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Environment and Development Challenges: The Imperative to Act

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The Blue Planet Prize laureates

The Asahi Glass Foundation

Table of Contents

This paper is a synthesis of the key messages from the individual papers written by the Blue Planet Laureates (Annex I describes the Blue Planet Prize), and discusses the current and projected state of the global and regional environment, and the implications for environmental, social and economic sustainability. It addresses the drivers for change, the implications for inaction, and what is needed to achieve economic development and growth among the poor, coupled with environmental and social sustainability, and the imperative of action now. The paper does not claim to comprehensively address all environment and development issues, but a sub-set that are deemed to be of particular importance.

I. The Problem

I-1 Introduction

We have a dream a world without poverty a world that is equitable a world that respects human rights a world with increased and improved ethical behavior regarding poverty and natural resources - a world that is environmentally, socially and economically sustainable, and where economic growth is accomplished within the constraints of realising social objectives of poverty eradication and social equity and within the constraints of life support nature's carrying capacity, and a world where the challenges such as climate change, loss of biodiversity and social inequity have been successfully addressed. This is an achievable dream, but the system is broken and our current pathway will not realise it.

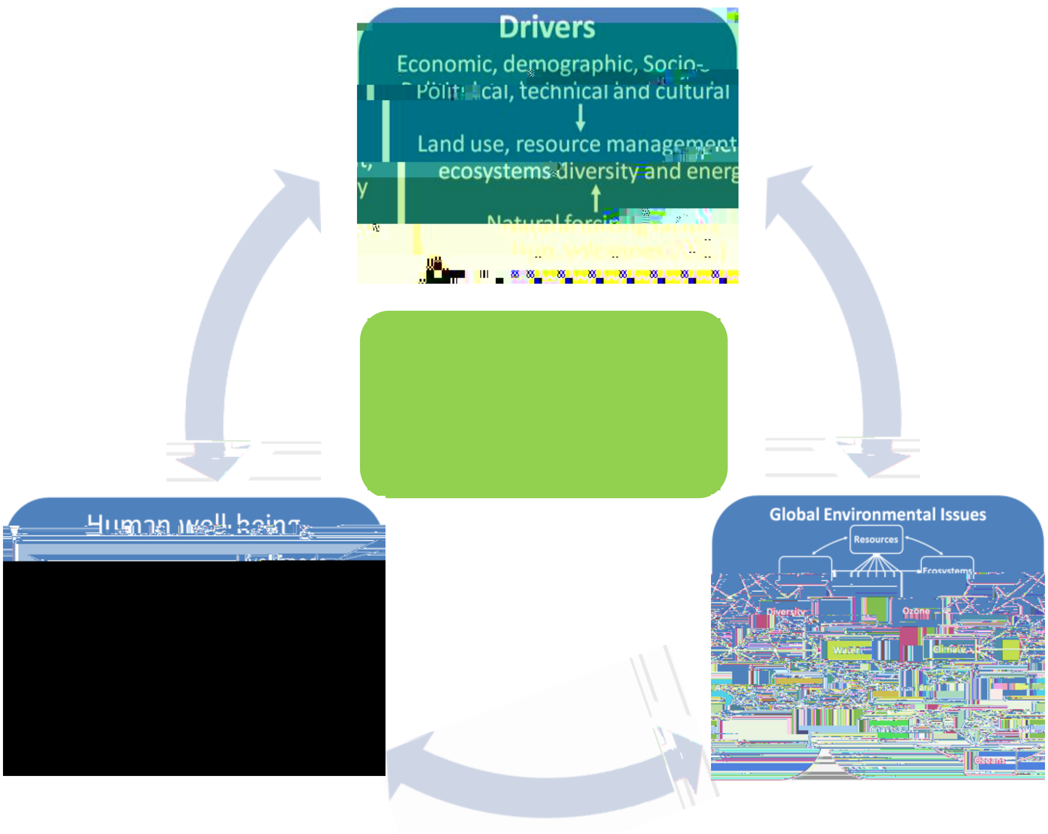
Unfortunately, h
potentially lethal fallout from a combination of increasingly rapid technological evolution matched with very slow ethical-social evolution. The human ability to do has vastly outstripped the ability to understand. As a result civilization is faced with a perfect storm of problems driven by overpopulation, overconsumption by the rich, the use of environmentally malign technologies, and gross inequalities. They include loss of the biodiversity that runs human life-support systems, climate disruption, global toxification, alteration of critical biogeochemical cycles, increasing probability of vast epidemics, and the specter of a civilization-destroying nuclear war. These biophysical problems are interacting tightly with human governance systems, institutions, and civil societies that are now inadequate to deal with them.

