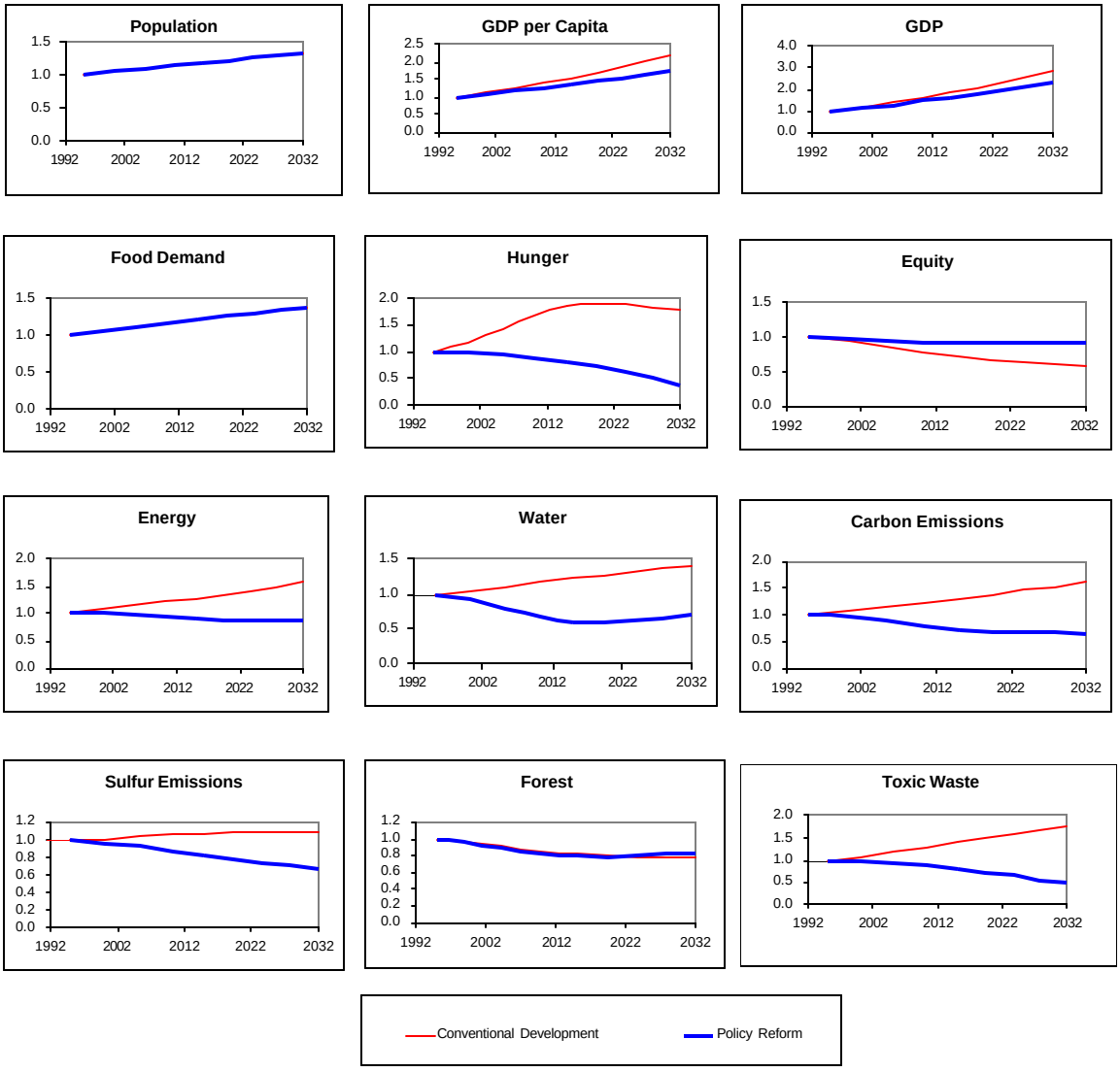
t: metric tonnes; ha: hectare; J: Joules; SSR: Self-Sufficiency Ratio = Production/Requirements

Mt = 10^6 t; Mha = 10^6 ha; EJ = 10^{18} J

*Commercial off take divided by annual increment on commercial forest areas.

AUSTRALIA AND NEW ZEALAND

Asia and the Pacific
Australia and New Zealand



Note: Values indexed to 1 in 1995.

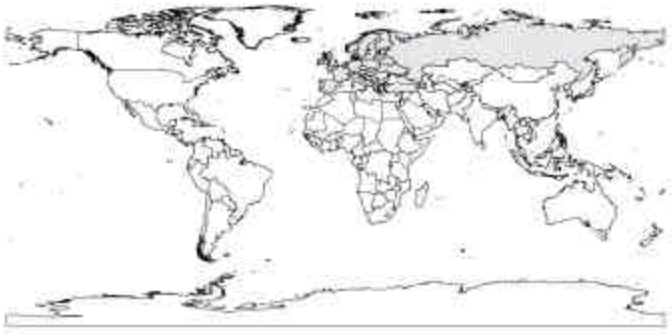
Aust + NZ	1995	2015		2032	
		Conventional Development	Policy Reform	Conventional Development	Policy Reform
DEMOGRAPHY					
Population (million)	22	26	26	29	29
Urbanization (%)	82	88	88	90	90
ECONOMY AND SOCIETY					
GDP (billion US$ PPP)	412	747	667	1,179	954
Agriculture (%)	3	2	2	1	2
Industry (%)	27	25	25	24	24
Services (%)	69	73	73	75	75
GDP per capita (1995 US$ PPP)	18,727	28,731	25,654	40,655	32,897
Hunger Incidence (% of population)	1	2	1	2	0
National Equity (L20%/H20%)	0.15	0.11	0.14	0.09	0.14
ENERGY					
Primary Energy Requirement (EJ)	5	6	4	7	4
Coal	2	2	1	2	1
Crude Oil	2	3	1	4	1
Natural Gas	1	1	1	1	1
Uranium	0	0	0	0	0
Hydropower	0	0	0	0	0
Renewables	0	0	1	0	1
Final Fuel Demand (EJ)	3	4	3	6	3
Agriculture	0	0	0	0	0
Households	0	0	0	0	0
Industry	1	2	1	2	1
Services	0	0	0	0	0
Transport	1	2	1	3	1
FOOD AND AGRICULTURE					
Avg. Daily Consumption (kcal/cap)	3,069	3,141	3,141	3,211	3,211
Share from Animal Products (%)	37	35	36	34	35
Meat and Milk Production (Mt)	25	32	32	37	39
Fraction of Meat from Feedlots (%)	2	6	11	8	16
Fish Production (Mt)	1	1	1	1	1
Crop Production (Mt)	57	98	121	122	177
Total Cropland (Mha)	51	55	77	49	94
Irrigated Cropland (Mha)	2	3	3	3	3
Potential Cultivable Land (Mha)	154	153	153	152	153
Cereal Harvest Yield (t/ha)	1.28	2.04	3.77	2.51	2.45
Meat and Milk SSR	2.29	2.47	2.50	2.62	2.72
Fish SSR	1.41	1.89	1.89	1.80	1.81
Crop SSR	2.17	2.21	2.03	2.12	2.04
ENVIRONMENTAL PRESSURES					
Total Water Withdrawals (billion m^3)	17	21	10	24	12
Agriculture (%)	35	36	76	39	77
Industry (%)	2	2	4	2	4
Households (%)	63	61	20	60	19
Water Use/Resource Ratio (%)	2	3	1	4	2
Population in Water Stress (million)	0	0	0	0	0
Carbon Emissions (MtC)	86	112	61	136	55
Sulfur Emissions (MtS)	2	2	1	2	1
Total Land Area (Mha)	795	795	795	795	795
Built Environment (%)	0	0	0	0	0
Cropland (%)	6	7	10	6	12
Forest (%)	18	14	14	14	15
Pasture (%)	54	59	58	62	60
Protected (%)	13	13	13	13	13
Other (%)	9	7	6	6	1
Forest Exploitation* (%)	69	84	90	100	100
Nitrogen Fertilizer Consumption (Mt)	1	1	1	2	2
Toxic Waste (Mt)	0.3	0.4	0.2	0.4	0.1

t: metric tonnes; ha: hectare; J: Joules; SSR: Self-Sufficiency Ratio = Production/Requirements

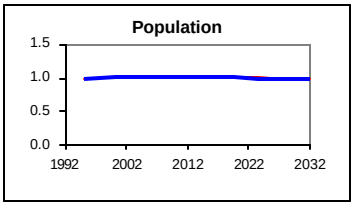
Mt = 10^6 t; Mha = 10^6 ha; EJ = 10^{18} J

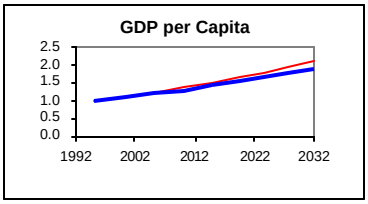
*Commercial off take divided by annual increment on commercial forest areas.

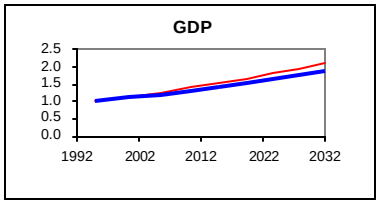
EUROPE

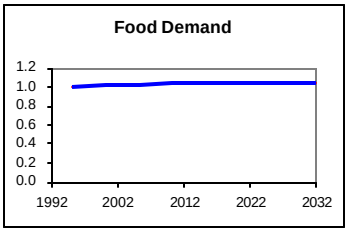


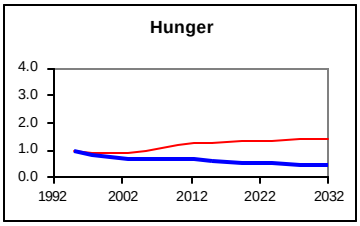
Europe

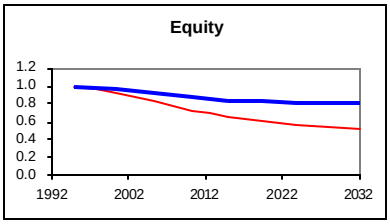


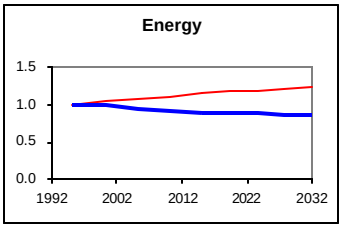


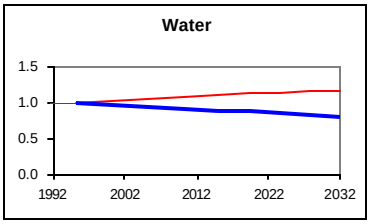


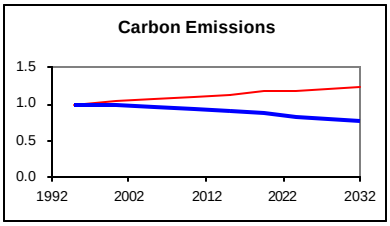


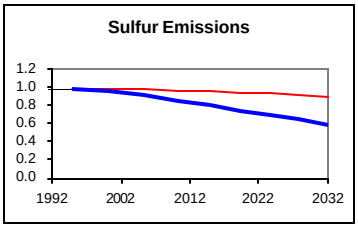


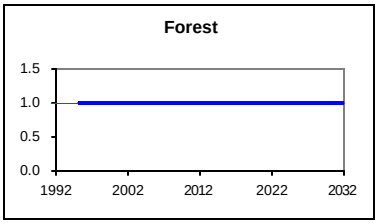


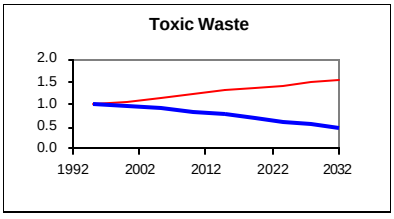












Note: Values indexed to 1 in 1995.

