

BUILDING PLANETARY RESILIENCE IN DYNAMIC WORLD

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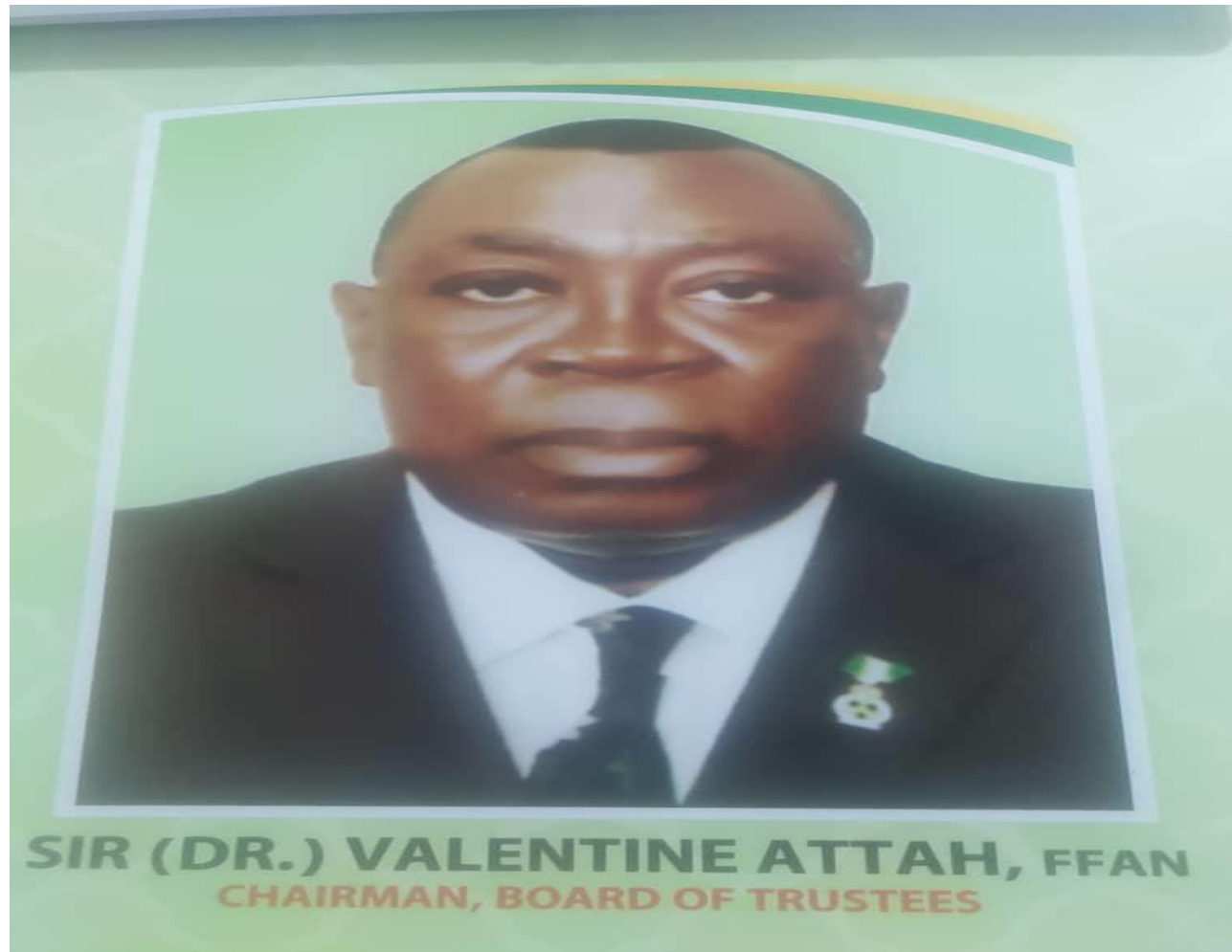
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**SIR(DR.) VALENTINE ATTAH, FFAN
A GREAT FORESTER AND DEVELOPMENT ICON
FARE THEE WELL, BIG BROTHER AND FRIEND**

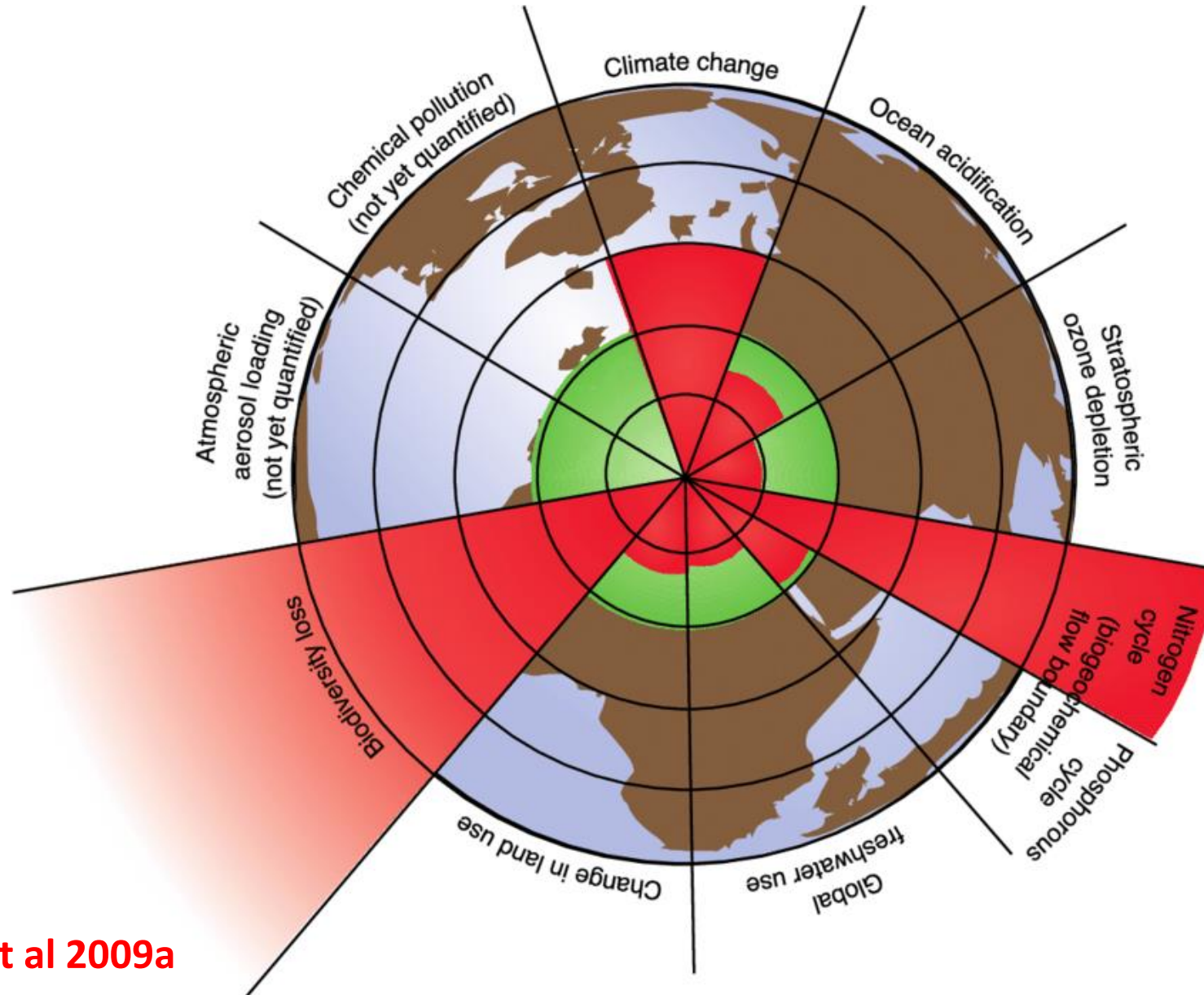


STATE OF OUR PLANET

- ❖ The 1992 Earth Summit in Rio de Janeiro broke the ground first time, in human history to chart a new course that would engender harmony between development and nature.
- ❖ It gave rise to the development initiative tagged the Millennium Development Goals (MDGs) and the sustainability agenda.
- ❖ The Sustainable Development Goals (SDGs) came on the heels of the MDGs
- ❖ Both agenda stirred the conscience of humanity to adopt development practices, which will ensure social equity, economic advancement and environmental stability.