The rapidly deteriorating biophysical situation is more than bad enough, but it is barely recognized by a global society infected by the irrational belief that physical economies can grow the ecological life support system. In economics the main issue deals with what, where and how much of the natural resources are required to alleviate poverty, while social issues deal with for whom and how much are resources developed, and environmental issues address how natural resources can be managed with minimum negative impact on ecosystems. The interaction between economic, social and environment are enhanced and its coordination made more effective if their respective goals are translated into quantitative terms within a defined time scale. What is needed is to realize economic growth within the constraints of social and environmental sustainability.

I-2 Underlying Drivers of Change

The major indirect drivers of change are primarily demographic, economic, socio-political, technological, and cultural and religious (Figure 1). These affect climate change and biodiversity loss somewhat differently, although the number of people and their ability to purchase and consume energy and natural resources are common to both issues. Human-induced climate change is primarily driven by the aggregate consumption and choice of technologies to produce and use energy, which is influenced by energy subsidies and unaccounted costs, hence the current over-reliance on burning fossil fuels. The loss of biodiversity and the degradation of ecosystems and their services are primarily due to the conversion of natural habitats, over-exploitation of resources, air, land and water pollution, introduction of exotic species and human-induced climate change.

FIGURE 1



in the provision of information, and there are failures in valuing ecosystems and biodiversity. In addition, environmentally-damaging subsidies in areas such as energy, transportation and agriculture, which total about $1 trillion per year, cause further market distortion and are in general leading to environmental degradation and should be eliminated. We must act strongly across all these dimensions.

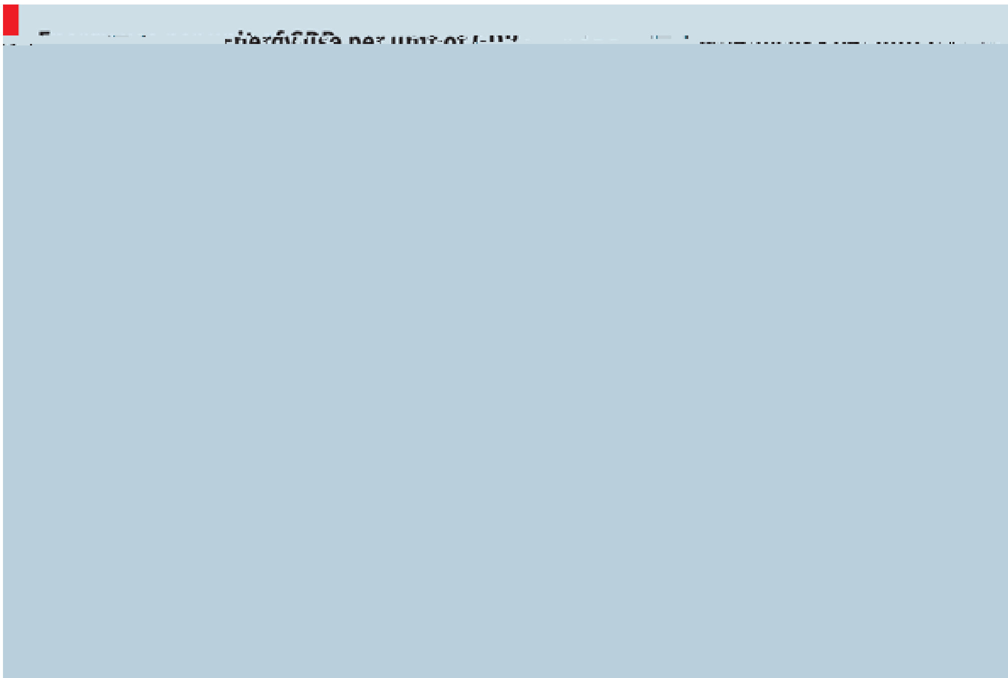
Correcting the biodiversity and ecosystem market failure is particularly urgent and important. The benefits that we derive from the natural world (biodiversity and ecosystem services) and its constituent ecosystems are critically important to human well-being and economic prosperity, but are consistently undervalued in economic analysis and decision making. Contemporary economic and participatory techniques allow us to take into account the monetary and non-monetary values of a wide range of ecosystem services. These techniques need to be adopted in everyday decision-making practice. Failure to include the valuation of non-market values in decision making results in a less efficient resource allocation, with negative consequences for social well-being. Recognising the value of ecosystem services would allow the world to move towards a more sustainable future, in which the benefits of ecosystem services are better realised and more equitably distributed.

