Melissa D. Ho, Ph.D.
SVP, Freshwater & Food
WWF-US

NOURISH 2019
PLANET | FOOD SYSTEM | DAIRY

June 18, 2019

Protecting Resources and Building Anew: Towards a sustainable agricultural future


WWF

WWF’s MISSION

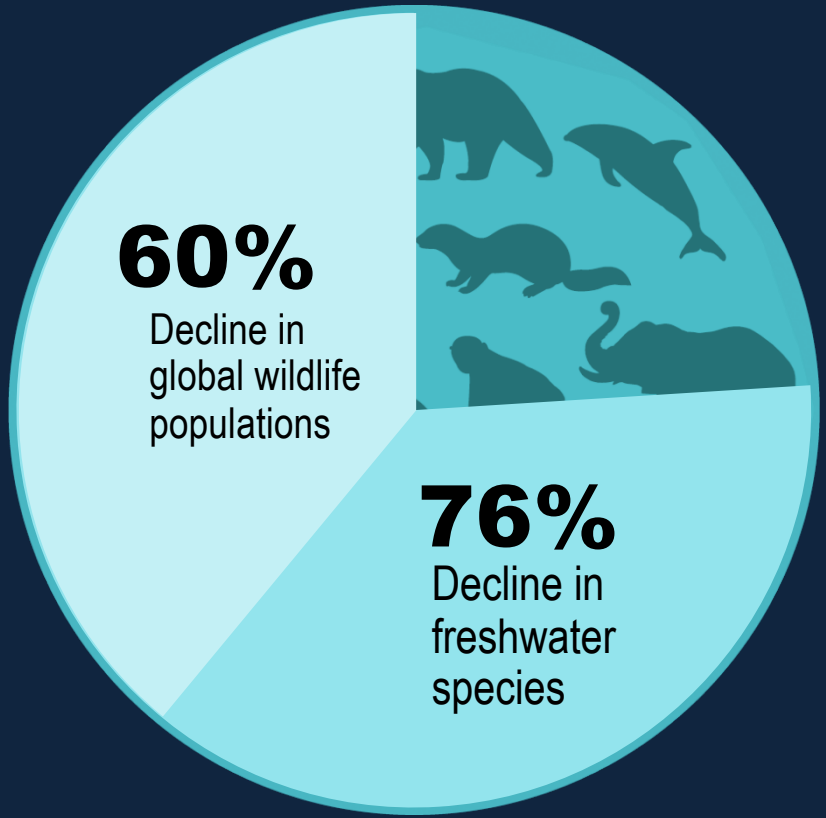
To stop the degradation of the planet's natural environment and to build a future in which people live in harmony with nature

The Year 2020: Setting the Global Agenda to 2030

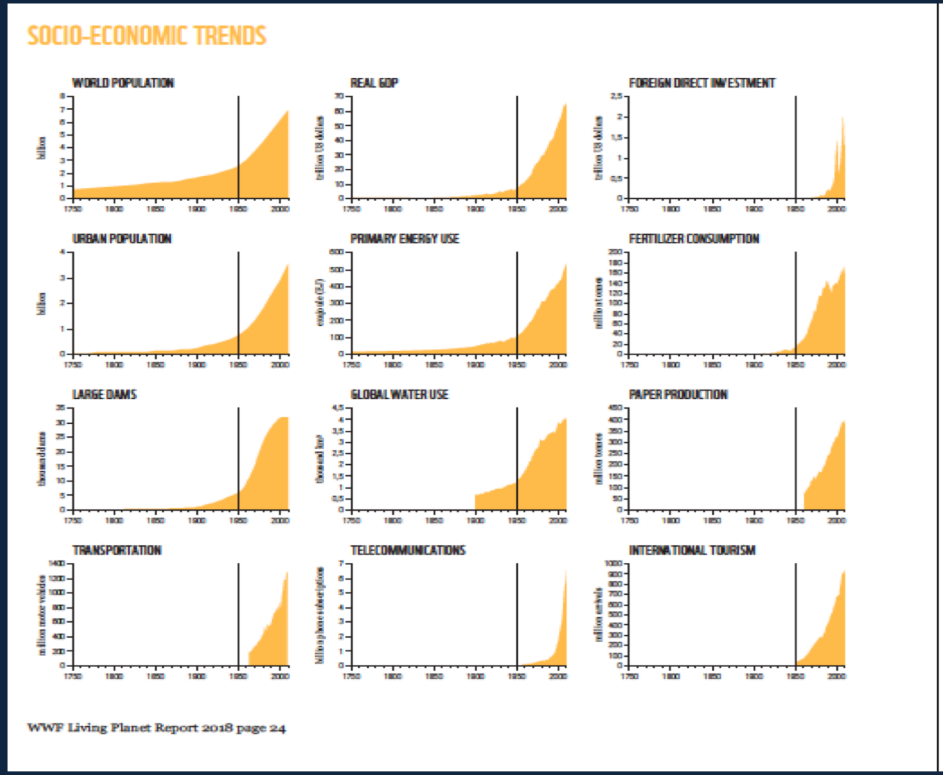
The Living Planet Report: Tracking global biodiversity