- ❖ Over the last three decades, however, the planet has witnessed what Rockstrom (2013) describes as a ***Quadruple squeeze***: population, climate change, ecosystem decline and surprise, and the trajectory for all these are upward and climbing.
- ❖ We now inhabit a planet where humans have traversed the planetary boundaries, the the ozone layer is on the decline as a result of increasing CO₂, ocean acidification, biodiversity loss, land use change, chemical pollution, phosphorous flow, atmospheric aerosol, nitrogen flow, and overpowered industrial vehicle.

STATE OF OUR PLANET



Source: Rockström et al 2009a

STATE OF OUR PLANET

- Forests, fisheries, oceans, rangelands, freshwater systems (lakes, wetlands, rivers) and other natural ecosystems are all threatened while many are on the verge of collapse.
- Water, land, and air are getting increasingly polluted, water tables are falling, soil erosion is leading to desertification, global warming is well underway, and species are dying out 1000 times faster than their natural rate of extinction (World Centric, 2017).
- Population growth and the burgeoning demand for food, fibre and fuel have accelerated the pace of forest clearance. (FAO, 2010b).



Plate : Population, Congestion and Industrialization



Plate : Clearing of Forest Land for Other Purposes

STATE OF OUR PLANET

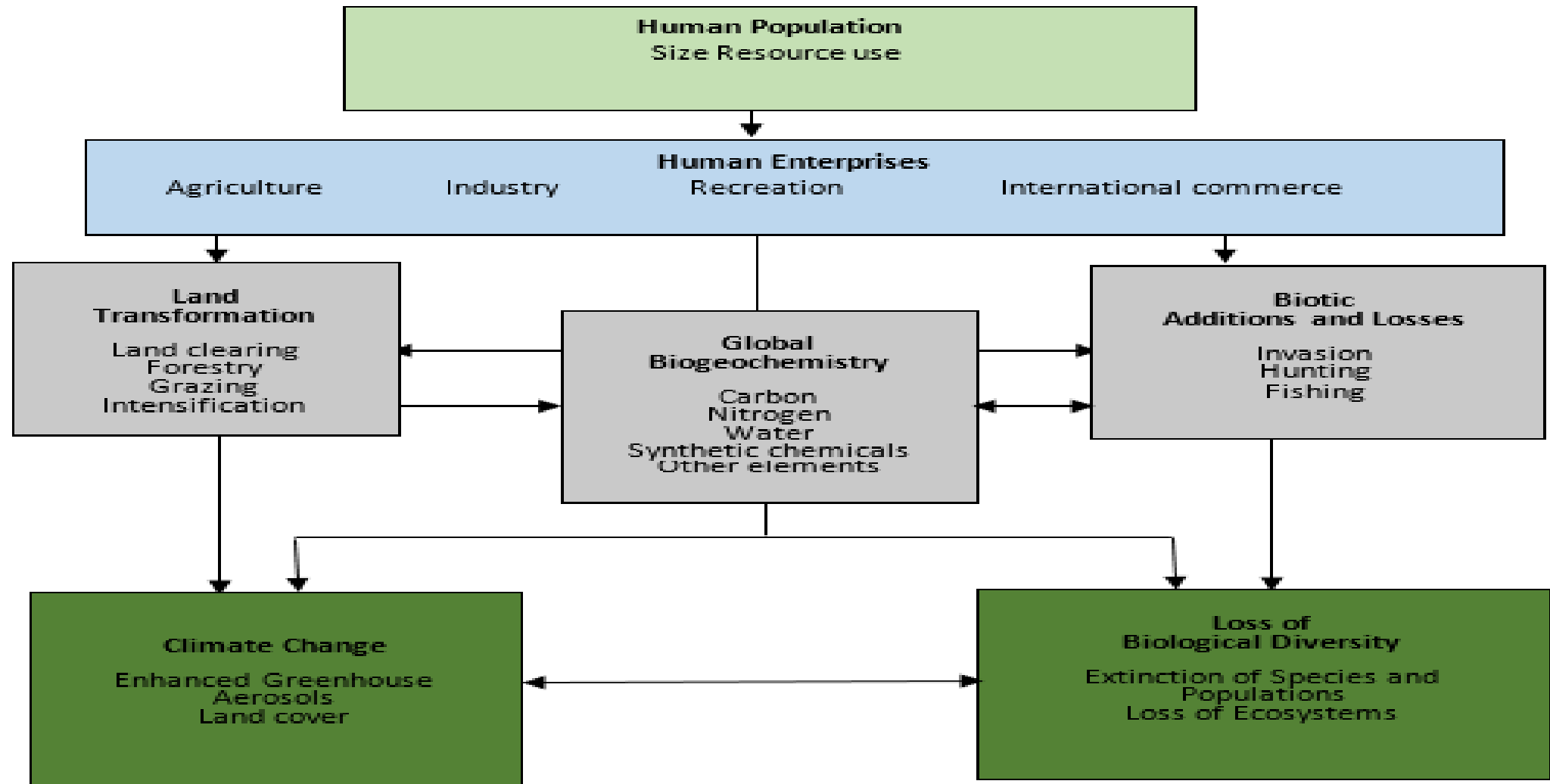


Figure : Model of humanity's direct and indirect effects on the Earth System

Source: Vitousek, Peter M., Harold A. Mooney, Jane Lubchenco, and Jerry M. Melillo, 1997:

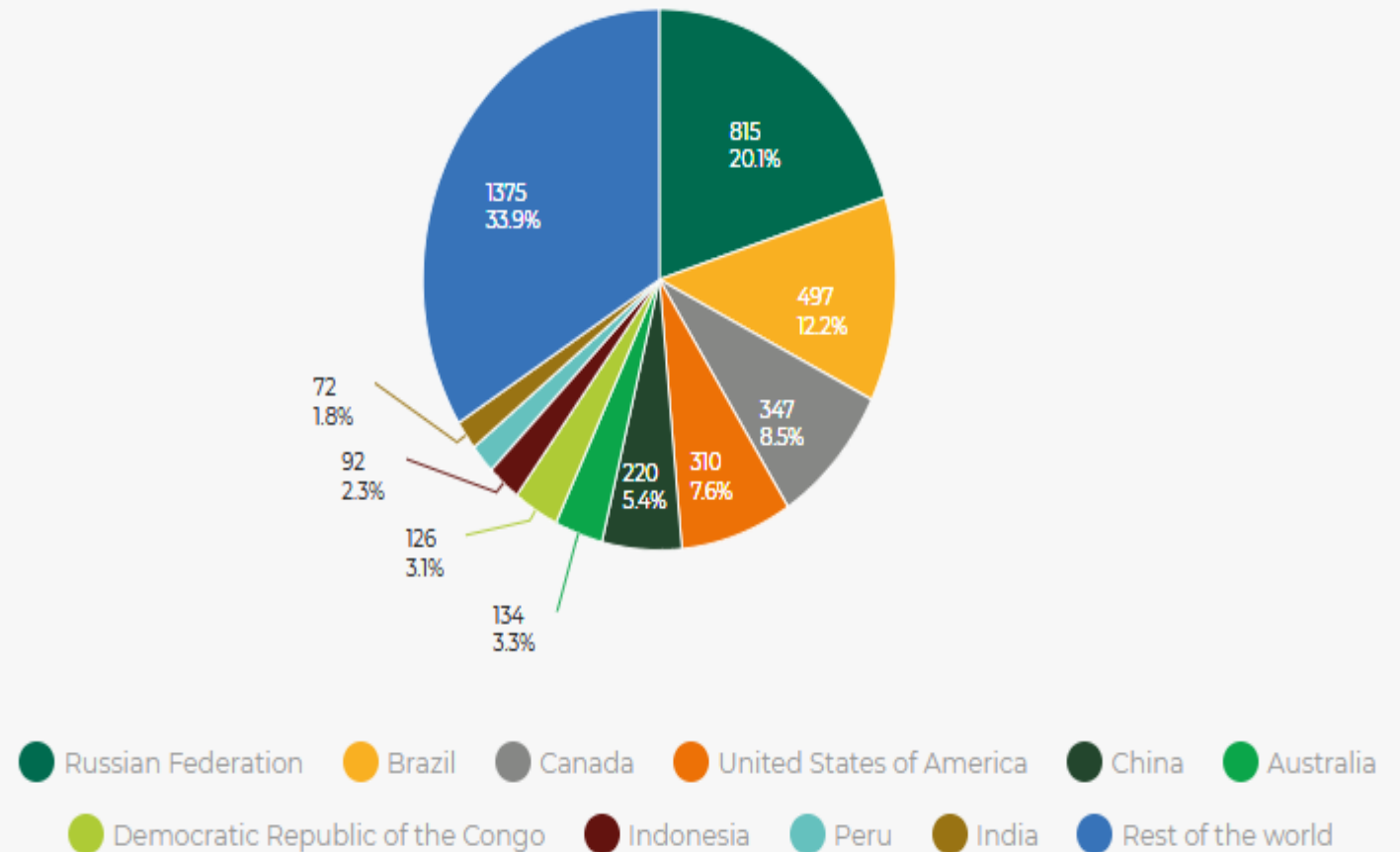
"Human Domination of Earth's Ecosystem." Science 277 (5352): 494-499.

GLOBAL DISTRIBUTION OF FOREST

➤ The total forest area is 4.06 billion hectares, approximately 5000m² (or 50 x 100m) per person, but forests are not equally distributed around the globe. FAO, 2020.

➤ Over half of the world's forests are in only five countries (the Russian Federation, Brazil, Canada, the United States of America and China) and two-thirds (66 percent) of forests are found in ten countries.

Global distribution of forests showing the ten countries with the largest forest area, 2020 (million hectares and % of world's forest)



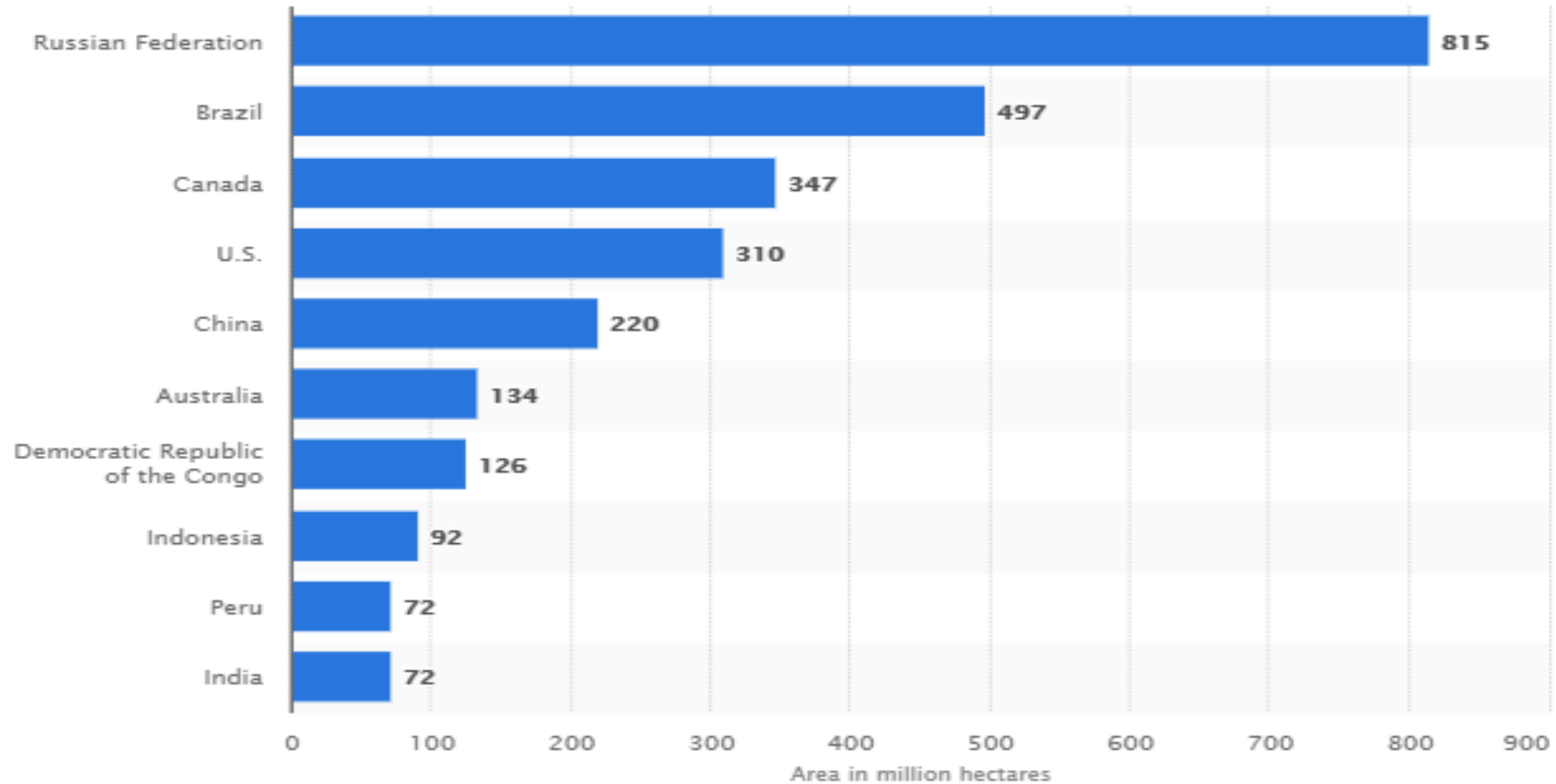
SOURCE: FAO

GLOBAL DISTRIBUTION OF FOREST

Countries	Million hectares	%
Russian Federation	815	20.1
Brazil	497	12.2
Canada	347	8.5
United States of America	310	7.6
China	220	5.4
Australia	134	3.3
Democratic Republic of Congo	126	3.1
Indonesia	92	2.3
India	72	1.8
Peru	72	1.8
Others	1375	33.9

**SOURCE: FAO,
2020**

GLOBAL DISTRIBUTION OF FOREST



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Table : Top ten countries reporting the greatest annual net gain in forest area, 2020

GLOBAL DISTRIBUTION OF FOREST

❖ As of December 2019, a total of 20 334 tree species had been included in the IUCN Red List of Threatened Species (IUCN, 2019a), of which 8 056 were assessed as globally threatened (Critically Endangered, Endangered or Vulnerable).