Europe	1995	2015		2032	
		Conventional Development	Policy Reform	Conventional Development	Policy Reform
DEMOGRAPHY					
Population (million)	812	826	820	807	795
Urbanization (%)	73	80	80	85	85
ECONOMY AND SOCIETY					
GDP (billion US$ PPP)	9,488	14,540	13,622	19,878	17,635
Agriculture (%)	4	3	3	2	2
Industry (%)	32	30	30	29	29
Services (%)	62	67	67	69	69
GDP per capita (1995 US$ PPP)	11,685	17,603	16,612	24,632	22,182
Hunger Incidence (% of population)	2	3	1	3	1
National Equity (L20%/H20%)	0.19	0.12	0.16	0.10	0.15
ENERGY					
Primary Energy Requirement (EJ)	118	135	106	146	103
Coal	25	26	20	27	14
Crude Oil	43	51	36	56	28
Natural Gas	33	39	37	42	37
Uranium	12	13	6	13	6
Hydropower	3	3	3	3	3
Renewables	3	4	6	5	15
Final Fuel Demand (EJ)	80	94	79	102	77
Agriculture	4	4	3	3	2
Households	24	24	21	20	19
Industry	30	35	28	38	28
Services	6	8	7	10	7
Transport	17	25	19	31	19
FOOD AND AGRICULTURE					
Avg. Daily Consumption (kcal/cap)	3,120	3,218	3,243	3,296	3,343
Share from Animal Products (%)	28	28	28	28	29
Meat and Milk Production (Mt)	305	353	363	387	411
Fraction of Meat from Feedlots (%)	29	32	33	34	36
Fish Production (Mt)	17	17	17	17	16
Crop Production (Mt)	993	1,157	1,303	1,277	1,447
Total Cropland (Mha)	347	318	343	321	321
Irrigated Cropland (Mha)	31	33	33	35	35
Potential Cultivable Land (Mha)	637	633	635	630	635
Cereal Harvest Yield (t/ha)	2.79	4.27	4.30	5.05	6.75
Meat and Milk SSR	1.04	1.14	1.16	1.25	1.31
Fish SSR	0.79	0.79	0.79	0.78	0.79
Crop SSR	0.88	0.94	1.03	1.00	1.11
ENVIRONMENTAL PRESSURES					
Total Water Withdrawals (billion m^3)	516	573	467	607	420
Agriculture (%)	34	35	43	37	53
Industry (%)	52	52	41	51	31
Households (%)	14	13	16	13	17
Water Use/Resource Ratio (%)	6	7	6	7	5
Population in Water Stress (million)	205	226	183	231	158
Carbon Emissions (MtC)	1,887	2,148	1,734	2,329	1,450
Sulfur Emissions (MtS)	21	20	16	18	12
Total Land Area (Mha)	2,359	2,359	2,359	2,359	2,359
Built Environment (%)	2	2	2	2	2
Cropland (%)	15	13	15	14	14
Forest (%)	38	38	38	38	39
Pasture (%)	8	8	8	8	8
Protected (%)	5	5	5	5	5
Other (%)	32	33	32	33	33
Forest Exploitation* (%)	25	29	51	35	64
Nitrogen Fertilizer Consumption (Mt)	11	13	14	15	12
Toxic Waste (Mt)	7.3	9.3	5.5	11.2	3.3

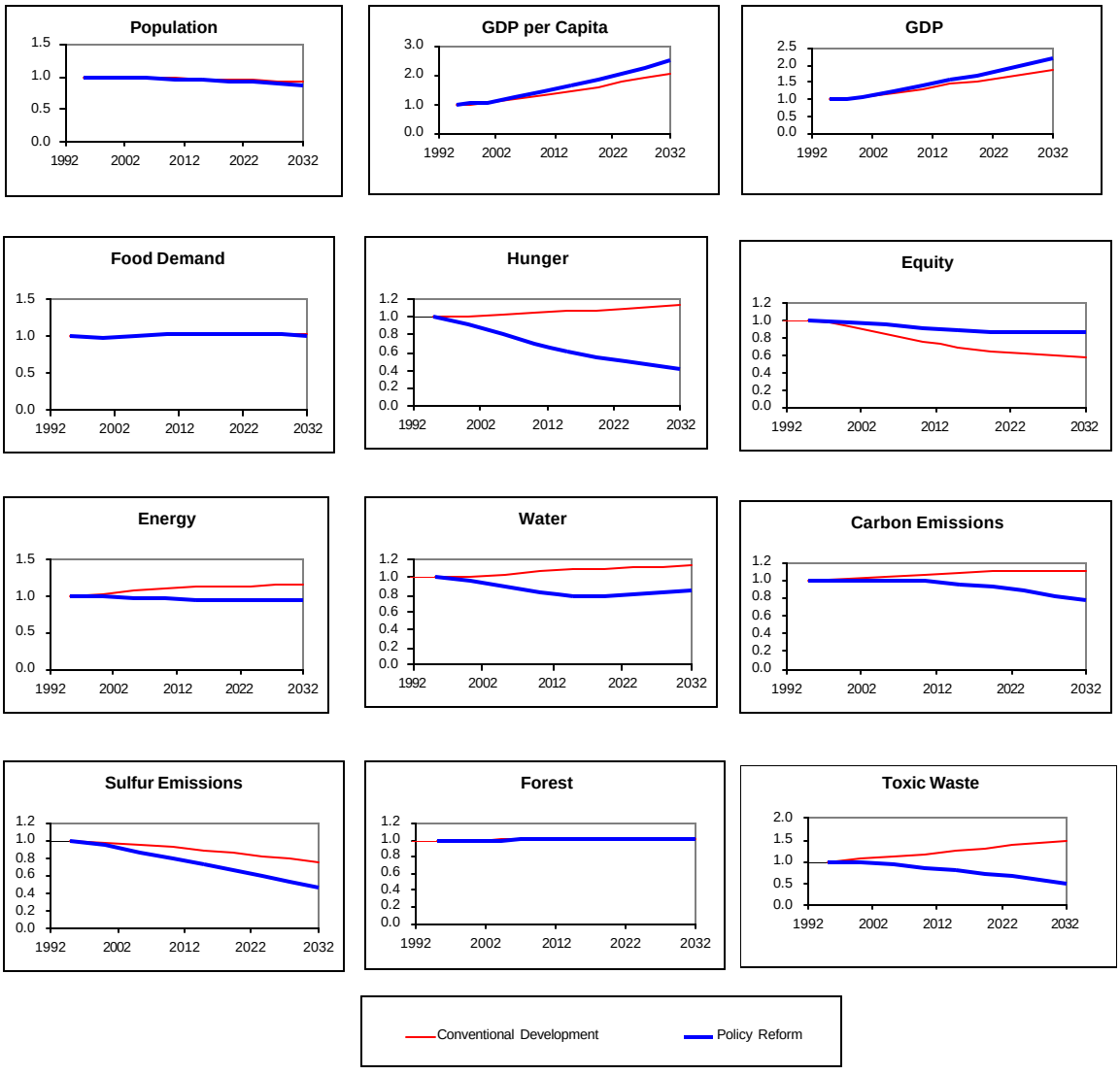
t: metric tonnes; ha: hectare; J: Joules; SSR: Self-Sufficiency Ratio = Production/Requirements

Mt = 10^6 t; Mha = 10^6 ha; EJ = 10^{18} J

*Commercial off take divided by annual increment on commercial forest areas.

EASTERN EUROPE

Europe
Eastern Europe



Note: Values indexed to 1 in 1995.

Eastern Europe	1995	2015		2032	
		Conventional Development	Policy Reform	Conventional Development	Policy Reform
DEMOGRAPHY					
Population (million)	231	223	220	211	205
Urbanization (%)	73	80	80	85	85
ECONOMY AND SOCIETY					
GDP (billion US$ PPP)	931	1,330	1,469	1,734	2,069
Agriculture (%)	11	7	7	5	4
Industry (%)	36	35	35	34	33
Services (%)	51	58	59	61	63
GDP per capita (1995 US$ PPP)	4,030	5,964	6,677	8,218	10,093
Hunger Incidence (% of population)	6	7	4	7	3
National Equity (L20%/H20%)	0.16	0.11	0.15	0.09	0.14
ENERGY					
Primary Energy Requirement (EJ)	40	45	38	46	38
Coal	8	8	6	8	3
Crude Oil	10	13	11	13	8
Natural Gas	18	20	19	21	18
Uranium	2	3	1	3	3
Hydropower	1	1	1	1	1
Renewables	1	1	1	1	5
Final Fuel Demand (EJ)	26	30	29	32	28
Agriculture	2	2	2	2	1
Households	10	10	9	8	7
Industry	11	14	14	16	15
Services	1	1	1	2	2
Transport	2	3	3	4	3
FOOD AND AGRICULTURE					
Avg. Daily Consumption (kcal/cap)	2,840	3,052	3,099	3,170	3,224
Share from Animal Products (%)	26	26	27	27	27
Meat and Milk Production (Mt)	85	102	105	115	122
Fraction of Meat from Feedlots (%)	30	36	37	39	41
Fish Production (Mt)	4	4	4	4	3
Crop Production (Mt)	263	359	376	418	408
Total Cropland (Mha)	178	153	163	170	142
Irrigated Cropland (Mha)	10	10	10	11	11
Potential Cultivable Land (Mha)	370	369	369	367	369
Cereal Harvest Yield (t/ha)	1.75	3.19	3.31	3.97	5.70
Meat and Milk SSR	1.08	1.22	1.25	1.37	1.46
Fish SSR	0.99	0.99	0.99	0.99	0.99
Crop SSR	0.80	0.95	0.96	1.05	1.00
ENVIRONMENTAL PRESSURES					
Total Water Withdrawals (billion m^3)	151	164	120	171	129
Agriculture (%)	27	30	41	32	42
Industry (%)	58	56	40	55	40
Households (%)	15	14	19	13	18
Water Use/Resource Ratio (%)	3	3	3	4	3
Population in Water Stress (million)	24	32	21	32	22
Carbon Emissions (MtC)	662	714	634	733	513
Sulfur Emissions (MtS)	9	8	6	7	4
Total Land Area (Mha)	1,789	1,789	1,789	1,789	1,789
Built Environment (%)	1	1	1	1	1
Cropland (%)	10	9	9	9	8
Forest (%)	40	41	41	40	41
Pasture (%)	6	6	6	6	6
Protected (%)	4	4	4	4	4
Other (%)	40	41	40	40	41
Forest Exploitation* (%)	8	8	34	10	47
Nitrogen Fertilizer Consumption (Mt)	2	5	4	6	4
Toxic Waste (Mt)	1.2	1.5	1.0	1.8	0.6

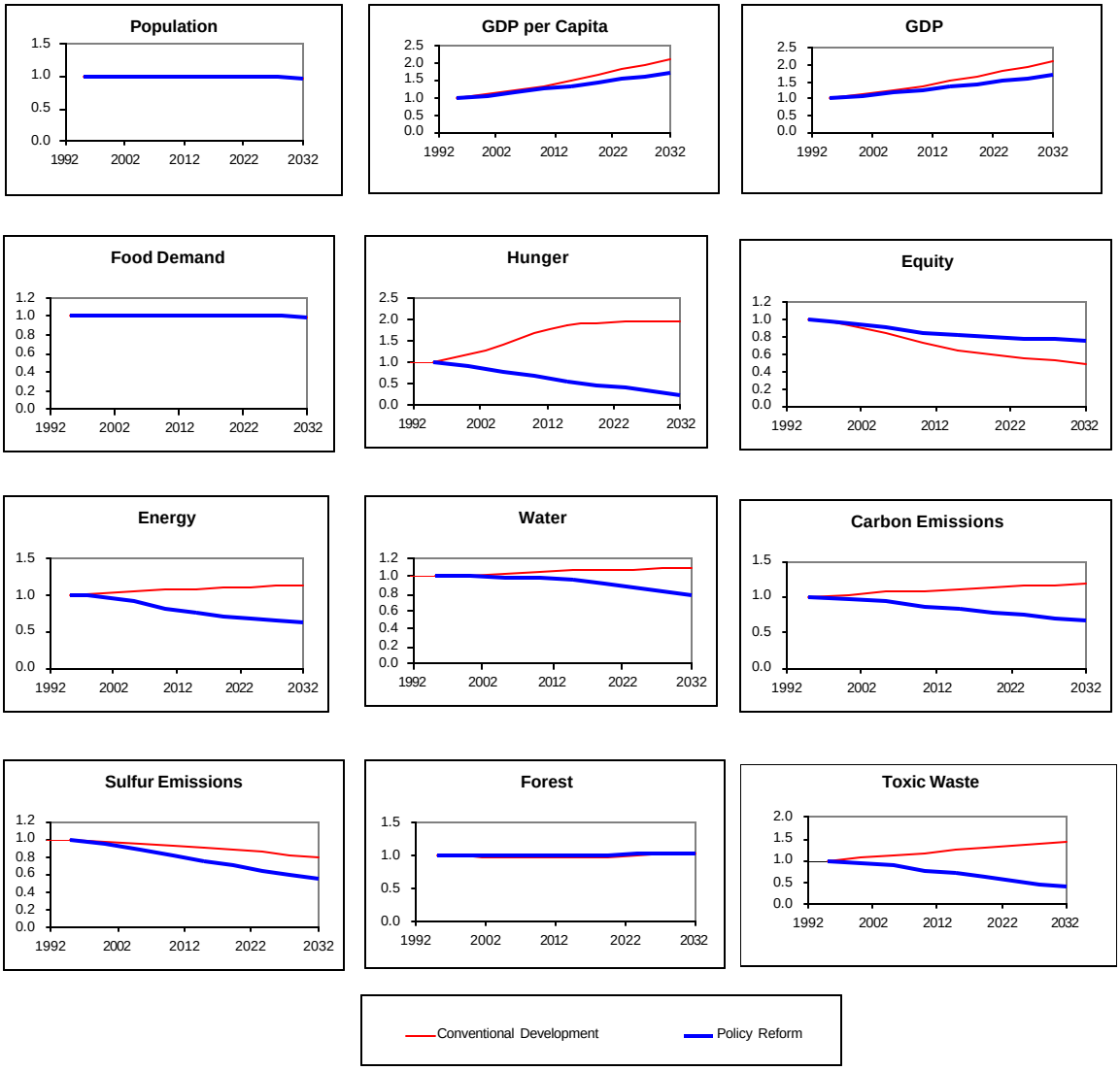
t: metric tonnes; ha: hectare; J: Joules; SSR: Self-Sufficiency Ratio = Production/Requirements

Mt = 10^6 t; Mha = 10^6 ha; EJ = 10^{18} J

*Commercial off take divided by annual increment on commercial forest areas.

WESTERN EUROPE

Europe
Western Europe



Note: Values indexed to 1 in 1995.