A planet under pressure

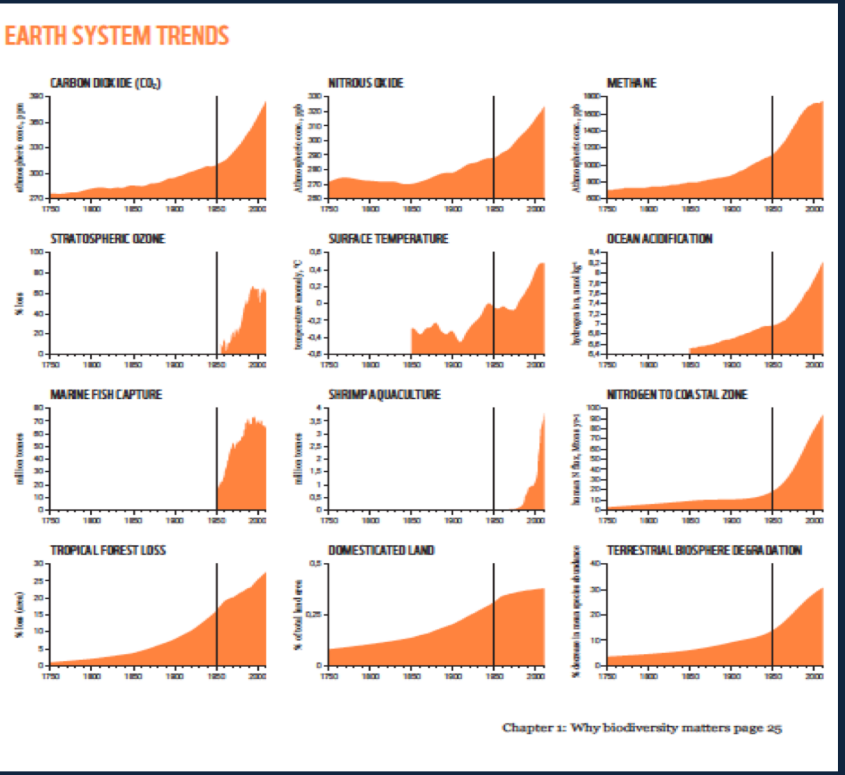
According to the Living Planet Index, the planet has seen a massive decline in biodiversity since 1970