❖ More than 1 400 tree species are assessed as critically endangered and in urgent need of conservation action.

❖ Ten countries with the most tree species

❑ Brazil, 9223

❑ Colombia, 6021

❑ Indonesia, 5623

❑ Malaysia, 5458

❑ Venezuela, 4879

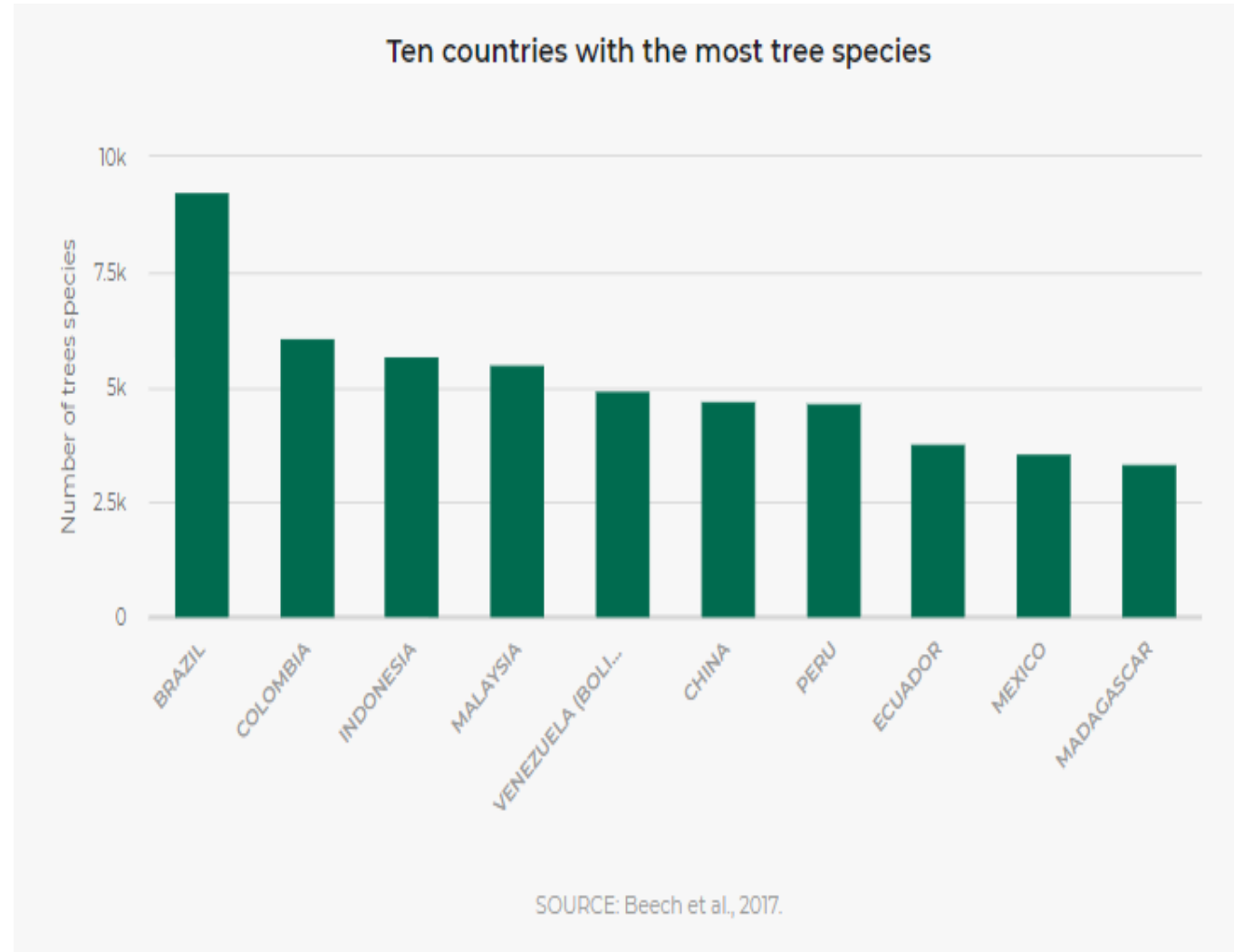
❑ China, 4680

❑ Peru, 4612

❑ Ecuador, 3750

❑ Mexico, 3514

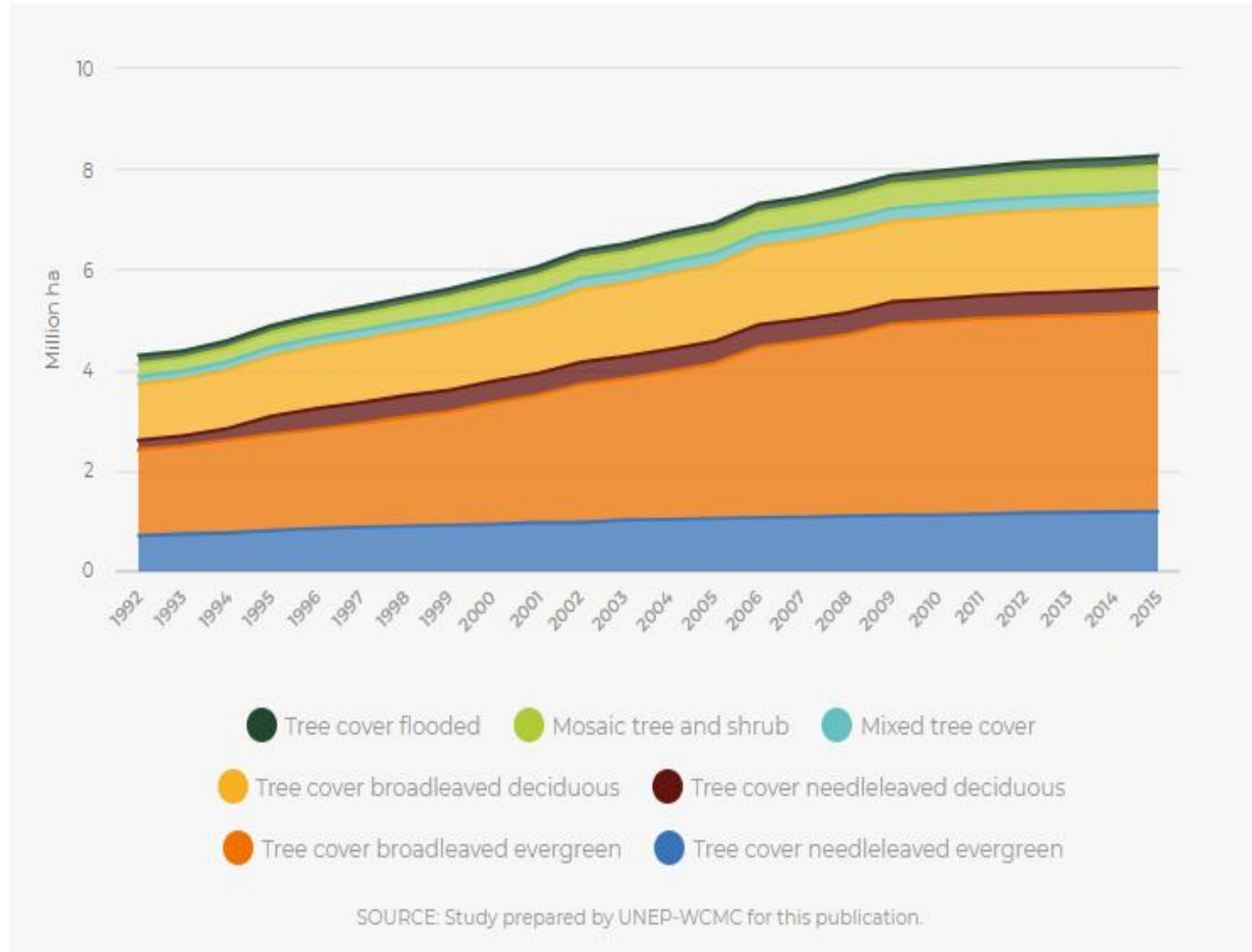
❑ Madagascar, 3297



Ten countries with the most tree species

❖ Globally, 18 percent of the world's forest area, or more than 700 million hectares fall within legally established protected areas such as national parks, conservation areas and game reserves (IUCN categories I-IV).