Western Europe	1995	2015		2032	
		Conventional Development	Policy Reform	Conventional Development	Policy Reform
DEMOGRAPHY					
Population (million)	390	395	395	382	382
Urbanization (%)	78	83	83	87	87
ECONOMY AND SOCIETY					
GDP (billion US$ PPP)	7,511	11,526	10,305	15,752	12,745
Agriculture (%)	3	2	2	1	2
Industry (%)	31	29	29	28	28
Services (%)	65	69	69	71	71
GDP per capita (1995 US$ PPP)	19,259	29,180	26,089	41,236	33,364
Hunger Incidence (% of population)	0	1	0	1	0
National Equity (L20%/H20%)	0.21	0.13	0.17	0.10	0.16
ENERGY					
Primary Energy Requirement (EJ)	63	69	49	73	40
Coal	10	10	8	10	6
Crude Oil	29	32	20	34	15
Natural Gas	12	14	12	16	12
Uranium	9	9	4	7	1
Hydropower	2	2	2	2	2
Renewables	2	3	3	4	4
Final Fuel Demand (EJ)	44	51	37	53	32
Agriculture	1	1	1	1	1
Households	11	11	9	8	7
Industry	14	14	9	14	8
Services	4	6	4	7	4
Transport	14	19	13	23	12
FOOD AND AGRICULTURE					
Avg. Daily Consumption (kcal/cap)	3,351	3,364	3,364	3,378	3,378
Share from Animal Products (%)	33	32	32	32	32
Meat and Milk Production (Mt)	174	196	201	211	226
Fraction of Meat from Feedlots (%)	29	28	28	26	27
Fish Production (Mt)	12	12	12	12	12
Crop Production (Mt)	487	494	570	510	619
Total Cropland (Mha)	88	95	87	82	85
Irrigated Cropland (Mha)	12	13	13	13	13
Potential Cultivable Land (Mha)	143	142	143	142	143
Cereal Harvest Yield (t/ha)	4.98	7.47	6.03	9.42	9.46
Meat and Milk SSR	1.03	1.17	1.20	1.31	1.39
Fish SSR	0.78	0.78	0.78	0.78	0.78
Crop SSR	0.90	0.91	1.04	0.97	1.17
ENVIRONMENTAL PRESSURES					
Total Water Withdrawals (billion m^3)	259	275	252	281	203
Agriculture (%)	32	34	37	36	49
Industry (%)	55	54	49	52	35
Households (%)	13	13	14	12	16
Water Use/Resource Ratio (%)	13	13	12	14	10
Population in Water Stress (million)	153	144	136	140	114
Carbon Emissions (MtC)	949	1,051	778	1,123	638
Sulfur Emissions (MtS)	9	8	7	7	5
Total Land Area (Mha)	360	360	360	360	360
Built Environment (%)	6	7	6	7	6
Cropland (%)	25	27	24	23	24
Forest (%)	31	30	32	33	33
Pasture (%)	16	16	16	16	16
Protected (%)	12	12	12	12	12
Other (%)	9	8	9	9	10
Forest Exploitation* (%)	82	100	95	100	100
Nitrogen Fertilizer Consumption (Mt)	6	5	6	5	5
Toxic Waste (Mt)	5.2	6.4	3.6	7.5	2.0

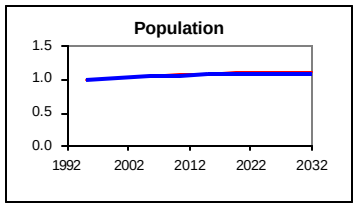
t: metric tonnes; ha: hectare; J: Joules; SSR: Self-Sufficiency Ratio = Production/Requirements

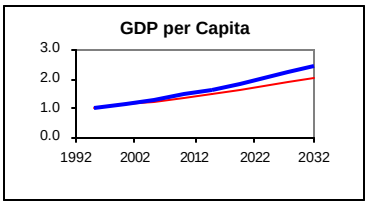
Mt = 10^6 t; Mha = 10^6 ha; EJ = 10^{18} J

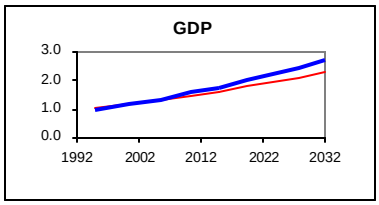
*Commercial off take divided by annual increment on commercial forest areas.

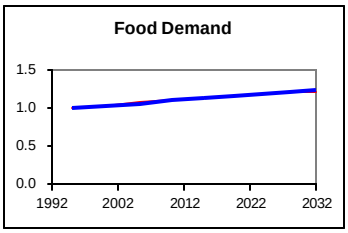
CENTRAL EUROPE

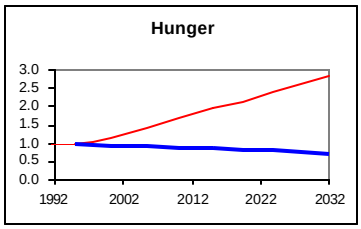
Europe
Central Europe

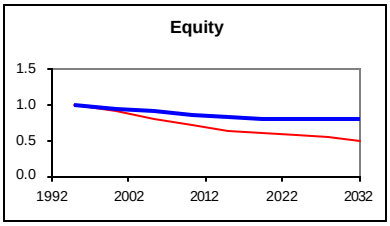


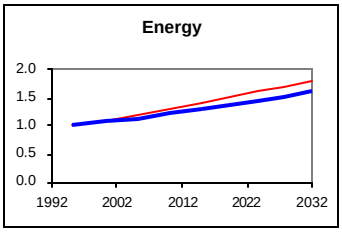


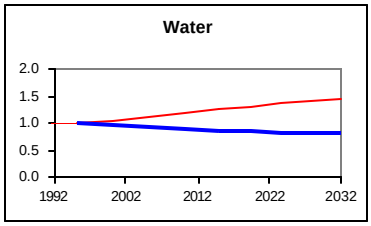


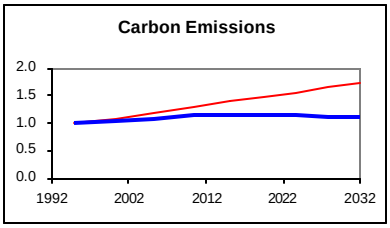


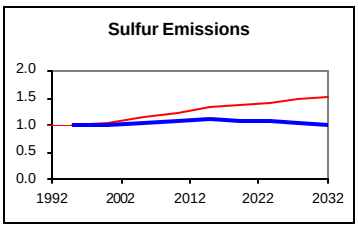


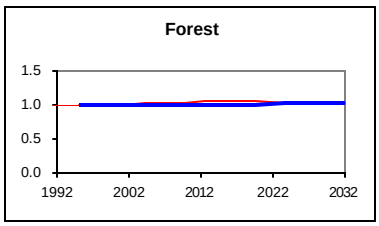


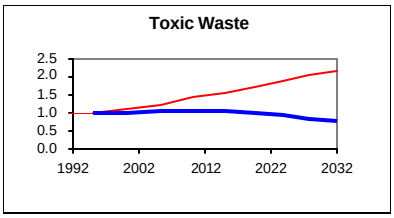












Note: Values indexed to 1 in 1995.

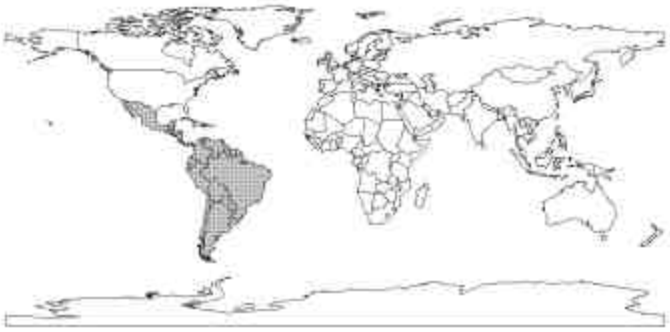
Central Europe	1995	2015		2032	
		Conventional Development	Policy Reform	Conventional Development	Policy Reform
DEMOGRAPHY					
Population (million)	191	208	205	214	208
Urbanization (%)	64	75	75	82	82
ECONOMY AND SOCIETY					
GDP (billion US$ PPP)	1,046	1,684	1,848	2,392	2,821
Agriculture (%)	12	8	7	6	4
Industry (%)	32	31	31	30	29
Services (%)	53	61	62	64	66
GDP per capita (1995 US$ PPP)	5,476	8,096	9,015	11,178	13,563
Hunger Incidence (% of population)	1	3	1	4	1
National Equity (L20%/H20%)	0.18	0.12	0.15	0.09	0.14
ENERGY					
Primary Energy Requirement (EJ)	15	21	20	27	24
Coal	6	8	6	9	5
Crude Oil	4	6	4	9	4
Natural Gas	3	5	5	6	7
Uranium	1	1	1	2	2
Hydropower	0	0	0	0	0
Renewables	1	1	2	1	6
Final Fuel Demand (EJ)	10	13	14	18	17
Agriculture	1	1	1	1	1
Households	3	3	4	4	4
Industry	4	6	5	7	6
Services	0	1	1	1	1
Transport	2	3	3	5	4
FOOD AND AGRICULTURE					
Avg. Daily Consumption (kcal/cap)	2,987	3,119	3,165	3,274	3,395
Share from Animal Products (%)	21	22	23	23	24
Meat and Milk Production (Mt)	47	55	56	61	63
Fraction of Meat from Feedlots (%)	30	35	36	39	41
Fish Production (Mt)	1	1	1	1	1
Crop Production (Mt)	242	305	357	349	419
Total Cropland (Mha)	80	69	92	70	94
Irrigated Cropland (Mha)	9	10	10	10	10
Potential Cultivable Land (Mha)	124	122	123	120	122
Cereal Harvest Yield (t/ha)	2.65	4.09	4.33	4.86	6.11
Meat and Milk SSR	0.96	0.95	0.95	0.94	0.93
Fish SSR	0.51	0.51	0.51	0.51	0.51
Crop SSR	0.93	0.97	1.11	0.99	1.14
ENVIRONMENTAL PRESSURES					
Total Water Withdrawals (billion m^3)	107	134	94	155	88
Agriculture (%)	49	45	64	43	76
Industry (%)	39	42	19	44	6
Households (%)	12	12	17	13	18
Water Use/Resource Ratio (%)	9	11	8	13	7
Population in Water Stress (million)	28	50	26	59	22
Carbon Emissions (MtC)	275	383	321	473	300
Sulfur Emissions (MtS)	3	4	3	5	3
Total Land Area (Mha)	209	209	209	209	209
Built Environment (%)	4	4	4	5	5
Cropland (%)	38	33	44	33	45
Forest (%)	27	29	28	28	29
Pasture (%)	16	17	17	17	17
Protected (%)	5	5	5	5	5
Other (%)	9	12	2	11	(1)
Forest Exploitation* (%)	72	80	100	100	100
Nitrogen Fertilizer Consumption (Mt)	3	4	4	4	4
Toxic Waste (Mt)	0.9	1.4	0.9	2.0	0.7

t: metric tonnes; ha: hectare; J: Joules; SSR: Self-Sufficiency Ratio = Production/Requirements

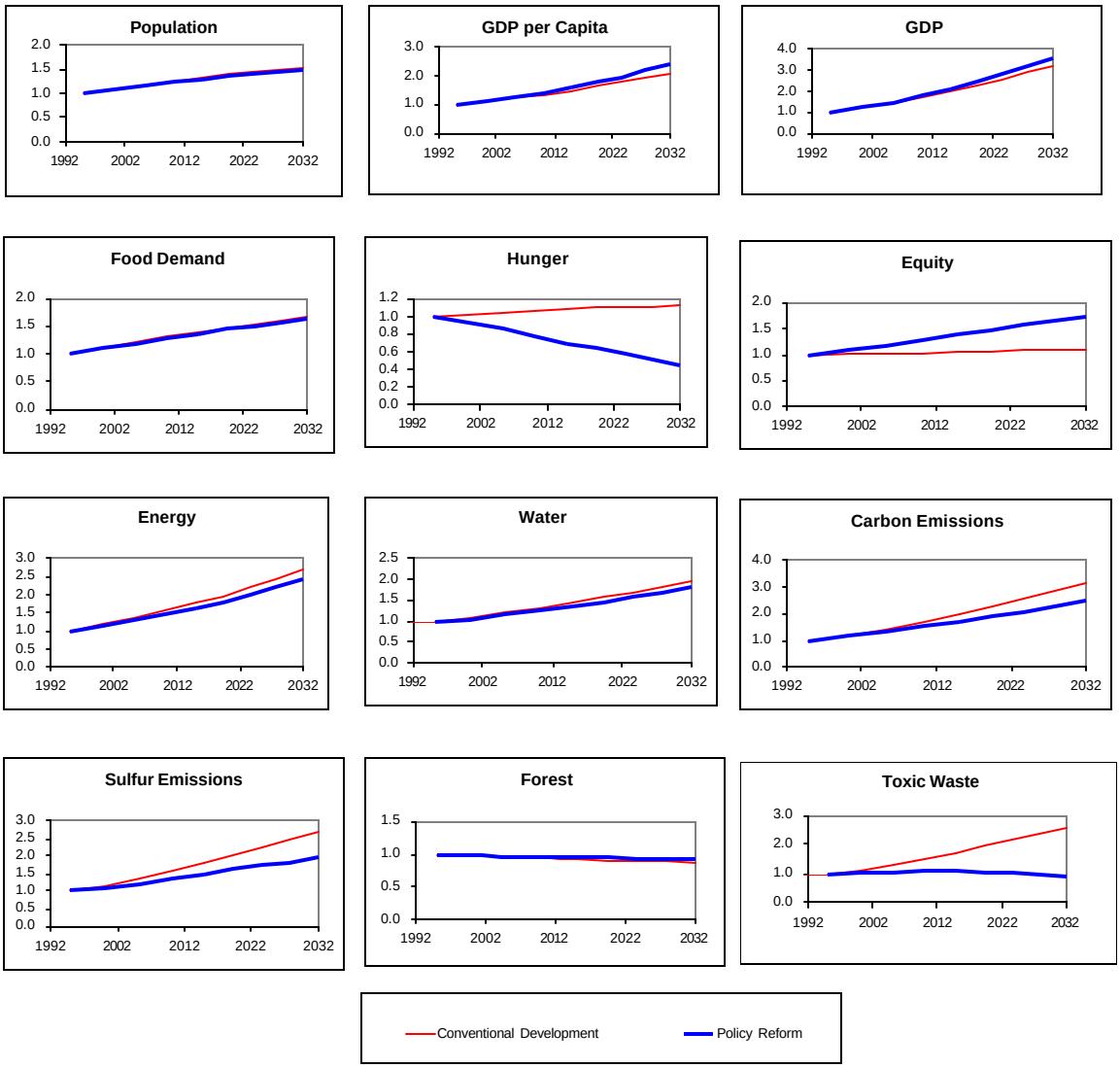
Mt = 10^6 t; Mha = 10^6 ha; EJ = 10^{18} J

*Commercial off take divided by annual increment on commercial forest areas.