Correcting these market failures is also important if developing countries are to continue to advance and improve their living standards. The economic emergence of the BRICS (Brazil, Russia, India, China, and South Africa) over recent decades has been a major success story. Their combined share of world GDP has increased from 23% to 32% over the last six decades. In contrast, over the same period the OECD share of world GDP has declined from 57% to 41%. This rapid economic growth has seen great improvements in health, literacy, and income. However, this rapid growth and development was achieved mostly through the increased use of fossil fuels (which in 2008 represented 90% of their energy consumption) and through the unsustainable exploitation of natural resources including oceans and forests. As a consequence of this energy intensive development, the emergence of the BRICS is associated with a significant increase in their GHG emissions (particularly CO_2), which have increased from 15% to 35% of global emissions over the last 60 years. This energy intensive development path is clearly unsustainable and impacts are already being felt, e.g. rapid increases in desertification in China and collapsing biodiversity in their oceans. Failure to shift to a low-carbon development path, which will, among other actions, require correcting market failures and removing harmful energy subsidies, may result in damaging climate change and environmental damage. This would jeopardize future growth and put at risk these great advances in development over the past several decades. There are encouraging signs from BRIC countries. For example, in Brazil deforestation in the Amazon has been cut by around 80% in the last 7 years and in China their 12th 5-year plan (2011-2015) indicates a change in strategy to a more sustainable low-carbon economy. But much greater action is urgently needed.

I-2-3 Technology:

The over-reliance on fossil fuel energy (coal, oil and gas) and inefficient end-use technologies has significantly increased the atmospheric concentrations of carbon dioxide and other greenhouse gases. We are currently putting one million years worth of sequestered carbon into the atmosphere each year. Recent efforts to reduce the carbon intensity (CO_2/GDP) were made in a large number of countries particularly in China and Russia where the carbon content has declined significantly in the last 30 years albeit from very high levels (Figure 2). However the carbon intensities of India, South Africa and Brazil (including deforestation) have not declined significantly in that period. It is therefore clear that all countries have to take serious measures to reduce their CO_2 emissions in the next few decades. OECD countries alone, despite their efforts to reduce their carbon intensity (and carbon emissions),
growth of carbon emissions.

FIGURE 2



1-2-4 Socio-Political

There are serious shortcomings in the decision making systems on which we rely in government, business and society. This is true at local, national and global levels. The rules and institutions for decision making are influenced by vested interests, yet each interest has very different access to how decisions are made. Effective change in governance demands action at many levels to establish transparent means for holding those in power to account. Governance failures also occur because decisions are being made in sectoral compartments, with environmental, social and economic dimensions addressed by separate, competing structures.