❖ The largest share of forest in protected areas is found in South America (31 percent) and the lowest in Europe (5 percent), [FAO, 2020](#).



Increase in forest area within protected areas by forest type, 1992–2015 (Million hectares)

Source: <http://www.fao.org/state-of-forests/en/>

GLOBAL DISTRIBUTION OF FOREST

- ❖ Since 1990, it is estimated that 420 million hectares of forest have been lost through conversion to other land uses, although the rate of deforestation has decreased over the past three decades.
- ❖ Between 2015 and 2020, the rate of deforestation was estimated at 10 million hectares per year, down from 16 million hectares per year in the 1990s. The area of primary forest worldwide has decreased by over 80 million hectares since 1990.
- ❖ Agricultural expansion continues to be the main driver of deforestation and forest degradation and the associated loss of forest biodiversity.

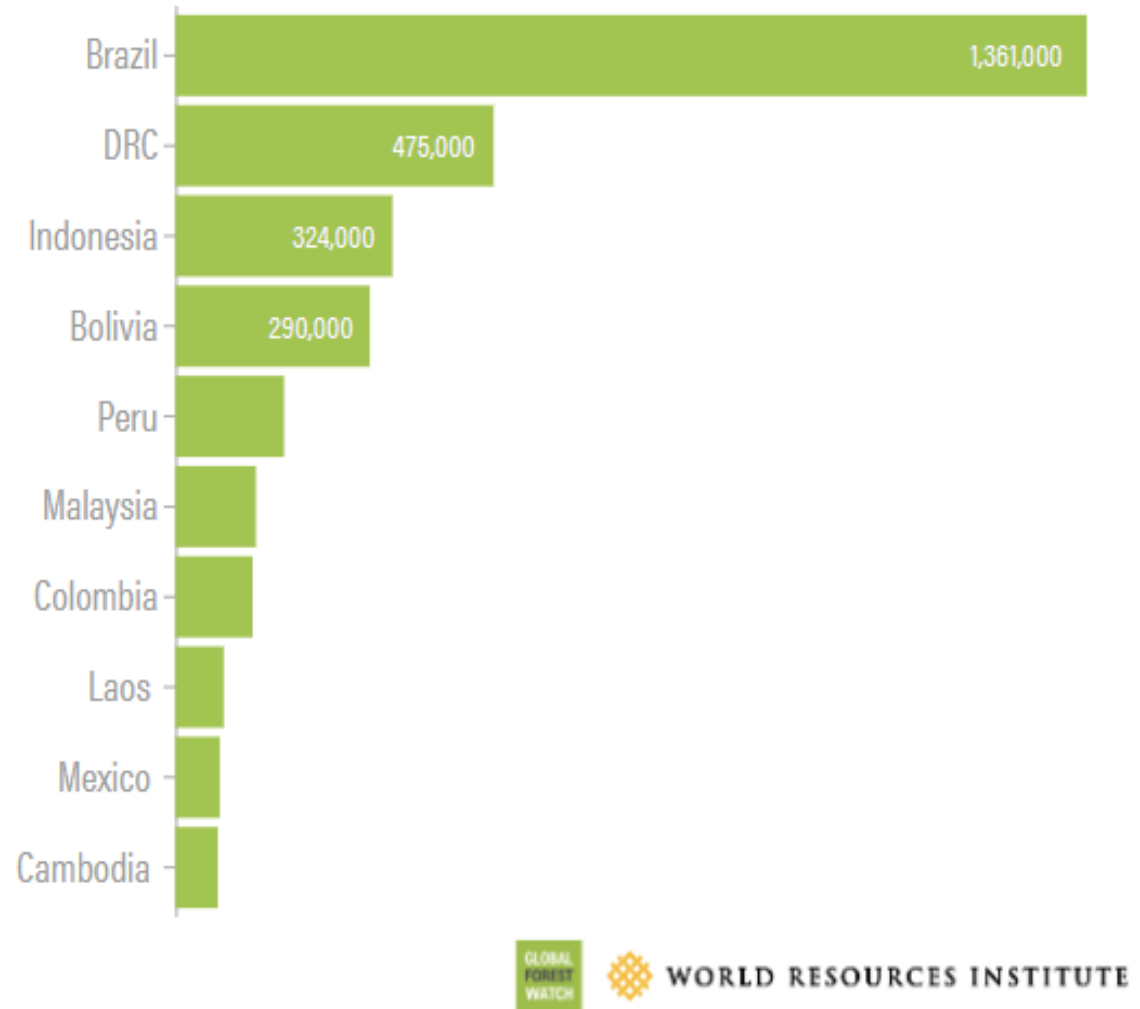


Fig. : Top 10 Tropical Countries that Lost the Most Primary Forest in 2019 (in hectares)

LINKING FORESTRY AND DEVELOPMENT

- ❖ The contribution of the forestry sector to GDP has continued to decline from over 1.2 percent in 2000 to 0.9 percent in 2011.
- ❖ This decline has occurred because other sectors of the global economy (especially services) have expanded more rapidly (i.e. global GDP has increased by 40 percent over the period) while value added in the forestry sector has increased by only 3 percent.
- ❖ At the regional level, all regions display this downward trend without exception.
- ❖ The global forest sector collectively directly employed more than 18.21 million people and supported more than 45.15 million jobs through direct, indirect and induced impacts. The global forest sector had a direct contribution of more than \$539 billion and a total contribution of more than \$1298 billion to the world GDP. Yanshu, *etal.* 2019. <https://ideas.repec.org/a/eee/forpol/v100y2019icp236-253.html>

GLOBAL FOREST AND WILDLIFE

- ❖ Wildlife usually refers to animal species that have not been domesticated (Usher, 1986).
- ❖ They can be found in all ecosystems such as deserts, forests, rain forests, grasslands and even urban areas.
- ❖ These various ecosystems contain very unique forms of wildlife.
- ❖ The global wildlife population is said to have reduced by fifty-two percent between 1970 and 2014, (Naik, Gautam, 2014).

GLOBAL FOREST AND WILDLIFE

- ❖ The population sizes of mammals, birds, fish, amphibians and reptiles have seen an alarming average drop of 68% since 1970, (WWF, 2020). 2020 WWF - World Wide Fund For Nature © 1986 Panda Symbol WWF – World Wide Fund For Nature (formerly World Wildlife Fund)
- ❖ Wildlife are very important, though may be dangerous to man, their values range from educational to economic.
- ❖ They include wildfowl, buffalo, tigers, bears, rabbits, squirrel, lions, giraffes, antelopes, gazelles amongst many others. They can be kept as pet or serve as a source of tourism.