LATIN AMERICA AND THE CARIBBEAN



Latin America & the Caribbean



Note: Values indexed to 1 in 1995.

Latin America and the Carribbean	1995	2015		2032	
		Conventional Development	Policy Reform	Conventional Development	Policy Reform
DEMOGRAPHY					
Population (million)	480	631	623	736	716
Urbanization (%)	74	81	81	86	86
ECONOMY AND SOCIETY					
GDP (billion US$ PPP)	2,753	5,372	5,740	8,746	9,809
Agriculture (%)	11	7	7	5	4
Industry (%)	31	30	30	29	29
Services (%)	56	63	63	66	67
GDP per capita (1995 US$ PPP)	5,735	8,513	9,213	11,883	13,700
Hunger Incidence (% of population)	11	9	6	8	3
National Equity (L20%/H20%)	0.05	0.05	0.07	0.05	0.09
ENERGY					
Primary Energy Requirement (EJ)	24	43	40	66	59
Coal	1	3	2	5	2
Crude Oil	13	20	15	29	19
Natural Gas	4	10	10	17	19
Uranium	0	1	1	3	2
Hydropower	2	3	2	4	3
Renewables	4	6	9	8	15
Final Fuel Demand (EJ)	17	28	28	48	41
Agriculture	1	1	1	1	1
Households	3	3	7	10	11
Industry	7	12	11	19	16
Services	1	2	2	3	3
Transport	5	10	7	14	10
FOOD AND AGRICULTURE					
Avg. Daily Consumption (kcal/cap)	2,696	2,820	2,844	2,911	2,946
Share from Animal Products (%)	18	19	20	20	21
Meat and Milk Production (Mt)	78	118	120	152	155
Fraction of Meat from Feedlots (%)	12	21	27	33	44
Fish Production (Mt)	20	29	29	33	32
Crop Production (Mt)	832	1,179	1,093	1,471	1,508
Total Cropland (Mha)	144	159	199	146	240
Irrigated Cropland (Mha)	18	20	20	22	22
Potential Cultivable Land (Mha)	976	958	963	940	959
Cereal Harvest Yield (t/ha)	2.45	2.88	2.67	3.12	2.59
Meat and Milk SSR	0.91	0.92	0.93	0.93	0.95
Fish SSR	2.35	2.70	2.70	2.62	2.63
Crop SSR	0.96	1.00	1.03	1.00	1.06
ENVIRONMENTAL PRESSURES					
Total Water Withdrawals (billion m^3)	201	292	272	388	365
Agriculture (%)	74	65	69	58	61
Industry (%)	10	18	12	24	20
Households (%)	16	17	19	18	19
Water Use/Resource Ratio (%)	1	2	2	3	3
Population in Water Stress (million)	43	77	74	106	99
Carbon Emissions (MtC)	286	576	494	898	711
Sulfur Emissions (MtS)	3	6	5	9	6
Total Land Area (Mha)	2,017	2,017	2,017	2,017	2,017
Built Environment (%)	1	2	2	2	2
Cropland (%)	7	8	10	7	12
Forest (%)	47	44	45	42	44
Pasture (%)	29	32	29	34	30
Protected (%)	6	6	6	6	6
Other (%)	9	8	8	8	6
Forest Exploitation* (%)	55	82	89	96	97
Nitrogen Fertilizer Consumption (Mt)	5	9	8	12	10
Toxic Waste (Mt)	3.0	5.2	3.3	7.8	2.6

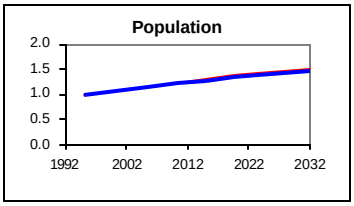
t: metric tonnes; ha: hectare; J: Joules; SSR: Self-Sufficiency Ratio = Production/Requirements

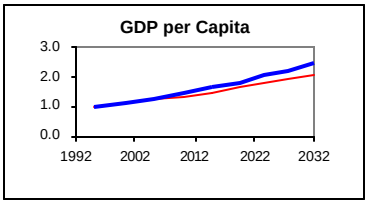
Mt = 10^6 t; Mha = 10^6 ha; EJ = 10^{18} J

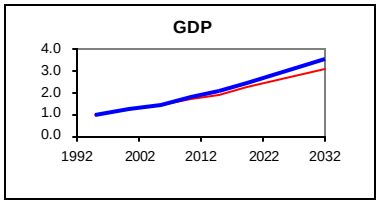
*Commercial off take divided by annual increment on commercial forest areas.

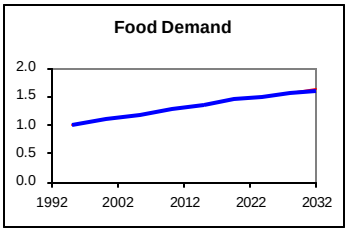
SOUTH AMERICA

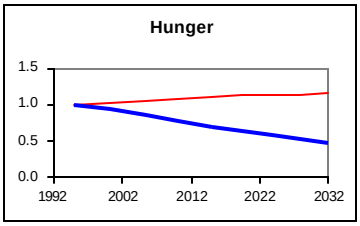
Latin America & the Caribbean
South America

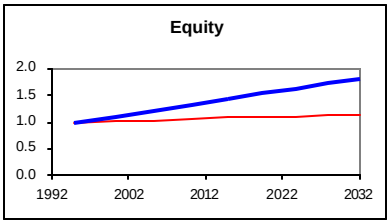


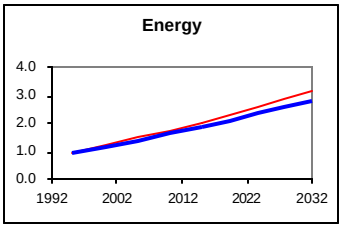


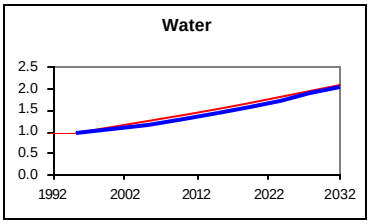


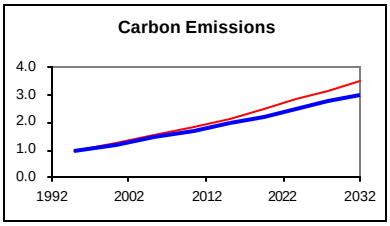


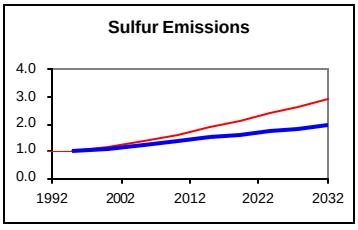


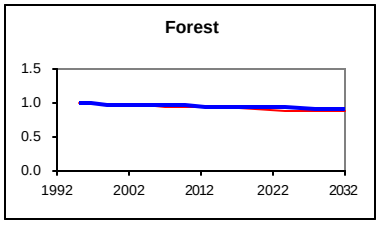


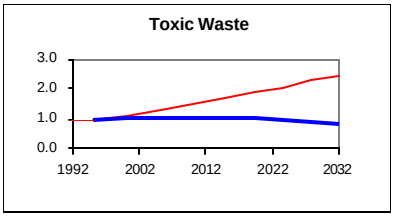












Note: Values indexed to 1 in 1995.

South America	1995	2015		2032	
		Conventional Development	Policy Reform	Conventional Development	Policy Reform
DEMOGRAPHY					
Population (million)	321	418	413	487	473
Urbanization (%)	78	85	85	90	90
ECONOMY AND SOCIETY					
GDP (billion US$ PPP)	1,915	3,690	3,996	5,976	6,864
Agriculture (%)	12	7	7	5	4
Industry (%)	33	32	32	31	30
Services (%)	53	60	61	64	66
GDP per capita (1995 US$ PPP)	5,966	8,828	9,676	12,271	14,512
Hunger Incidence (% of population)	10	9	6	8	3
National Equity (L20%/H20%)	0.05	0.05	0.07	0.05	0.09
ENERGY					
Primary Energy Requirement (EJ)	14	29	27	44	40
Coal	1	2	1	4	2
Crude Oil	6	12	10	18	12
Natural Gas	2	6	8	10	14
Uranium	0	1	1	2	1
Hydropower	2	2	2	4	2
Renewables	3	5	5	6	9
Final Fuel Demand (EJ)	11	18	18	31	27
Agriculture	1	1	1	1	1
Households	2	2	4	7	7
Industry	4	8	7	12	10
Services	1	1	1	2	3
Transport	3	6	4	10	6
FOOD AND AGRICULTURE					
Avg. Daily Consumption (kcal/cap)	2,699	2,820	2,847	2,910	2,950
Share from Animal Products (%)	19	21	21	22	22
Meat and Milk Production (Mt)	60	91	93	118	121
Fraction of Meat from Feedlots (%)	10	21	28	33	45
Fish Production (Mt)	18	27	27	31	30
Crop Production (Mt)	636	839	733	1,071	1,029
Total Cropland (Mha)	105	108	142	98	178
Irrigated Cropland (Mha)	10	11	11	12	12
Potential Cultivable Land (Mha)	901	887	892	875	889
Cereal Harvest Yield (t/ha)	2.48	2.90	2.55	3.13	2.54
Meat and Milk SSR	0.97	1.01	1.02	1.03	1.05
Fish SSR	2.88	3.36	3.37	3.28	3.28
Crop SSR	0.92	0.90	0.89	0.92	0.91
ENVIRONMENTAL PRESSURES					
Total Water Withdrawals (billion m^3)	105	164	150	223	218
Agriculture (%)	64	52	55	45	46
Industry (%)	13	25	20	32	31
Households (%)	24	23	25	23	23
Water Use/Resource Ratio (%)	1	1	1	2	2
Population in Water Stress (million)	4	10	9	17	16
Carbon Emissions (MtC)	167	364	333	587	499
Sulfur Emissions (MtS)	2	4	3	6	4
Total Land Area (Mha)	1,752	1,752	1,752	1,752	1,752
Built Environment (%)	1	1	1	2	1
Cropland (%)	6	6	8	6	10
Forest (%)	51	48	48	45	47
Pasture (%)	28	31	28	34	28
Protected (%)	6	6	6	6	6
Other (%)	8	8	8	7	7
Forest Exploitation* (%)	58	87	94	100	100
Nitrogen Fertilizer Consumption (Mt)	3	6	5	8	7
Toxic Waste (Mt)	2.3	3.8	2.4	5.6	1.9

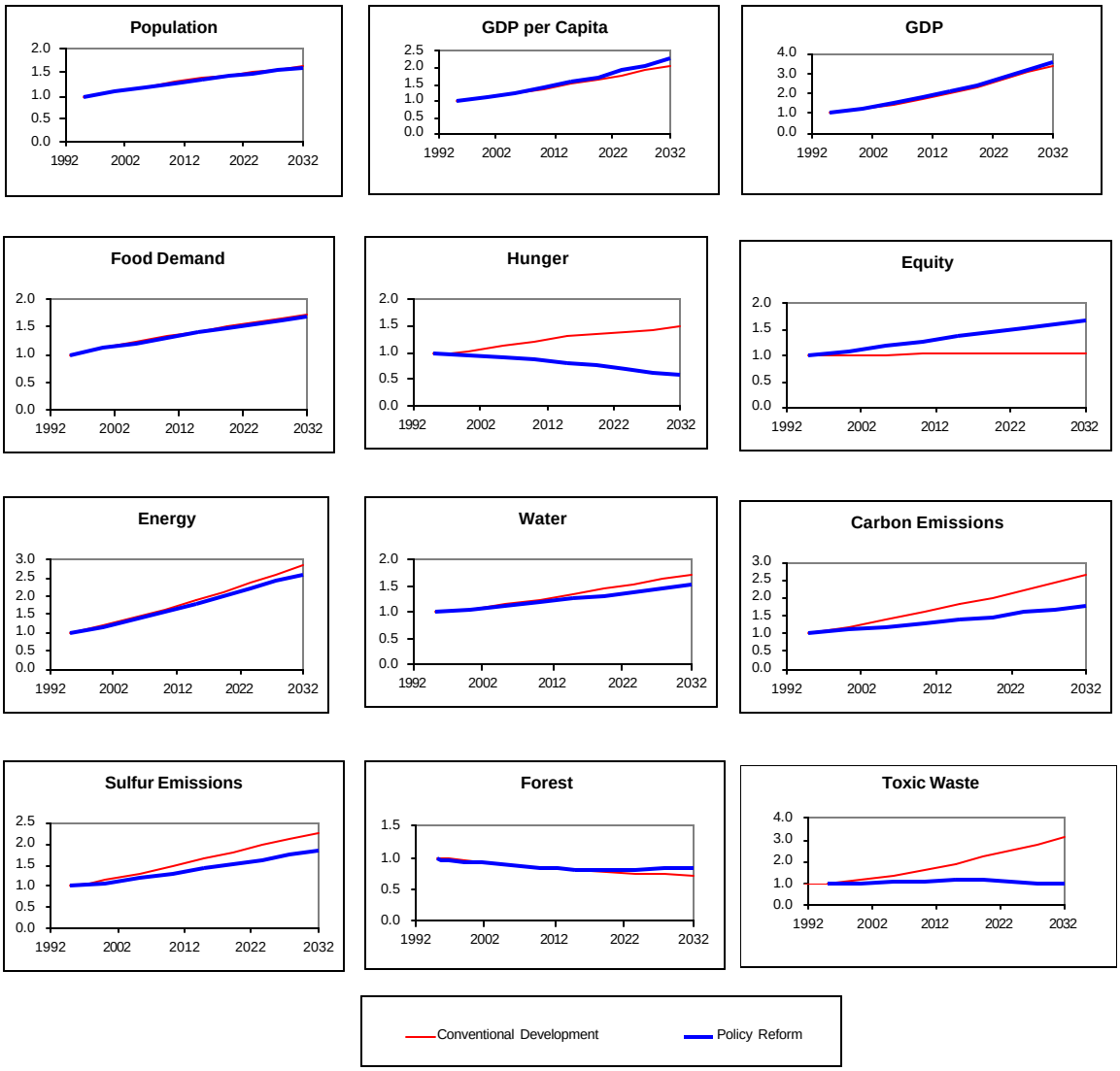
t: metric tonnes; ha: hectare; J: Joules; SSR: Self-Sufficiency Ratio = Production/Requirements

Mt = 10^6 t; Mha = 10^6 ha; EJ = 10^{18} J

*Commercial off take divided by annual increment on commercial forest areas.