The Anthropocene:
The Great Human Acceleration

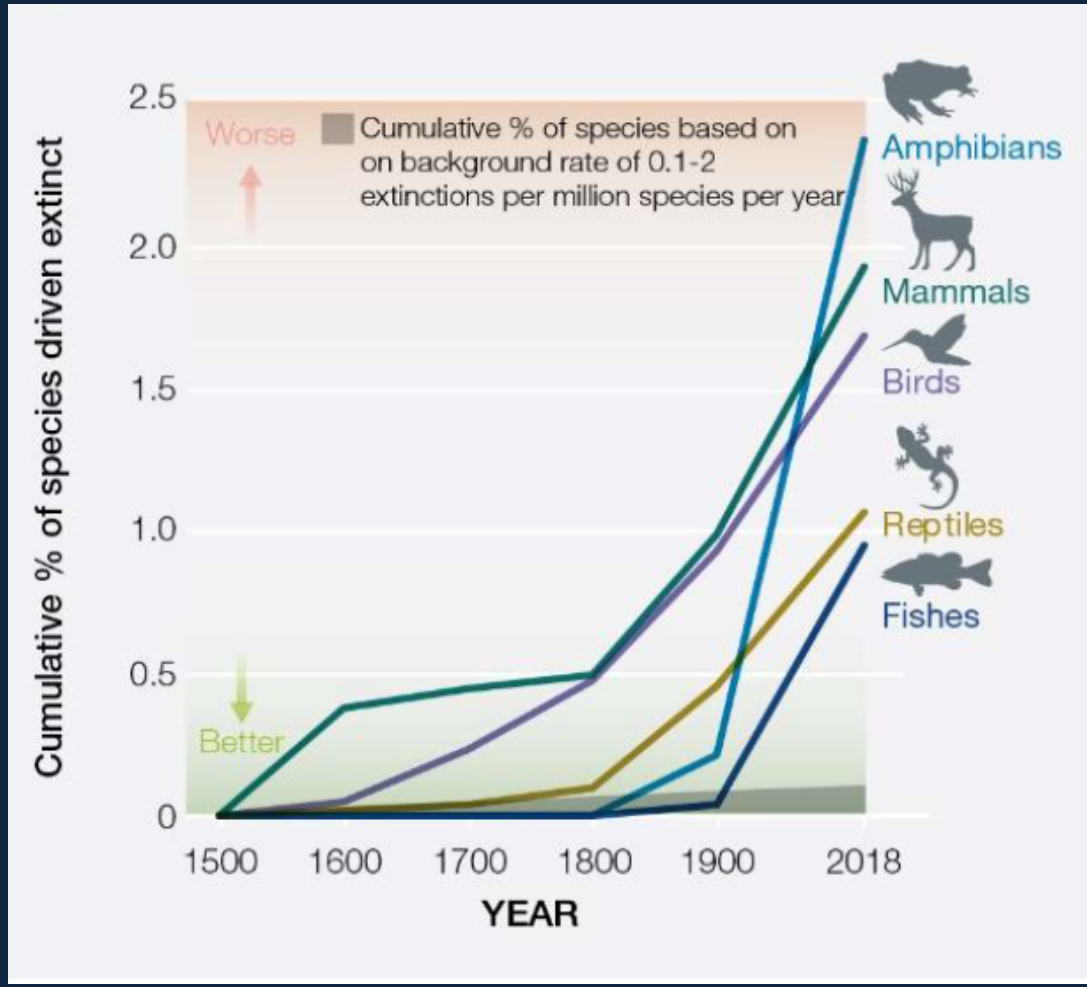


WWF Living Planet