GLOBAL FOREST AND WILDLIFE

- ❖ The Living Planet Index (LPI) now tracks the abundance of almost 21,000 populations of mammals, birds, fish, reptiles and amphibians around the world. The building blocks for this indicator are wildlife population datasets. These population trends are brought together in the LPI to calculate the average percentage change in population sizes since 1970 using an index. This year's index includes almost 400 new species and 4,870 new populations.
- ❖ Since the last Living Planet Index was released in 2018, the number of species represented has improved for the majority of regions and taxonomic groups, with the biggest boost being to amphibian species. At present the LPI contains data only for vertebrate species as, historically, these have been better monitored; but efforts to incorporate data on invertebrates are underway as we try to broaden our understanding of changes in wildlife populations.

GLOBAL FOREST AND WILDLIFE

- ❖ The 2020 global Living Planet Index shows an average 68% (range: -73% to -62%) fall in monitored populations of mammals, birds, amphibians, reptiles and fish between 1970 and 2016.

GLOBAL FOREST AND WILDLIFE

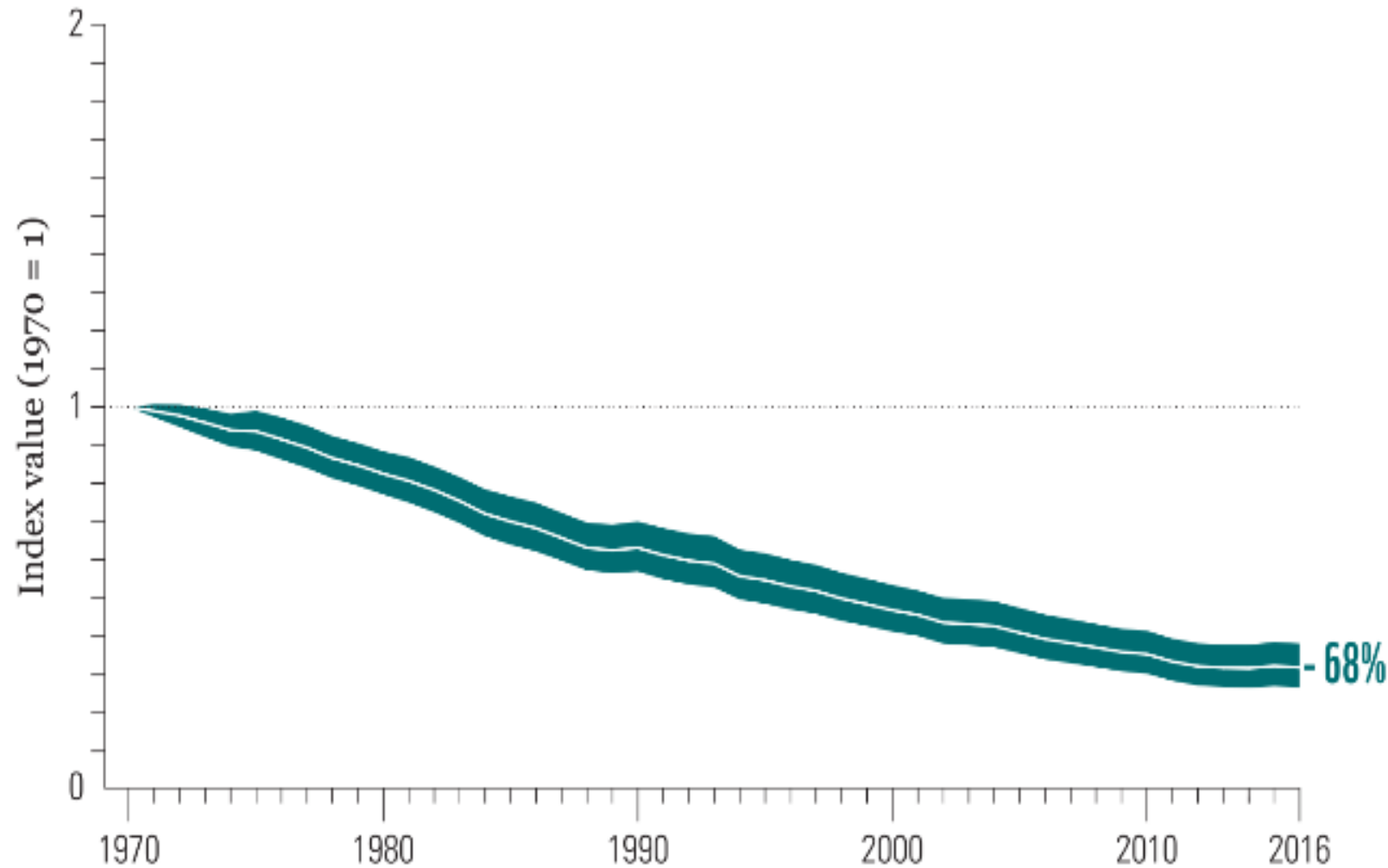


Figure 1: The global Living Planet Index: 1970 to 2016
Average abundance of 20,811 populations representing 4,392 species monitored across the globe declined by 68%. The white line shows the index values and the shaded areas represent the statistical certainty surrounding the trend (range: -73% to -62%). Sourced from WWF/ZSL (2020)¹.

Key

- Global Living Planet Index
- Confidence limits

GLOBAL FOREST AND WATER

- ❖ According to available estimates, the entire water of the earth is around 136,000,000 cubic kilometres.
- ❖ Water is a very vital component of human life.
- ❖ Agriculture which is the largest consumer of water, consumes about 70% of all fresh water withdrawals.