MESO-AMERICA

Latin America & the Caribbean
Meso-America



Note: Values indexed to 1 in 1995.

Meso-America	1995	2015		2032	
		Conventional Development	Policy Reform	Conventional Development	Policy Reform
DEMOGRAPHY					
Population (million)	123	169	167	200	195
Urbanization (%)	68	76	76	82	82
ECONOMY AND SOCIETY					
GDP (billion US$ PPP)	724	1,477	1,529	2,449	2,597
Agriculture (%)	9	6	6	4	4
Industry (%)	25	26	26	26	26
Services (%)	66	68	69	70	70
GDP per capita (1995 US$ PPP)	5,886	8,740	9,156	12,245	13,318
Hunger Incidence (% of population)	8	8	5	8	3
National Equity (L20%/H20%)	0.05	0.05	0.07	0.06	0.09
ENERGY					
Primary Energy Requirement (EJ)	6	12	11	18	16
Coal	0	0	0	0	0
Crude Oil	4	7	5	9	6
Natural Gas	1	3	2	5	4
Uranium	0	0	0	1	0
Hydropower	0	0	1	1	1
Renewables	1	1	3	1	5
Final Fuel Demand (EJ)	5	8	8	13	12
Agriculture	0	0	0	0	0
Households	1	1	2	3	3
Industry	2	3	3	5	4
Services	0	0	0	1	1
Transport	2	3	3	4	3
FOOD AND AGRICULTURE					
Avg. Daily Consumption (kcal/cap)	2,847	2,949	2,963	3,022	3,044
Share from Animal Products (%)	16	17	18	19	19
Meat and Milk Production (Mt)	16	24	24	30	30
Fraction of Meat from Feedlots (%)	19	23	23	33	33
Fish Production (Mt)	2	2	2	2	2
Crop Production (Mt)	133	242	278	285	381
Total Cropland (Mha)	32	44	52	43	58
Irrigated Cropland (Mha)	7	7	7	8	8
Potential Cultivable Land (Mha)	63	58	60	54	59
Cereal Harvest Yield (t/ha)	2.40	2.85	3.30	3.11	2.90
Meat and Milk SSR	0.79	0.76	0.76	0.74	0.74
Fish SSR	0.88	0.85	0.85	0.84	0.84
Crop SSR	0.94	1.22	1.41	1.16	1.57
ENVIRONMENTAL PRESSURES					
Total Water Withdrawals (billion m^3)	84	114	106	146	128
Agriculture (%)	86	80	86	76	85
Industry (%)	8	11	2	14	3
Households (%)	6	9	12	11	11
Water Use/Resource Ratio (%)	8	11	11	15	13
Population in Water Stress (million)	32	58	56	76	70
Carbon Emissions (MtC)	99	180	138	262	179
Sulfur Emissions (MtS)	1	2	1	2	2
Total Land Area (Mha)	242	242	242	242	242
Built Environment (%)	3	4	4	5	4
Cropland (%)	13	18	21	18	24
Forest (%)	27	22	22	20	23
Pasture (%)	37	37	37	40	40
Protected (%)	6	6	6	6	6
Other (%)	15	13	10	12	3
Forest Exploitation* (%)	33	43	46	60	57
Nitrogen Fertilizer Consumption (Mt)	2	3	3	3	3
Toxic Waste (Mt)	0.6	1.2	0.8	2.0	0.6

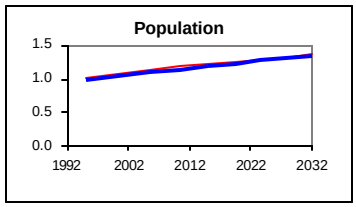
t: metric tonnes; ha: hectare; J: Joules; SSR: Self-Sufficiency Ratio = Production/Requirements

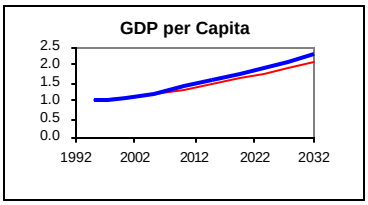
Mt = 10^6 t; Mha = 10^6 ha; EJ = 10^{18} J

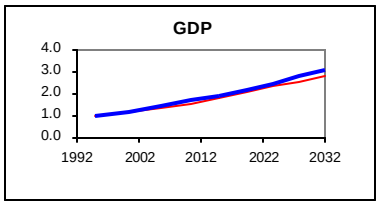
*Commercial off take divided by annual increment on commercial forest areas.

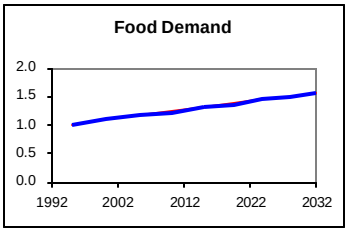
CARIBBEAN

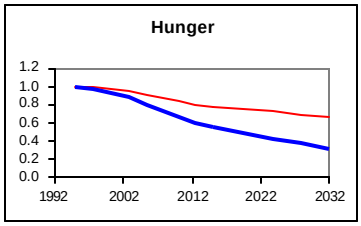
Latin America & the Caribbean
Caribbean

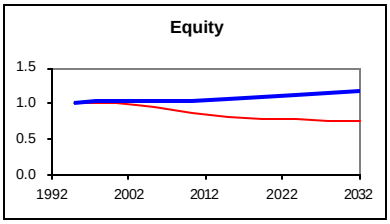


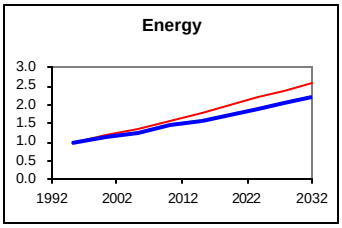


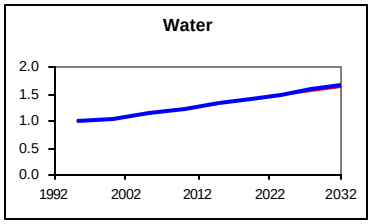


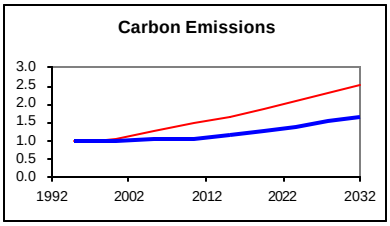


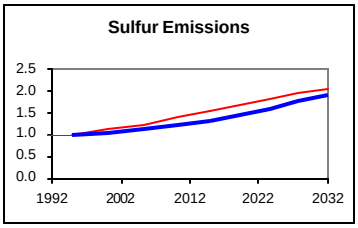


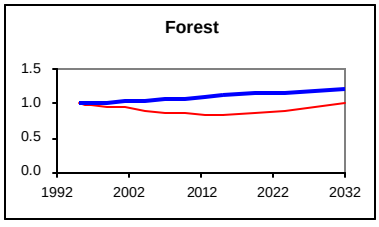


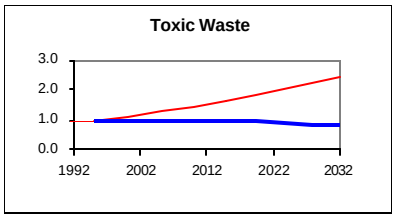












Note: Values indexed to 1 in 1995.

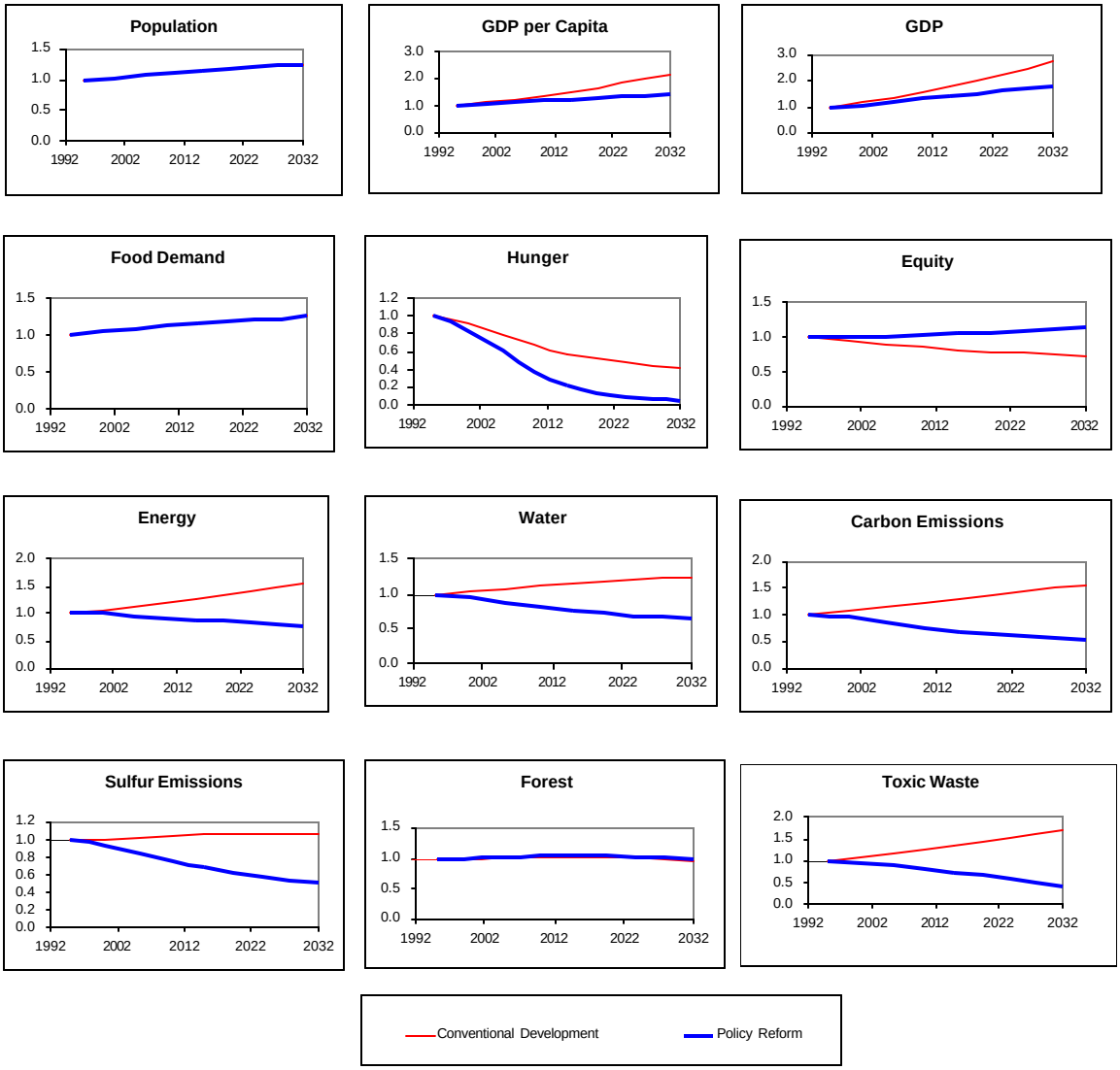
Caribbean	1995	2015		2032	
		Conventional Development	Policy Reform	Conventional Development	Policy Reform
DEMOGRAPHY					
Population (million)	36	44	43	49	48
Urbanization (%)	61	70	70	76	76
ECONOMY AND SOCIETY					
GDP (billion US$ PPP)	114	205	215	321	348
Agriculture (%)	14	10	9	7	6
Industry (%)	25	25	25	26	26
Services (%)	58	65	66	68	68
GDP per capita (1995 US$ PPP)	3,167	4,659	5,000	6,551	7,250
Hunger Incidence (% of population)	30	19	14	15	7
National Equity (L20%/H20%)	0.09	0.08	0.10	0.07	0.11
ENERGY					
Primary Energy Requirement (EJ)	1	3	2	4	3
Coal	0	0	0	0	0
Crude Oil	1	1	1	2	1
Natural Gas	0	1	0	1	1
Uranium	0	0	0	0	0
Hydropower	0	0	0	0	0
Renewables	0	1	1	1	1
Final Fuel Demand (EJ)	1	2	2	3	3
Agriculture	0	0	0	0	0
Households	0	0	0	0	0
Industry	1	1	1	2	2
Services	0	0	0	0	0
Transport	0	0	0	1	0
FOOD AND AGRICULTURE					
Avg. Daily Consumption (kcal/cap)	2,150	2,330	2,357	2,471	2,514
Share from Animal Products (%)	15	17	17	18	19
Meat and Milk Production (Mt)	2	3	3	4	4
Fraction of Meat from Feedlots (%)	21	25	26	37	39
Fish Production (Mt)	0	0	0	0	0
Crop Production (Mt)	63	98	82	115	99
Total Cropland (Mha)	6	7	5	6	4
Irrigated Cropland (Mha)	1	2	2	2	2
Potential Cultivable Land (Mha)	12	12	12	12	12
Cereal Harvest Yield (t/ha)	1.54	1.99	1.95	2.22	2.00
Meat and Milk SSR	0.53	0.51	0.51	0.50	0.50
Fish SSR	0.44	0.43	0.43	0.43	0.43
Crop SSR	1.78	2.12	1.78	2.04	1.76
ENVIRONMENTAL PRESSURES					
Total Water Withdrawals (billion m^3)	12	15	15	19	19
Agriculture (%)	88	85	85	83	82
Industry (%)	3	4	4	5	6
Households (%)	8	10	11	12	13
Water Use/Resource Ratio (%)	15	19	19	24	24
Population in Water Stress (million)	7	9	9	13	13
Carbon Emissions (MtC)	20	33	23	49	32
Sulfur Emissions (MtS)	0	0	0	0	0
Total Land Area (Mha)	23	23	23	23	23
Built Environment (%)	8	10	10	11	11
Cropland (%)	28	32	22	25	17
Forest (%)	16	14	18	16	20
Pasture (%)	27	27	27	27	27
Protected (%)	9	9	9	9	9
Other (%)	12	9	15	12	17
Forest Exploitation* (%)	52	82	85	100	100
Nitrogen Fertilizer Consumption (Mt)	0	0	0	0	0
Toxic Waste (Mt)	0.1	0.2	0.1	0.3	0.1

t: metric tonnes; ha: hectare; J: Joules; SSR: Self-Sufficiency Ratio = Production/Requirements

Mt = 10^6 t; Mha = 10^6 ha; EJ = 10^{18} J

*Commercial off take divided by annual increment on commercial forest areas.