The shift of many countries, and in particular the United States, towards corporate plutocracies, with wealth (and thus power) transferred in large quantities from the poor and middle-

This will have far-reaching implications, including for agriculture: 70% of all freshwater is currently used for irrigation. Of all irrigation water use 15-35% of irrigation water use already exceeds supply and is thus unsustainable.

Freshwater availability is spatially variable and scarce, particularly in many regions of Africa

become much drier even under medium levels of climate change. Glacier melt, which provides water for many developing countries, will likely decrease over time and exacerbate problems of water shortage

FIGURE 3

II. The Way Forward

II-1 Our Vision

The current global development model is unsustainable. We can no longer assume that our collective actions will not trigger tipping points, as environmental thresholds are breached, risking irreversible damage to both ecosystems and human communities. Therefore, our vision must be to eradicate poverty and reduce inequality, make growth more sustainable and inclusive, production and consumption more sustainable, combating climate change, and respecting other planetary boundaries. This will require recognizing, understanding and acting on interconnections between the economy, society and the natural environment.

If fail to act and the science is right, then humanity is in deep trouble and it will be very difficult to extricate ourselves. Basic decision theory or common sense points to strong action, particularly since the science is very likely to be right. The Stern Review (2006) sets out the analytical case for early and strong action. The costs of action increase with delay.

The challenge is to generate substantial benefits simultaneously across multiple economic, environmental and social objectives. This synergy is advantageous and important, given that by 2030; however, this will require innovative institutions and national enabling mechanisms such as appropriate subsidies and financing. Clean sstoves would substantially reduce indoor air pollution, which causes millions of premature deaths per year, and should also lead to climate benefits due to avoidance of products of incomplete combustion.

The share of renewable energy in global primary energy could increase to 30% to 75%, and in some regions (especially but limited to tropical regions) could exceed 90% by 2050. The main task is to achieve scale-up, reduce costs and integrate renewables in future energy systems. Carefully developed, renewable energies can provide multiple benefits, including employment, energy security, human health, environment, and mitigation of climate change.

Empirical evidence shows that switching from oil and coal to efficient use and diverse, climate-safe renewable supplies will not be costly but profitable. Saving fuel is almost always cheaper than buying fuel, and integrative design can often even make big savings cheaper than small ones (expanding returns). Scores of market failures block efficiency but can be turned into business opportunities. A number of renewable sources, as their costs plummet, now out-compete

new electric capacity since 2008, reaching a record $260 billion of private investment in 2011 and $1 trillion since 2004, and provides one-fifth of -fourth of its capacity. Fast-growing distributed resources add valuable resilience, and can bring electricity to the 1.6 billion people who now lack it.

Most components of Carbon Capture and Storage (CCS) systems are technically available, but the main task is to reduce costs and achieve rapid technology improvement. A number of pilot

All countries, both rich as well as poor, will need to develop their own national adaptation plans. While many adaptation actions will be country and location specific, nevertheless there are opportunities for learning lessons across countries, south-south as well as south-north.

The most effective adaptation strategy is mitigation in order to limit the magnitude of climate change, especially given there are significant physical, financial, technological, and behavioral limits to adaptation.

II-5 Approaches to Conserve and Sustainably Use Biodiversity

The loss of biodiversity and degradation of ecosystem services can be stopped and reversed by concerted planning based on adequate data, a well-managed protected areas network, enhancement of the conservation value of agricultural areas supported by the new science of countryside biogeography, use of InVest and other new tools for mapping and evaluating the services, and transformational shifts in the public and private sector that value the role of natural capital in economic development. The CBD is the international umbrella for biodiversity, and its 2020 regional and global targets for protecting biodiversity - particularly targets on protected areas and preventing extinctions are critically important.