Report 2018 page 24



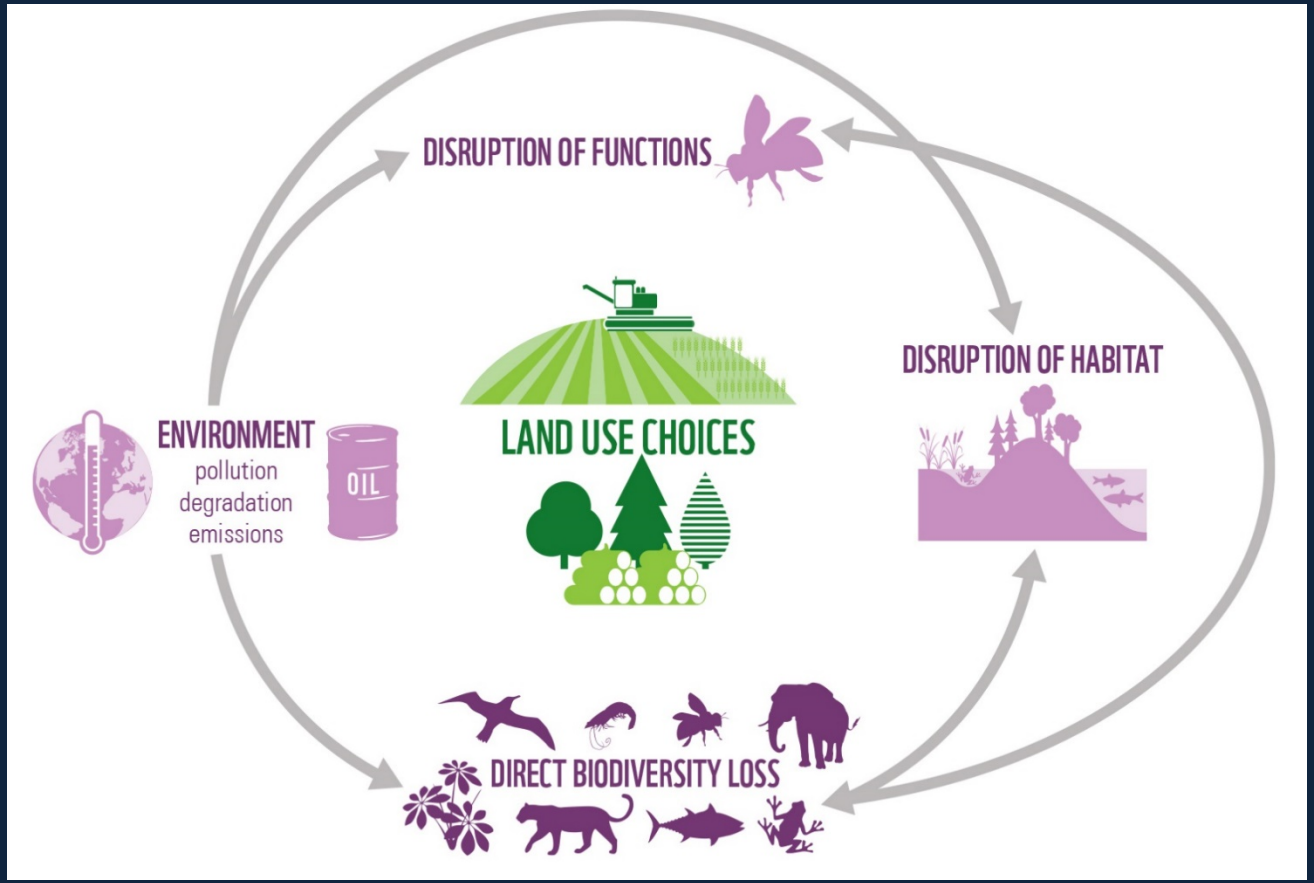
Chapter 1: Why biodiversity matters page 25