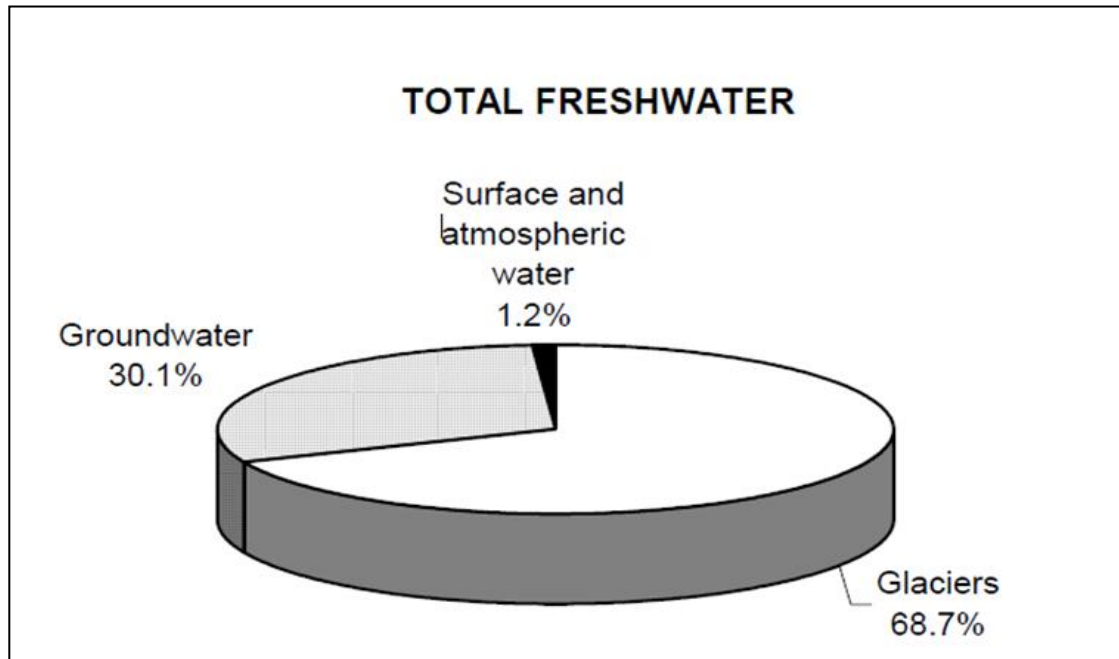


Figure : Distribution of Total Water

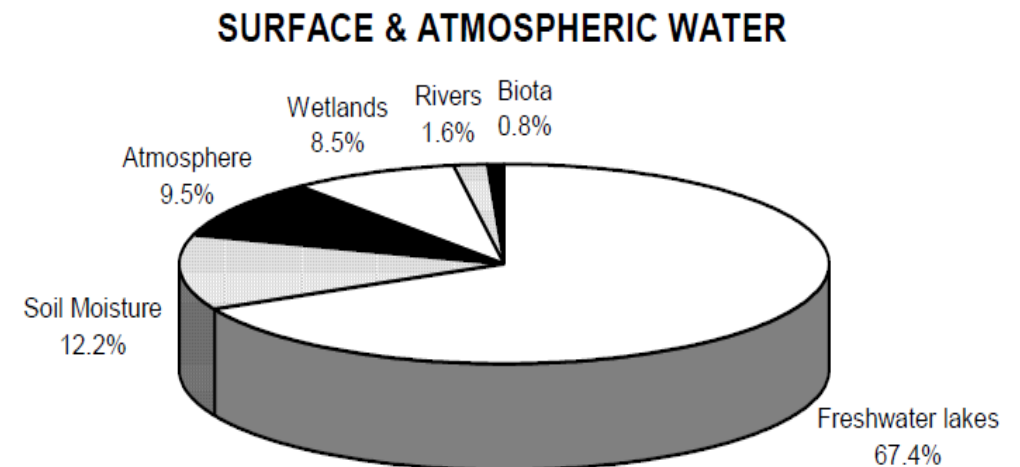


Figure : Distribution of Surface and Atmospheric Water

GLOBAL FOREST AND WATER

- ❖ Freshwater biodiversity is declining far faster than that in our oceans or forests. Based on available data, we know that almost 90% of global wetlands have been lost since 1700 83; and global mapping has recently revealed the extent to which humans have altered millions of kilometres of rivers.
- ❖ These changes have had a profound impact on freshwater biodiversity with population trends for monitored freshwater species falling steeply.

GLOBAL FOREST AND WATER

- ❖ Climate change will exacerbate the risks associated with variations in the distribution and availability of water resources.
- ❖ Groundwater provides drinking water to at least 50% of the global population and accounts for 43% of all of the water used for irrigation (FAO, 2010). Worldwide, 2.5 billion people depend solely on groundwater resources to satisfy their basic daily water needs (UNESCO, 2012).

GLOBAL FOREST, WATER, POPULATION NEXUS

- ❖ The world's population is growing by about 80 million people per year (USCB, 2012) and is predicted to reach 9.1 billion by 2050, with 2.4 billion people living in sub-Saharan Africa (UNDESA, 2013a).
- ❖ Global gross domestic product (GDP) rose an average of 3.5% per year from 1960 to 2012 (World Economics, 2014). Much of this economic growth has come at a significant social and environmental cost.
- ❖ Population growth, urbanization, industrialization, and increases in production and consumption have all generated ever-increasing demands for freshwater resources.

GLOBAL FOREST, WATER, POPULATION NEXUS

- ❖ By 2030, the world is projected to face a 40% global water deficit under the business-as-usual climate scenario (2030 WRG, 2009).
- ❖ The fact is there is enough water to meet the world's growing needs, but not without dramatically changing the way water is used, managed and shared. The global water crisis is one of governance (WWAP, 2006), much more than of resource availability.

POPULATION VS WATER DEMAND

- ❖ An estimated 20% of the world's aquifers is being over-exploited (Gleeson et al., 2012), leading to serious consequences such as land subsidence and saltwater intrusion (USGS, 2013).
- ❖ Economic losses due to water-related hazards have risen greatly in the past decade. Since 1992, floods, droughts and storms have affected 4.2 billion people (95% of all people affected by all disasters) and caused US\$1.3 trillion of damage (63% of all damage) (UNISDR, 2012).

POPULATION VS WATER DEMAND

- ❖ Water availability faces pressures from pollution. Eutrophication of surface water and coastal zones is expected to increase almost everywhere until 2030 (UNDESA, 2012). Globally, the number of lakes with harmful algal blooms will increase by at least 20% until 2050.
- ❖ Regionally, the global limit of ecological sustainability of water available for abstraction is reported to have been exceeded for about one-third of the human population and it will rise to about half by 2030 (WWAP, 2012).

POPULATION VS WATER DEMAND

- ❖ In most countries, funding for water infrastructure comes from government allocations, although many developing countries still depend on external assistance to fund water resources management and utilities. Over 50% of countries low on the Human Development Index have reported that financing for water resources development and management from government budgets and official development assistance has been increasing over the past 20 years (UN-Water, 2012).
- ❖ Challenges such as economic shocks, food shortages and climate change threaten to undercut economic and social progress made in recent years.

MOVING TOWARDS A FRAGILE PLANET

- ❖ The downward trend in the above listed natural resources, which are germane to sustainable development has increasingly made our planet **Fragile**
- ❖ The **fragility** comes in different forms of crises: intra communal, intercommunal and international

MOVING TOWARDS A FRAGILE PLANET

- ❖ Humans are being displaced from their natural abodes, jobs are being lost, natural disasters are occurring and becoming increasingly unpredictable, habitat loss is becoming common phenomenon for all living things, both terrestrial and aquatic.
- ❖ These call for mitigation, adaptation and **resilience building**
- ❖ Biodiversity Conservation and Sustainability are key

BIODIVERSITY CONSERVATION AND SUSTAINABILITY

The common themes and concerns of both conservation and sustainability are that:

- ❖ Depletion of the natural resources will inevitably generate scarcity in the future. This represents a deprivation of the future generation;
- ❖ The excessive or disorderly use of natural resources will cause ecological disequilibrium and environmental deterioration which will have deleterious effects on the quality of human life;

BIODIVERSITY CONSERVATION AND SUSTAINABILITY

- ❖ The high or extravagant use of natural resources creates an associated waste disposal problem which represents a form of external costs that will still have to be borne by the society as a whole as opposed to the individuals who extract the natural resources;
- ❖ The uncontrolled exploitation of natural resources leads to the irreversible loss of certain natural endowments of unique value e.g. loss of beautiful landscapes and monuments.

EMBRACING SUSTAINABLE DEVELOPMENT GOALS TO ACHIEVE HEALTHY, SAFE AND LIVABLE PLANET

- ❖ The sustainable development goals (SDGs), otherwise known as agenda 2030 are a universal call to action to end poverty, protect the planet and ensure that all people enjoy peace and prosperity.
- ❖ The agenda consists of 17 indivisible and interconnected goals with 169 targets, which build on the Millennium Development Goals (MDGs).
- ❖ They also include new areas such as climate change, reducing inequality, sustainable consumption, peace and justice, among other priorities.