To stop biodiversity loss and maintain the services humanity depends on, the value of ecosystem services and natural capital must be incorporated into national accounting and decision-making processes across all sectors of society, access to ecosystem benefits and costs of ecosystem conservation must be shared equitably, and biodiversity and ecosystem services must be seen as the most fundamental component of green economic development. Therefore there is a need to further develop and use tools such as InVest, as well as the motivation, for nations to establish a national inclusive wealth accounting system, including accounting for ecosystem services imported and exported, which could stimulate further approaches to ecosystem service marketplace development. These tools can assist decision makers on how to balance the tradeoffs in choosing among ecosystem services in land use decisions at multiple spatial scales and include both economic and non-economic valuation. We also need to initiate a campaign to build societal awareness, including building the concept into secondary school education

Biodiversity and natural ecosystems are foundational to solving the climate crisis, as conservation can slow climate change, increase the adaptive capacity of both people and ecosystems, save lives and sustain livelihoods in myriad ways as Earth's climate changes. Tropical forests, coastal marine habitats, and other ecosystems play major roles in global biochemical cycles, and are thus essential to mitigation. They are also widely available, and via protection and restoration can be deployed immediately to reduce atmospheric greenhouse gas concentrations without waiting for new technology. An effective mechanism for Reducing Emissions from Deforestation and forest Degradation (REDD+) must be implemented and financed to support countries in either reducing deforestation or, for some countries, maintaining

Climate mitigation and adaptation, for both nature and people, can no longer be thought of as separate problems, for they will not be solved in isolation. If human adaptation to climate change compromises forests or other ecosystems, this loss will speed climate change. If mitigation of climate change is sought for example via reforestation using single-species stands rather than ensembles of native species this will reduce biodiversity. These losses will increase the need for adaptation even as our capacity to accommodate it diminishes. An integrated approach makes this cycle virtuous: by conserving biodiversity, we decelerate climate change while increasing the adaptive capacity of people and ecosystems alike.

A

improving on bottom-line finances -

before. They bridge their gap to sustainability (backcasting from the boundary conditions). And they empower, rather than discourage, proactive policy makers in legislation procedures and at international summits. This feeds into the next section. We need governance models that can empower the pioneering role models. To have shared mental models of boundary conditions for sustainability, will not suffice unless infrastructures for bringing people together to co-create solutions are established.

II-9 The Importance of Good Governance

There are serious shortcomings in the decision-making systems on which we rely in government, business, and society more broadly. Building more effective governance and institutions is central to achieving more sustainable patterns of development globally, nationally, and locally. Yet the central importance of governance issues is often neglected. This is partly due

structures. An analysis of governance needs to ask: How, where and by whom are decisions made? Who gets to write the rules by which decisions are made? What gets decided and who gets what? How are people able to monitor how decisions are made? Governance is more than just a question of the institutional architecture, and how different elements relate to each other. For and corporations. The international nature of much of the corporate sector involved in natural resource use means that even the governments of the countries in which they are headquartered have limited ability to influence their actions and decisions.

Globally, we urgently need better means to agree and implement measures to achieve our collective goals. Given the large numbers of states and their separate jurisdictions, more effective and far-reaching international institutions and rules are necessary, yet nation states are unwilling to submit to collective agreements which constrain their freedom of manoeuvre. Equally, greater control over international financial and corporate actors is needed, to reduce their ability to escape fiscal and other responsibilities through freedom of movement between different jurisdictions. Global efforts to address climate change have resulted in a complex international governance architecture, which has largely replicated geopolitical and global economic power relations among nations. There has been little room in these evolving governance arrangements for the priorities of weaker countries and marginalized people to be heard and addressed. Growing reliance on the G20 as a forum for sorting out global problems runs the risk of disempowering the large number of smaller, less economically prominent nations.