NORTH AMERICA



Note: Values indexed to 1 in 1995.

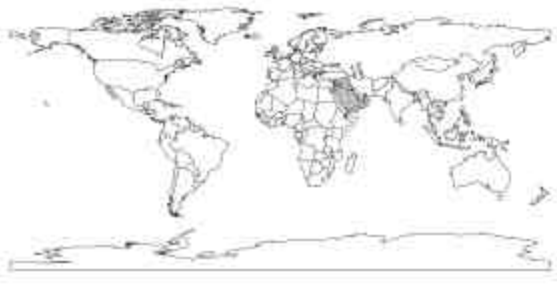
North America	1995	2015		2032	
		Conventional Development	Policy Reform	Conventional Development	Policy Reform
DEMOGRAPHY					
Population (million)	297	343	343	374	374
Urbanization (%)	76	82	82	86	86
ECONOMY AND SOCIETY					
GDP (billion US$ PPP)	7,851	13,757	11,034	21,135	14,136
Agriculture (%)	2	1	2	1	1
Industry (%)	26	24	24	23	23
Services (%)	72	75	74	76	76
GDP per capita (1995 US$ PPP)	26,434	40,108	32,169	56,511	37,797
Hunger Incidence (% of population)	2	1	0	1	0
National Equity (L20%/H20%)	0.10	0.08	0.11	0.07	0.12
ENERGY					
Primary Energy Requirement (EJ)	100	128	89	154	78
Coal	21	23	11	24	7
Crude Oil	40	55	26	69	22
Natural Gas	24	32	20	41	18
Uranium	9	10	15	10	9
Hydropower	2	3	3	3	3
Renewables	3	5	14	7	19
Final Fuel Demand (EJ)	67	90	61	111	58
Agriculture	1	1	1	1	1
Households	12	12	11	11	11
Industry	21	28	17	35	15
Services	8	11	8	13	9
Transport	25	38	24	51	23
FOOD AND AGRICULTURE					
Avg. Daily Consumption (kcal/cap)	3,549	3,534	3,534	3,519	3,519
Share from Animal Products (%)	31	31	31	31	31
Meat and Milk Production (Mt)	127	153	154	170	173
Fraction of Meat from Feedlots (%)	48	57	58	61	63
Fish Production (Mt)	7	8	8	9	9
Crop Production (Mt)	655	817	739	953	968
Total Cropland (Mha)	233	225	220	270	266
Irrigated Cropland (Mha)	22	23	23	23	23
Potential Cultivable Land (Mha)	480	476	478	474	477
Cereal Harvest Yield (t/ha)	4.94	5.57	7.04	5.94	6.00
Meat and Milk SSR	1.01	1.06	1.06	1.09	1.10
Fish SSR	0.84	0.83	0.83	0.82	0.82
Crop SSR	1.24	1.19	1.06	1.21	1.18
ENVIRONMENTAL PRESSURES					
Total Water Withdrawals (billion m^3)	588	671	445	731	391
Agriculture (%)	34	33	50	34	63
Industry (%)	56	57	39	57	27
Households (%)	10	10	10	9	10
Water Use/Resource Ratio (%)	11	12	8	14	7
Population in Water Stress (million)	72	108	60	126	45
Carbon Emissions (MtC)	1,608	2,077	1,093	2,523	880
Sulfur Emissions (MtS)	13	13	9	13	6
Total Land Area (Mha)	1,838	1,838	1,838	1,838	1,838
Built Environment (%)	2	2	2	3	2
Cropland (%)	13	12	12	15	14
Forest (%)	39	40	40	38	39
Pasture (%)	15	14	14	14	14
Protected (%)	10	10	10	10	10
Other (%)	21	21	21	21	20
Forest Exploitation* (%)	100	100	100	100	100
Nitrogen Fertilizer Consumption (Mt)	8	11	8	13	9
Toxic Waste (Mt)	3.9	5.3	2.9	6.6	1.7

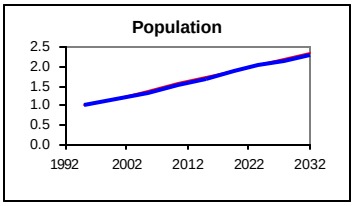
t: metric tonnes; ha: hectare; J: Joules; SSR: Self-Sufficiency Ratio = Production/Requirements

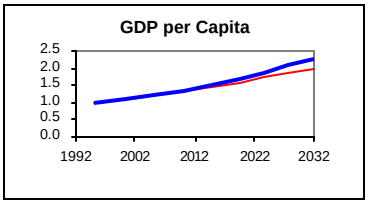
Mt = 10^6 t; Mha = 10^6 ha; EJ = 10^{18} J

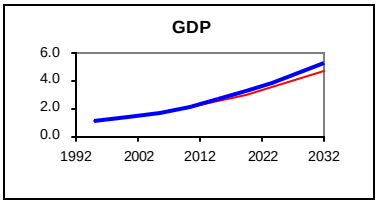
*Commercial off take divided by annual increment on commercial forest areas.

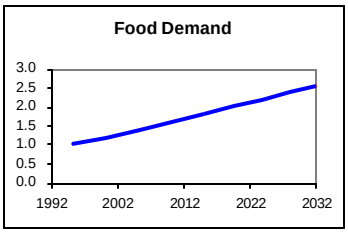
WEST ASIA

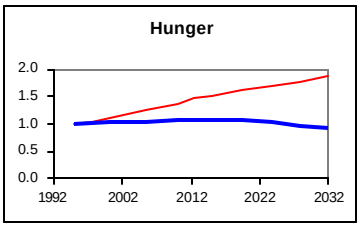


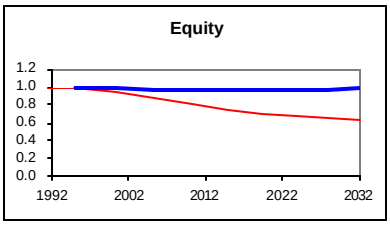


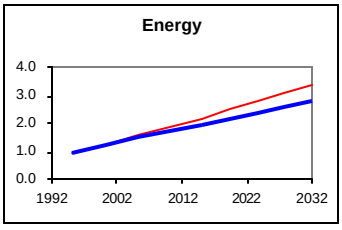


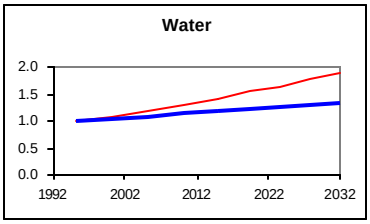


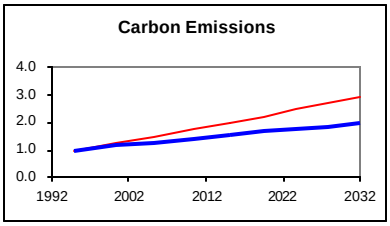


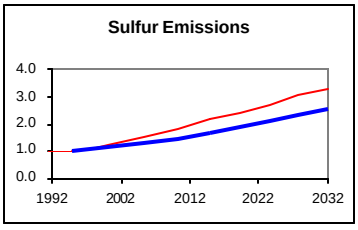


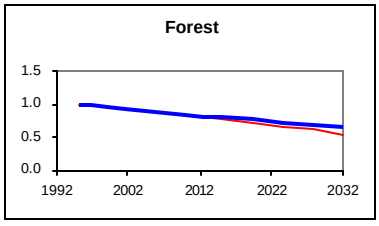


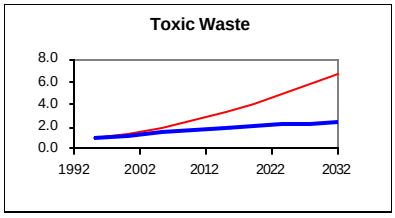












Note: Values indexed to 1 in 1995.

West Asia	1995	2015		2032	
		Conventional Development	Policy Reform	Conventional Development	Policy Reform
DEMOGRAPHY					
Population (million)	84	146	144	199	194
Urbanization (%)	73	79	79	85	85
ECONOMY AND SOCIETY					
GDP (billion US$ PPP)	637	1,591	1,635	2,958	3,348
Agriculture (%)	12	8	7	5	4
Industry (%)	23	24	25	25	26
Services (%)	46	68	68	70	70
GDP per capita (1995 US$ PPP)	7,583	10,897	11,354	14,864	17,258
Hunger Incidence (% of population)	12	11	8	10	5
National Equity (L20%/H20%)	0.13	0.10	0.13	0.08	0.13
ENERGY					
Primary Energy Requirement (EJ)	7	15	13	23	19
Coal	0	0	0	0	0
Crude Oil	4	9	6	13	7
Natural Gas	2	5	5	8	7
Uranium	0	0	0	1	0
Hydropower	0	0	0	0	0
Renewables	0	0	2	1	5
Final Fuel Demand (EJ)	4	8	8	15	12
Agriculture	0	0	0	0	0
Households	1	1	3	4	4
Industry	1	3	2	5	3
Services	0	1	1	1	1
Transport	2	3	2	5	4
FOOD AND AGRICULTURE					
Avg. Daily Consumption (kcal/cap)	2,452	2,574	2,590	2,668	2,722
Share from Animal Products (%)	10	11	12	13	13
Meat and Milk Production (Mt)	4	8	9	13	13
Fraction of Meat from Feedlots (%)	31	34	35	54	56
Fish Production (Mt)	0	0	0	1	1
Crop Production (Mt)	36	56	50	72	60
Total Cropland (Mha)	17	16	17	15	16
Irrigated Cropland (Mha)	5	6	5	6	5
Potential Cultivable Land (Mha)	18	16	17	15	16
Cereal Harvest Yield (t/ha)	1.57	2.42	2.06	3.04	2.14
Meat and Milk SSR	0.60	0.56	0.56	0.53	0.52
Fish SSR	0.58	0.55	0.55	0.53	0.53
Crop SSR	0.48	0.42	0.38	0.37	0.31
ENVIRONMENTAL PRESSURES					
Total Water Withdrawals (billion m^3)	80	114	95	152	108
Agriculture (%)	90	83	85	78	80
Industry (%)	4	7	4	11	7
Households (%)	6	10	10	13	13
Water Use/Resource Ratio (%)	51	73	61	97	69
Population in Water Stress (million)	75	135	130	190	178
Carbon Emissions (MtC)	125	251	193	370	246
Sulfur Emissions (MtS)	1	2	1	2	2
Total Land Area (Mha)	372	372	372	372	372
Built Environment (%)	1	2	2	3	3
Cropland (%)	5	4	4	4	4
Forest (%)	1	1	1	1	1
Pasture (%)	40	40	40	40	40
Protected (%)	3	3	3	3	3
Other (%)	50	49	49	49	49
Forest Exploitation* (%)	100	100	100	100	100
Nitrogen Fertilizer Consumption (Mt)	1	1	1	1	1
Toxic Waste (Mt)	0.3	0.9	0.5	1.8	0.6

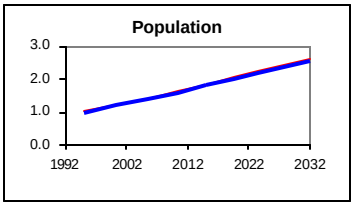
t: metric tonnes; ha: hectare; J: Joules; SSR: Self-Sufficiency Ratio = Production/Requirements

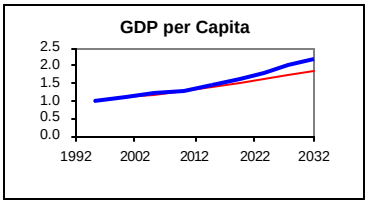
Mt = 10^6 t; Mha = 10^6 ha; EJ = 10^{18} J

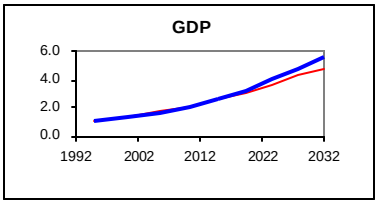
*Commercial off take divided by annual increment on commercial forest areas.