EMBRACING SUSTAINABLE DEVELOPMENT GOALS TO ACHIEVE HEALTHY, SAFE AND LIVABLE PLANET

- ❖ Of particular importance to us in renewable natural resources education and research are goals 12 – 15 which bother on sustainable consumption and production, climate change and oceans, as well as biodiversity, forests and desertification.
- ❖ While these mentioned goals speak to environmental issues and sustenance, of importance also are goals 1, 2 and 4; which speak to ending poverty, hunger, and ensuring food security and education.
- ❖ Most critical to this discourse are Goals 14 and 15 as contained in the Resolution adopted by the General Assembly on 25 September 2015:

GOAL 14. CONSERVE AND SUSTAINABLY USE THE OCEANS, SEAS AND MARINE RESOURCES FOR SUSTAINABLE DEVELOPMENT

- **14.1** By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution
- **14.2** By 2020, **sustainably** manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and take action for their restoration in order to achieve healthy and productive oceans
- **14.3** Minimize and address the impacts of ocean acidification, including through enhanced scientific cooperation at all levels
- **14.4** By 2020, effectively regulate harvesting and end overfishing, illegal, unreported and unregulated fishing and destructive fishing practices and implement science-based management plans, in order to restore fish stocks in the shortest time feasible, at least to levels that can produce maximum sustainable yield as determined by their biological characteristics

GOAL 14. CONSERVE AND SUSTAINABLY USE THE OCEANS, SEAS AND MARINE RESOURCES FOR SUSTAINABLE DEVELOPMENT

- **14.5 By 2020**, conserve at least 10 per cent of coastal and marine areas, consistent with national and international law and based on the best available scientific information
- **14.6 By 2020**, prohibit certain forms of fisheries subsidies which contribute to overcapacity and overfishing, eliminate subsidies that contribute to illegal, unreported and unregulated fishing and refrain from introducing new such subsidies, recognizing that appropriate and effective special and differential treatment for developing and least developed countries should be an integral part of the World Trade Organization fisheries subsidies negotiation¹⁶
- **14.7 By 2030**, increase the economic benefits to small island developing States and least developed countries from the sustainable use of marine resources, including through sustainable management of fisheries, aquaculture and tourism

GOAL 15. PROTECT, RESTORE AND PROMOTE SUSTAINABLE USE OF TERRESTRIAL ECOSYSTEMS, SUSTAINABLY MANAGE FORESTS, COMBAT DESERTIFICATION, AND HALT AND REVERSE LAND DEGRADATION AND HALT BIODIVERSITY LOSS

- **15.1 By 2020**, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements
- **15.2 By 2020**, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally
- **15.3 By 2030**, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world
- **15.4 By 2030**, ensure the conservation of mountain ecosystems, including their biodiversity, in order to enhance their capacity to provide benefits that are essential for sustainable development

GOAL 15. PROTECT, RESTORE AND PROMOTE SUSTAINABLE USE OF TERRESTRIAL ECOSYSTEMS, SUSTAINABLY MANAGE FORESTS, COMBAT DESERTIFICATION, AND HALT AND REVERSE LAND DEGRADATION AND HALT BIODIVERSITY LOSS

- **15.5** Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species
- **15.6** Promote fair and equitable sharing of the benefits arising from the utilization of genetic resources and promote appropriate access to such resources, as internationally agreed
- **15.7** Take urgent action to end poaching and trafficking of protected species of flora and fauna and address both demand and supply of illegal wildlife products
- **15.8** By 2020, introduce measures to prevent the introduction and significantly reduce the impact of invasive alien species on land and water ecosystems and control or eradicate the priority species
- **15.9** By 2020, integrate ecosystem and biodiversity values into national and local planning, development processes, poverty reduction strategies and accounts

GOAL 14. CONSERVE AND SUSTAINABLY USE THE OCEANS, SEAS AND MARINE RESOURCES FOR SUSTAINABLE DEVELOPMENT

- **14.a** Increase scientific knowledge, develop research capacity and transfer marine technology, taking into account the Intergovernmental Oceanographic Commission Criteria and Guidelines on the Transfer of Marine Technology, in order to improve ocean health and to enhance the contribution of marine biodiversity to the development of developing countries, in particular small island developing States and least developed countries
- **14.b** Provide access for small-scale artisanal fishers to marine resources and markets
- **14.c** Enhance the conservation and sustainable use of oceans and their resources by implementing international law as reflected in the United Nations Convention on the Law of the Sea, which provides the legal framework for the conservation and sustainable use of oceans and their resources, as recalled in paragraph 158 of “The future we want”

GOAL 15. PROTECT, RESTORE AND PROMOTE SUSTAINABLE USE OF TERRESTRIAL ECOSYSTEMS, SUSTAINABLY MANAGE FORESTS, COMBAT DESERTIFICATION, AND HALT AND REVERSE LAND DEGRADATION AND HALT BIODIVERSITY LOSS

- **15.a** Mobilize and significantly increase financial resources from all sources to conserve and sustainably use biodiversity and ecosystems
- **15.b** Mobilize significant resources from all sources and at all levels to finance sustainable forest management and provide adequate incentives to developing countries to advance such management, including for conservation and reforestation
- **15.c** Enhance global support for efforts to combat poaching and trafficking of protected species, including by increasing the capacity of local communities to pursue sustainable livelihood opportunities

STRATEGIES FOR RESILIENCE BUILDING...

- ❖ Need to create earth-friendly interactions
- ❖ This will require leaning heavily on the SDGs
- ❖ In this context, we need to ensure sustainable consumption and production patterns, as well as building resilient infrastructure, promoting inclusive and sustainable industrialization and fostering innovation.

STRATEGIES FOR RESILIENCE BUILDING...

- ❖ Our development trajectory will require the attributes of resilience building in all aspects
- ❖ For example, Ifejika Speranza (2010) as cited by Okali (2012) lists factors that contribute to enhancing these attributes in relation to climate change, particularly at the farm level, in a smallholder agricultural system, and which are also applicable nature management, to include:

BUILDING RESILIENCE

(i) for Buffer Capacity:

- ✓ Diversity of livelihood options;
- ✓ Raised human capital endowments;
- ✓ Improved rights and access to livelihood resources;
- ✓ Improved incomes;

BUILDING RESILIENCE

- ✓ Enhanced site specific knowledge;
- ✓ Policies that serve as incentives;
- ✓ A tendency towards stewardship, rather than just exploitation;
- ✓ Enhanced environmental benefits.

BUILDING RESILIENCE

(ii) for Self Organization:

- ✓ Dependence on local resources;
- ✓ Cooperation and networking among components of the system;
- ✓ Ownership of resources;
- ✓ Degree of dependence on indigenous knowledge;
- ✓ Flexibility in decision making.

BUILDING RESILIENCE

(iii) for Increasing Adaptive Capacity:

- ✓ Opportunities for knowledge combination, promoted by existence of a variety of learning platforms;
- ✓ Functioning feedback mechanisms: especially among stakeholders – farmers, extension officers, researchers, policymakers; NGOs
- ✓ Narrowing of power differentials;
- ✓ Reliance on indigenous knowledge.

In Sum...

- ✓ What happens in countries is what happens to the planet!
- ✓ These challenges call for new and ingenious approaches to development
- ✓ Unfortunately, Africa is always at the wrong end of the problem
- ✓ But we can succeed if we act decisively. Only business unusual, not business as usual will help.

CONCLUDING REMARKS

- ✓ Strategies for resilience building must be both local and global, since every part of the world will be affected, even though developing countries will be most affected.
- ✓ The overall objectives are to stop all human actions that contribute to cause the problem and if possible reverse the trend, and to attain a significant level of adaptation in vulnerable areas and sectors so that humankind as we know it can continue to survive and develop.

CONCLUDING REMARKS

- ✓ The urgent challenge, especially to developing countries like ours is to develop adaptation strategies that are matched to ascertained vulnerabilities of sectors and geographical zones.
- ✓ Much research is needed to ascertain these vulnerabilities and adaptation options.

I THANK THE **FFPS** AND THE
ORGANIZERS OF THIS WEBINAR
FOR THE OPPORTUNITY TO
SHARE MY THOUGHTS ON THIS
SUBJECT