Development policymakers and

Box 1

Traditional and peoples practise of collecting rain water for drinking and irrigation needs to be revived. It has been used tested and proved over hundreds of years. But ever since the academic engineers turned up on the scene this practise has been devalued and the technology solution of exploiting (thus abusing) ground water through powerful polluting drilling rigs installing deep well pumps has seriously depleted groundwater. Thousands of open wells for irrigation and hand pumps for drinking water have gone dry. What needs to be done on a war footing is to collect water from the roofs of public buildings (schools, dispensaries etc) into underground tanks and this could be used for drinking water and sanitation. Small dams need to be constructed to allow for ground water recharge thus revitalizing the dry open wells and hand pumps, reclaiming collective assets worth millions of dollars. What is needed is simple practical solutions multiplied over a large scale all over the world. This does not need much money but the long term impact will be tremendous.

The answer to addressing the critical issues of poverty and climate change is not primarily technical but social. The problems of corruption, wastage of funds, poor technology choices and absent transparency or accountability are social problems for which they are innovative solutions are emerging from the grass roots. For instance the idea and practice of Public Hearings and Social Audits came from the people who were fed up with government inaction in India. Now it has been institutionalized and benefitting nearly 600,000 villages in India.

Grass root groups have found the value and relevance of a South-South Partnership where the use and application of traditional knowledge, village skills and practical wisdom between communities across Continents have resulted in low cost community based solutions that have had an incredible impact in improving the quality of life. Migration from rural to the urban areas has decreased. Dependency on urban and technology skills has decreased.

The empowerment of women is the ultimate sustainable rural solution. By improving their capacity and competence to provide basic services in the rural areas (for instance train them to be solar engineers Box 2) they could be the new role models that the world is looking for.

Box 2

Without using the written or spoken word and only through sign language 300 illiterate rural grandmothers between ages 35 to 50 have been trained as solar engineers. In 6 months they have solar electrified over 15,000 houses reaching more than 100 villages covering the whole continent of Africa (28 countries in 5 years) at a total cost of $ 2.5 million. This is what is spent on 1 Millennium Village in Africa. If a grandmother is selected from any part of the developing world the Government of India pays the air fare and 6 months training costs in India. The funds for the hardware has been provided by GEF Small Grants Programme, UNWOMEN, UNESCO, Skoll Foundation, and individual philanthropists.

The long term answer is not a centralised system but a demystified and decentralized system where the management, control and ownership of the technology lie in the hands of the communities themselves and not dependent on paper qualified professionals from outside the villages.

Listen and learn how poor communities all over the world see the problems of energy, water, food and livelihoods as inter-dependent and integrated as part of a living eco system and not viewed separately.

II-12 Knowledge Generation and Assessment

Given the importance of credible peer-reviewed knowledge to controversial. The development of the proposed Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES) will provide vital information periodic assessments of the knowledge needed for ecosystem service delivery and the status of the delivery system.

However, we need a more integrated assessment process that either encompasses all environmental issues within the construct of sustainable economic growth and poverty alleviation, i.e., climate change, stratospheric ozone depletion, loss of biodiversity and ecosystem services, water degradation and air pollution, or the individual thematic assessments are periodically synthesized.

II-13 Conclusion

Climate change and loss of biodiversity undermines sustainable development. However, there is no dichotomy between economic progress and protecting our environment by limiting climate change and loss of biodiversity. Indeed, the cost to mitigate

Annex I:

The Blue Planet prize laureates who contributed to the paper are (in no special order):

- **Professor Sir Bob Watson**, Chief Scientific Adviser of the UK Department for Environment, Food and Rural Affairs (Defra)
- **Lord (Robert) May of Oxford**, former Chief Scientific Adviser to the UK Government and President of Royal Society of London
- **Professor Paul Ehrlich**, Stanford University
- **Professor Harold Mooney**, Stanford University
- **Dr Gordon Hisashi Sato,** President, Manzanar Project Corporation
- **Professor José Goldemberg**, secretary for the environment of the State of São Paulo, Brazil and Brazil's interim Secretary of Environment during the Rio Earth Summit in 1992
- **Dr Emil Salim**, former Environment Minister of the Republic of Indonesia
- **Dr Camilla Toulmin**, Director of the International Institute for Environment and