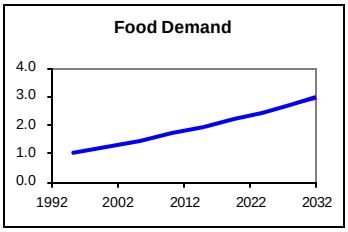
ARABIAN PENINSULA

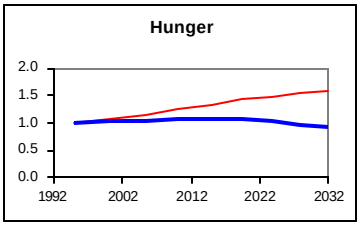
West Asia
Arabian Peninsula

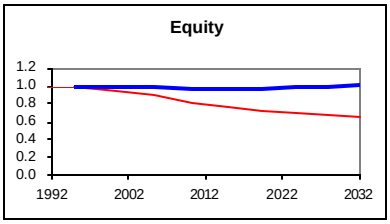


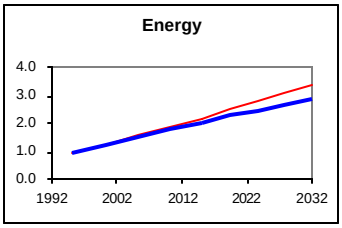


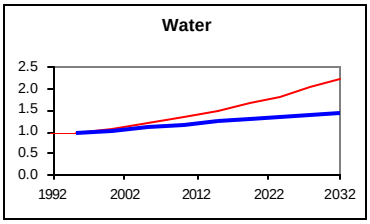


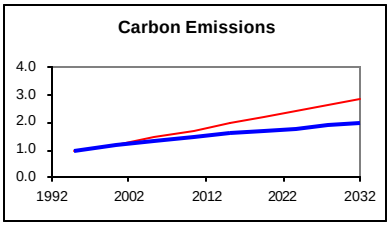


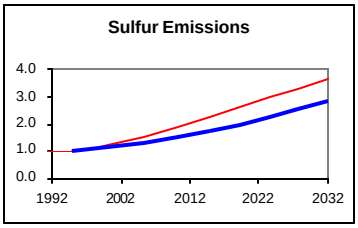


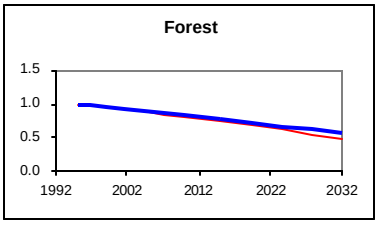


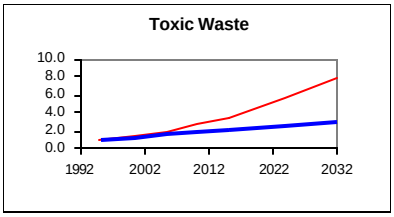












Note: Values indexed to 1 in 1995.

Arabian Pen	1995	2015		2032	
		Conventional Development	Policy Reform	Conventional Development	Policy Reform
DEMOGRAPHY					
Population (million)	40	73	72	104	101
Urbanization (%)	78	82	82	87	87
ECONOMY AND SOCIETY					
GDP (billion US$ PPP)	413	1,060	1,081	2,011	2,330
Agriculture (%)	5	4	4	3	2
Industry (%)	22	24	25	26	26
Services (%)	43	72	72	72	72
GDP per capita (1995 US$ PPP)	10,325	14,521	15,014	19,337	23,069
Hunger Incidence (% of population)	17	12	10	10	6
National Equity (L20%/H20%)	0.13	0.10	0.12	0.08	0.13
ENERGY					
Primary Energy Requirement (EJ)	5	10	10	16	14
Coal	0	0	0	0	0
Crude Oil	3	6	4	9	5
Natural Gas	2	4	4	6	5
Uranium	0	0	0	1	0
Hydropower	0	0	0	0	0
Renewables	0	0	2	1	3
Final Fuel Demand (EJ)	3	5	5	10	8
Agriculture	0	0	0	0	0
Households	1	1	2	2	2
Industry	1	2	1	3	2
Services	0	0	0	1	1
Transport	1	2	2	4	4
FOOD AND AGRICULTURE					
Avg. Daily Consumption (kcal/cap)	2,168	2,325	2,348	2,449	2,536
Share from Animal Products (%)	12	14	14	15	15
Meat and Milk Production (Mt)	2	3	3	5	5
Fraction of Meat from Feedlots (%)	32	34	36	54	57
Fish Production (Mt)	0	0	0	1	1
Crop Production (Mt)	11	17	16	22	19
Total Cropland (Mha)	5	5	5	5	5
Irrigated Cropland (Mha)	1	1	1	1	1
Potential Cultivable Land (Mha)	5	5	5	5	5
Cereal Harvest Yield (t/ha)	3.14	4.80	3.95	6.04	3.82
Meat and Milk SSR	0.45	0.42	0.42	0.40	0.39
Fish SSR	0.59	0.55	0.55	0.53	0.54
Crop SSR	0.37	0.30	0.28	0.25	0.21
ENVIRONMENTAL PRESSURES					
Total Water Withdrawals (billion m^3)	22	33	27	49	32
Agriculture (%)	88	76	79	66	72
Industry (%)	1	5	3	12	7
Households (%)	11	19	18	24	22
Water Use/Resource Ratio (%)	282	427	349	622	405
Population in Water Stress (million)	40	73	72	104	101
Carbon Emissions (MtC)	88	173	140	254	177
Sulfur Emissions (MtS)	0	1	1	2	1
Total Land Area (Mha)	300	300	300	300	300
Built Environment (%)	1	1	1	2	2
Cropland (%)	2	2	2	2	2
Forest (%)	1	1	1	1	1
Pasture (%)	46	46	46	46	46
Protected (%)	3	3	3	3	3
Other (%)	47	47	47	46	47
Forest Exploitation* (%)	0	0	0	0	0
Nitrogen Fertilizer Consumption (Mt)	0	0	0	0	0
Toxic Waste (Mt)	0.2	0.6	0.4	1.2	0.5

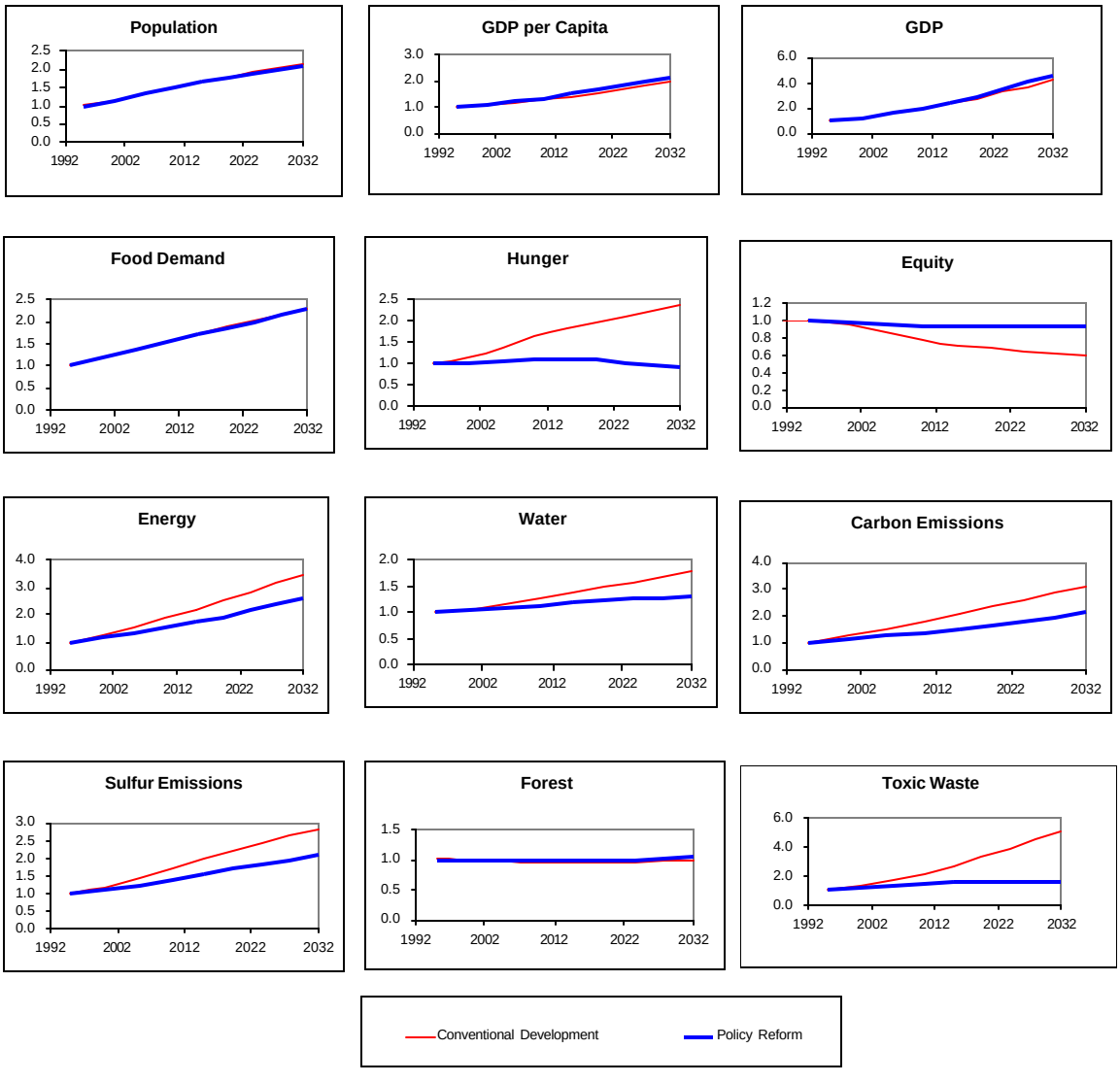
t: metric tonnes; ha: hectare; J: Joules; SSR: Self-Sufficiency Ratio = Production/Requirements

Mt = 10^6 t; Mha = 10^6 ha; EJ = 10^{18} J

*Commercial off take divided by annual increment on commercial forest areas.

MASHRIQ

West Asia
Mashriq



Note: Values indexed to 1 in 1995.

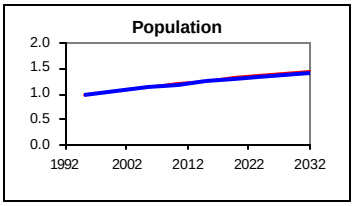
Mashriq	1995	2015		2032	
		Conventional Development	Policy Reform	Conventional Development	Policy Reform
DEMOGRAPHY					
Population (million)	44	73	72	95	93
Urbanization (%)	68	75	75	83	83
ECONOMY AND SOCIETY					
GDP (billion US$ PPP)	224	531	554	947	1,018
Agriculture (%)	24	15	14	10	9
Industry (%)	25	25	25	25	25
Services (%)	51	60	61	65	66
GDP per capita (1995 US$ PPP)	5,091	7,274	7,694	9,968	10,946
Hunger Incidence (% of population)	8	9	6	9	3
National Equity (L20%/H20%)	0.15	0.11	0.14	0.09	0.14
ENERGY					
Primary Energy Requirement (EJ)	2	4	3	7	5
Coal	0	0	0	0	0
Crude Oil	2	3	2	4	2
Natural Gas	0	1	1	2	1
Uranium	0	0	0	0	0
Hydropower	0	0	0	0	0
Renewables	0	0	0	0	1
Final Fuel Demand (EJ)	1	3	2	5	4
Agriculture	0	0	0	0	0
Households	1	1	1	2	1
Industry	0	1	1	1	1
Services	0	0	0	0	0
Transport	1	1	0	2	1
FOOD AND AGRICULTURE					
Avg. Daily Consumption (kcal/cap)	2,714	2,826	2,836	2,908	2,925
Share from Animal Products (%)	8	9	10	10	11
Meat and Milk Production (Mt)	3	5	5	7	7
Fraction of Meat from Feedlots (%)	31	33	34	53	54
Fish Production (Mt)	0	0	0	0	0
Crop Production (Mt)	25	38	34	49	41
Total Cropland (Mha)	12	11	11	10	11
Irrigated Cropland (Mha)	4	4	4	5	4
Potential Cultivable Land (Mha)	12	11	11	10	11
Cereal Harvest Yield (t/ha)	1.16	1.80	1.58	2.26	1.73
Meat and Milk SSR	0.76	0.71	0.71	0.68	0.68
Fish SSR	0.56	0.53	0.53	0.51	0.52
Crop SSR	0.55	0.50	0.45	0.46	0.39
ENVIRONMENTAL PRESSURES					
Total Water Withdrawals (billion m^3)	58	80	68	103	77
Agriculture (%)	91	86	88	84	84
Industry (%)	5	8	5	11	7
Households (%)	4	6	7	7	9
Water Use/Resource Ratio (%)	39	54	46	69	52
Population in Water Stress (million)	35	62	58	86	77
Carbon Emissions (MtC)	37	78	55	116	80
Sulfur Emissions (MtS)	0	1	0	1	1
Total Land Area (Mha)	72	72	72	72	72
Built Environment (%)	4	6	6	8	8
Cropland (%)	17	15	16	14	16
Forest (%)	1	1	1	1	1
Pasture (%)	18	18	18	18	18
Protected (%)	0	0	0	0	0
Other (%)	60	59	59	58	57
Forest Exploitation* (%)	100	100	100	100	100
Nitrogen Fertilizer Consumption (Mt)	0	1	0	1	0
Toxic Waste (Mt)	0.1	0.3	0.2	0.6	0.2

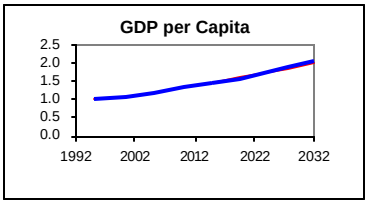
t: metric tonnes; ha: hectare; J: Joules; SSR: Self-Sufficiency Ratio = Production/Requirements

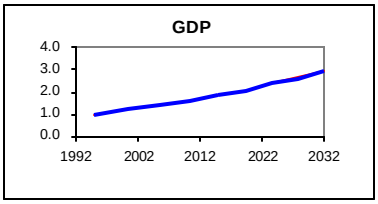
Mt = 10^6 t; Mha = 10^6 ha; EJ = 10^{18} J

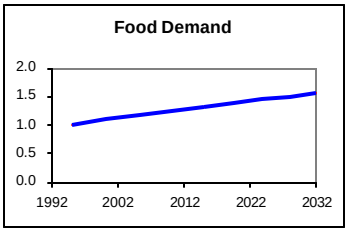
*Commercial off take divided by annual increment on commercial forest areas.