More species threatened now than ever before in human history

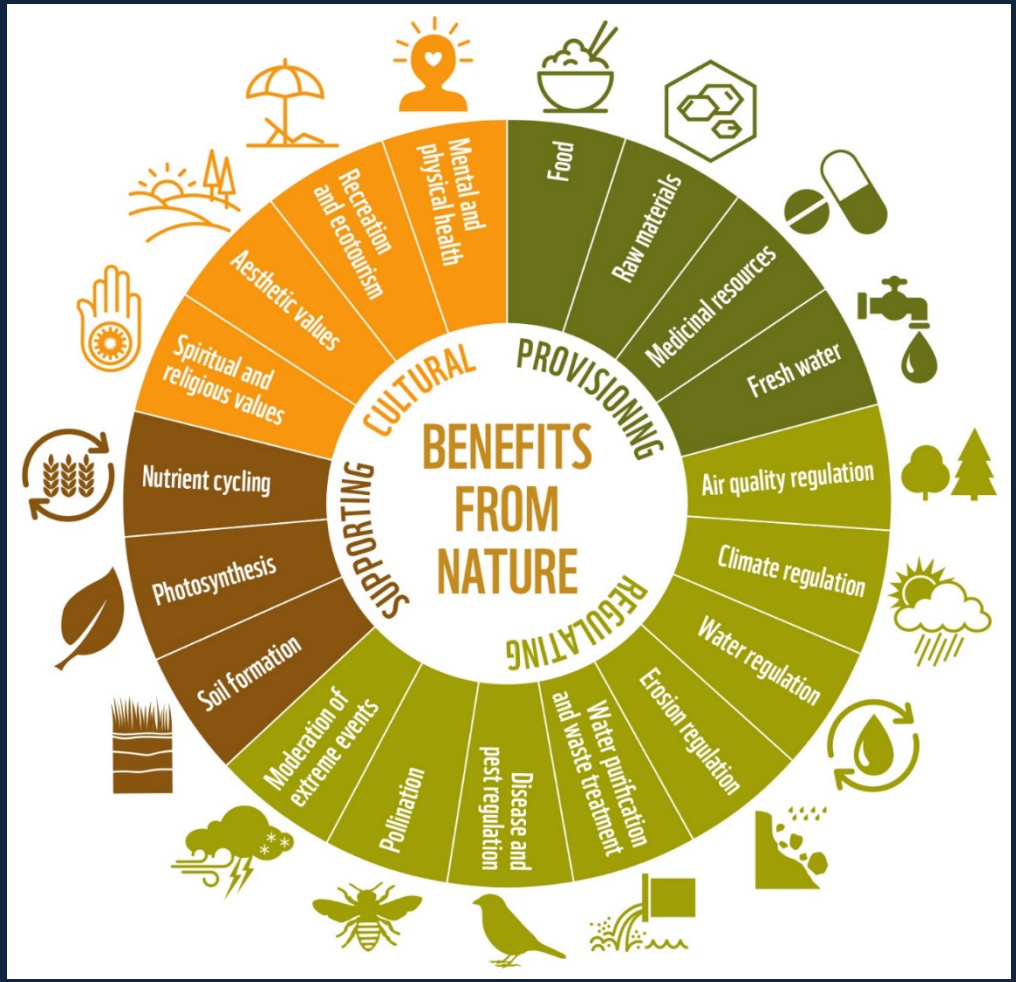


Source: IPBES Global Assessment Report – May, 2019

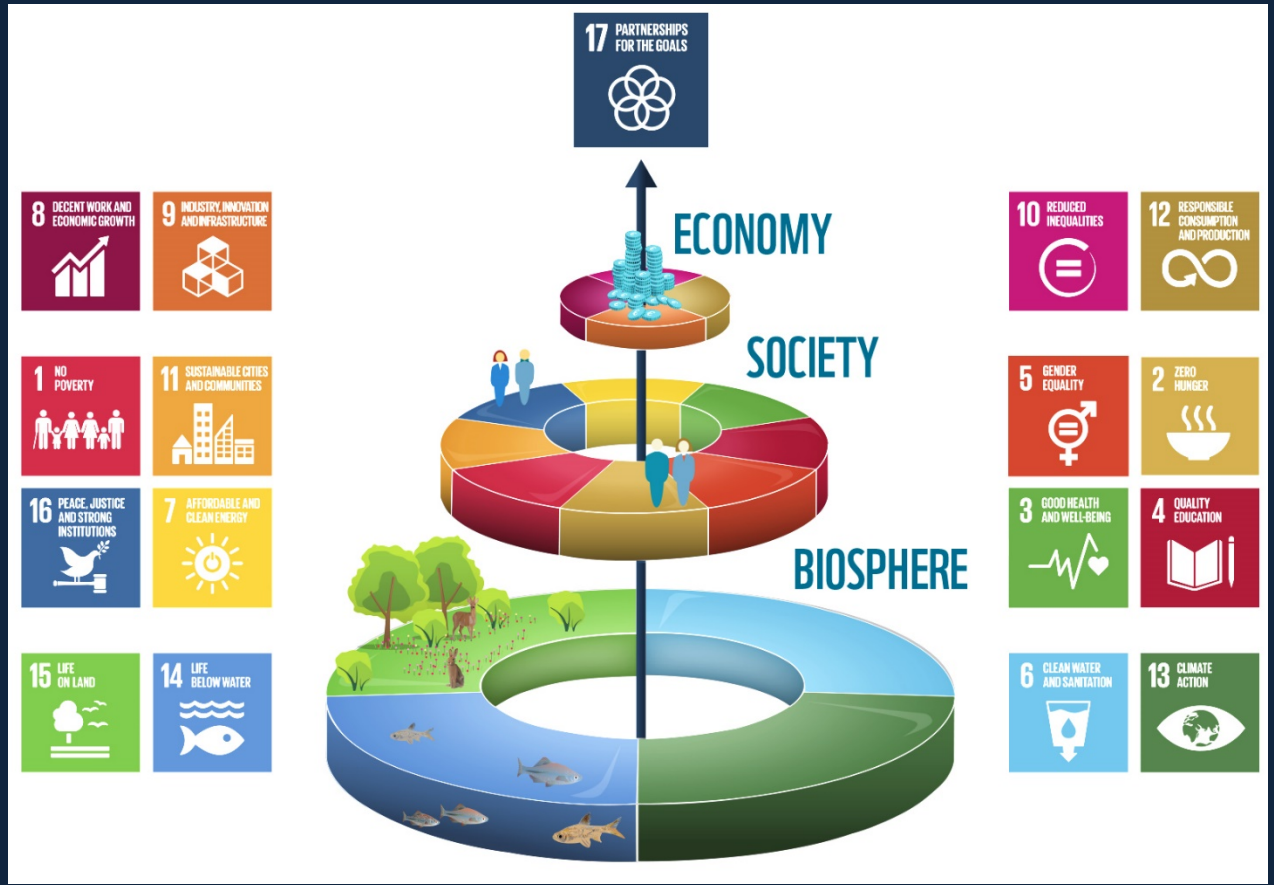
Drivers of degradation cause loss of biodiversity