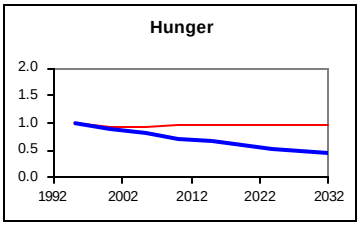
THE WORLD

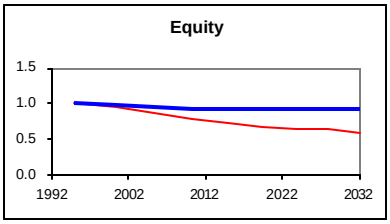


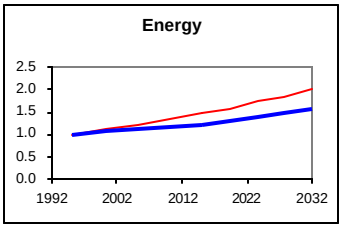


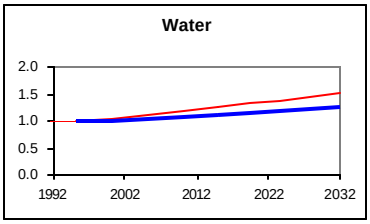


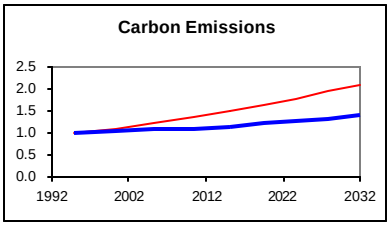


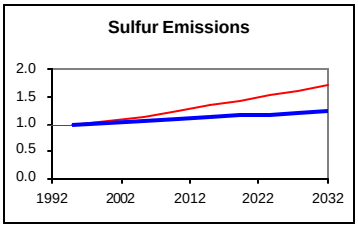


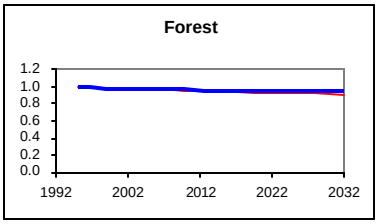


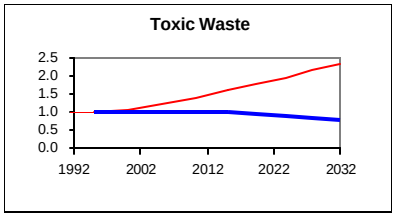












Note: Values indexed to 1 in 1995.

World	1995	2015		2032	
		Conventional Development	Policy Reform	Conventional Development	Policy Reform
DEMOGRAPHY					
Population (million)	5,659	7,146	7,061	8,207	8,001
Urbanization (%)	45	56	56	65	65
ECONOMY AND SOCIETY					
GDP (billion US$ PPP)	34,247	63,414	61,952	100,796	99,691
Agriculture (%)	9	6	6	4	4
Industry (%)	32	31	31	29	30
Services (%)	57	63	62	66	66
GDP per capita (1995 US$ PPP)	6,052	8,874	8,774	12,282	12,460
Hunger Incidence (% of population)	15	11	8	10	4
National Equity (L20%/H20%)	0.14	0.10	0.13	0.08	0.13
ENERGY					
Primary Energy Requirement (EJ)	394	577	486	791	620
Coal	95	136	106	178	113
Crude Oil	148	224	142	315	160
Natural Gas	77	119	115	168	176
Uranium	25	35	29	50	21
Hydropower	9	13	11	18	14
Renewables	39	51	82	63	135
Final Fuel Demand (EJ)	274	393	354	573	463
Agriculture	9	11	9	13	11
Households	77	77	100	123	123
Industry	103	156	130	213	167
Services	20	32	29	48	42
Transport	65	116	86	177	120
FOOD AND AGRICULTURE					
Avg. Daily Consumption (kcal/cap)	2,675	2,795	2,830	2,883	2,943
Share from Animal Products (%)	16	16	17	17	18
Meat and Milk Production (Mt)	799	1,071	1,095	1,306	1,355
Fraction of Meat from Feedlots (%)	22	27	31	33	40
Fish Production (Mt)	107	132	131	143	140
Crop Production (Mt)	5,091	7,113	7,152	8,573	8,811
Total Cropland (Mha)	1,449	1,481	1,584	1,482	1,625
Irrigated Cropland (Mha)	249	275	274	298	296
Potential Cultivable Land (Mha)	3,967	3,865	3,890	3,769	3,847
Cereal Harvest Yield (t/ha)	2.83	3.79	3.96	4.37	4.64
Meat and Milk SSR	0.99	1.00	1.00	1.00	1.00
Fish SSR	0.96	1.00	1.00	1.00	1.00
Crop SSR	0.95	1.00	1.00	1.00	1.00
ENVIRONMENTAL PRESSURES					
Total Water Withdrawals (billion m^3)	3,060	3,883	3,464	4,701	3,933
Agriculture (%)	67	65	72	63	74
Industry (%)	24	25	15	26	11
Households (%)	9	10	12	12	15
Water Use/Resource Ratio (%)	6	8	7	10	8
Population in Water Stress (million)	1,370	2,202	2,042	3,099	2,675
Carbon Emissions (MtC)	6,065	9,237	7,122	12,762	8,571
Sulfur Emissions (MtS)	68	91	75	115	83
Total Land Area (Mha)	12,985	12,985	12,985	12,985	12,985
Built Environment (%)	2	3	3	3	3
Cropland (%)	11	11	12	11	13
Forest (%)	30	29	29	28	29
Pasture (%)	26	27	27	28	27
Protected (%)	7	7	7	7	7
Other (%)	24	24	23	23	22
Forest Exploitation* (%)	45	57	68	67	80
Nitrogen Fertilizer Consumption (Mt)	65	95	81	113	80
Toxic Waste (Mt)	27.0	43.6	26.9	63.8	21.0

t: metric tonnes; ha: hectare; J: Joules; SSR: Self-Sufficiency Ratio = Production/Requirements

Mt = 10^6 t; Mha = 10^6 ha; EJ = 10^{18} J

*Commercial off take divided by annual increment on commercial forest areas.

Notes for Illustrative Scenarios

The following comments are organized by the graphs presented for each region.

Population

- *Conventional Development* from mid-range projections of the United Nations (1998 revision). *Policy Reform* populations in developing regions and transitional lower by 2.0% in 2015, by 3.4% in 2032. Population growth is lower due both to declines in fertility rates associated with declining poverty and through more active family planning efforts.
- Urbanization trends continue (see tables).

GDP per Capita

- *Conventional Development* assumptions consistent with mid-range economic scenarios from major institutions, such as those of the World Bank and OECD. *Policy Reform* assumptions reflect the more rapid convergence between developed and developing countries assumed in the scenarios, e.g., higher growth in the former and more moderate growth in latter, respectively, relative to *Conventional Development*.

Note: Local currencies are converted to a common currency using "purchasing power parity", which in contrast to the more common "market exchange rates", take into account relative prices for a similar "basket of goods" when comparing currency values.

GDP

- GDP is the product of population and GDP per capita.
- Structure of economic output changes gradually in developed regions toward greater share for services and, in the industrial sector, a lower share for heavy industry. Developing regions gradually converge toward these structures as income rises. See tables.

Food Demand

- Current patterns from FAOSTAT database (FAO, 1996).
- Food demand determined by population and food consumption per capita. Food consumption per capita increases with income, but at a slower rate.
- Meat consumption grows gradually as a fraction of caloric intake in developing regions and stabilizes in industrialized countries (see tables). This drives livestock, pastureland and fodder requirements.
- Agriculture output changes due to substantial yield improvements, and modest changes in land in agriculture and irrigation. Agriculture trade guided by consistency with historic patterns, constraints on agricultural expansion and, in *Policy Reform*, meeting environmental and resource targets.

Hunger

- Current levels from FAO (1999) (developing regions); Rose, et al. (1995) (U.S.).
- Hunger in the scenarios is determined by population, income and the distribution of income. The effects counteract: the number of hungry increases with population growth, increases as income distributions become less equitable, and decreases as incomes rise.

- In the *Policy Reform* scenario, the target for reducing hunger (see Table 3 in text) is met through more rapid income growth in developing countries in *Conventional Development* and less skewed income distribution. The hunger calculations are performed at the national level and aggregated to regional totals.

Equity

- Current levels from Deininger and Squire (1996); Tabatabai (1996) UNU/WIDER (1999); U.S. Census Bureau (1997); World Bank (2000).
- In the *Conventional Development* scenario, income distributions gradually converge toward U.S. levels, following the assumption of global convergence in the scenario. In some regions, this assumes a change from historic patterns as countries join the global economy and restructure economies and policies.
- In the *Policy Reform* scenario, income distributions (along with higher incomes in developing countries) are more equitable in order to meet hunger goals (see Hunger above)

Note: The "equity" indicator reported in the tables and graphs, is the ratio of the average income of the lowest-earning 20% of the population to that of the highest-earning 20%. The calculations are performed at the national level and aggregated to the regional level by population-weighting national values. As income distribution become more equal, the equity indicator increases.

Energy

- Current data from IEA (1997a, b) (most regions); EIA (2000) (South Pacific and Western Indian Ocean). Note: For two regions (South Pacific and Western Indian Ocean, detailed energy balances are not available.
- Energy requirements are determined by economic growth and the efficiency of energy use.
- Energy requirements are computed by economic sector (i.e., industrial subsectors, transportation modes, services, agriculture). Therefore, requirements change both due to the increasing scale of the economy and to the changing mix of economic activity, e.g., more services, less agriculture shift stabilization of heavy industry in industrialized countries, etc.
- Electrification increases in developing regions in both scenarios, but more rapidly in *Conventional Development*.
- Energy efficiency improves in the scenarios, following recent trends in *Conventional Development* in industrialized countries with gradual convergence toward these values in developing regions as incomes grow, and toward "best practices" in the *Policy Reform* in order to meet environmental targets.
- In several developing regions, the energy requirements in *Policy Reform* are comparable to *Conventional Development* as a result of two competing effects: higher economic growth drives energy needs up while greater efficiency drives it down.
- The mix of final fuel requirements changes in the course of the scenarios due to electrification, reduction of the share of traditional biomass and changing fuel prices. Modern renewables penetrate only gradually in *Conventional Development*, and more rapidly in *Policy Reform* in order to meet environmental targets.

Water

- Current patterns from Pacific Institute (2000).
- Water use in the scenarios is driven by changes in activity (e.g., population, irrigated agricultural, economic output and power production) and water use intensity (e.g., use per capita fort he household sector, use per hectare of irrigated land, use per value added in industry, power plant water cooling requirements, etc.).
- Water use intensities decreases (i.e., efficiency improves) in the scenarios, following recent trends in *Conventional Development* in industrialized countries with gradual convergence toward these values in developing regions as incomes grow, and toward "best practices" in the *Policy Reform* in order to meet environmental targets.
- In several regions, the water requirements in *Policy Reform* are comparable to *Conventional Development* as a result of competing effects: higher economic growth drives water needs up, greater efficiency drives it down and food trade changes in order to meet water and land requirements of the scenario.
- Water stress (as reported in the tables) is computed on a national basis and aggregated to regional values. At the national level, the level of water stress depends on the "use-to-resource ratio" — water withdrawals divided by renewable freshwater resources. The fraction of population in water stress rises from zero to .95 as the use-to-resource ratio rises from 0.1 to 0.4, and to 1.0 as as the ratio rises to 1. This is based on indicators in the literature (Raskin et al., 1997)

Carbon Emissions

- Current emissions computed from energy mix and emission coefficients (emission levels are consistent with standard sources).
- Scenario carbon emissions in energy sector determined by fuel use (see Energy above). In the *Policy Reform* scenario, the scenario target (see Table 3 in text) is met through more fuel switching (to natural gas and renewables) and greater efficiency improvements.

Note: Only carbon emissions from fossil fuels are reported.

Sulfur Emissions

- Current sulfur emissions determined by fuel use and sulfur emission coefficients, which depend both on emission control technology and sulfur content of fuels, especially coal.
- In *Conventional Development*, sulfur emissions in developed regions moderate relative to historic growth levels as current control policies play out. In *Policy Reform*, more rigorous reductions occur due to the changing fuel mix (e.g., greater penetration of renewables) and stricter emissions controls. The reductions in emission factors in the *Policy Reform* scenario are roughly twice as great as in the *Conventional Development* scenario.

Note: In some developing regions, sulfur emissions in the Reference *scenario are comparable to the* Policy Reform *scenario, but only where they are extremely low to begin with. This is because of more rapid economic growth in coal-using sectors.*

Forest

- Source: FAOSTAT database (FAO, 1996).

- In many regions, forest area declines due to conversion to agricultural land and the built environment, and losses to forestry. Forest area increases in *Policy Reform* due to expansion of plantations and reforestation, and greater reliance on agriculture imports in some regions, in order to meet the scenario target (see Table 3 in text).
- In major food exporting regions (North America, European regions, Australia and New Zealand) forest areas are similar in the two scenarios due to two counteracting effects in *Policy Reform*. On the one hand, there is more forest preservation. On the other hand, there is more land in agriculture as exports increase to allow food-importing regions to meet their own forest preservation goals.
- Exploitation levels on commercial forests tend to rise in the context of expanded economic growth and global trade (see tables).

Notes: Small apparent changes in the graphs of forest areas for certain regions may mask large absolute changes (see the numerical tables that accompany the graphs). The historical figures shown in the graph are from FAO (1998). Due to the considerable uncertainty and controversy regarding forest data, these figures should be taken only as very rough trends.

Toxic Waste

- Data source: World Bank Industrial Pollution Projection System (Hettige et al., 1994).
- *Conventional Development* incorporates "lower-bound" toxic emission factors from the above source (emissions per value added at the 3-digit ISIC level). Emission factors in *Policy Reform* scenario are reduced in all regions by 70% by 2032, to meet the scenario goal (see Table 3 in text).

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