Nature provides a range of benefits valued globally at over $125 trillion annually



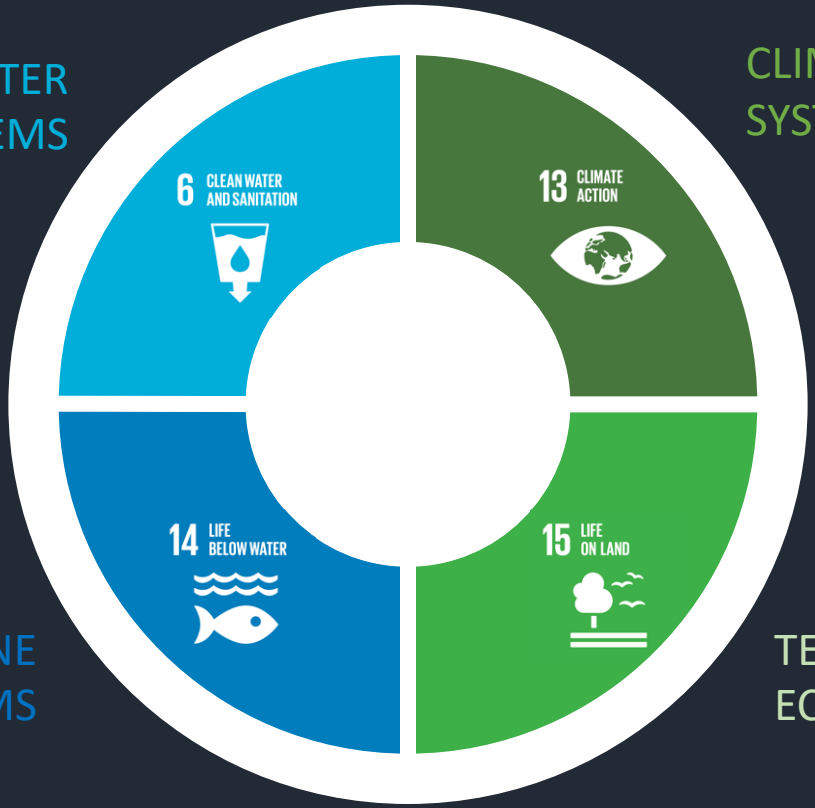
New Deal for Nature and People



Four goals define commitments and actions for planetary systems

FRESHWATER ECOSYSTEMS

CLIMATE SYSTEMS



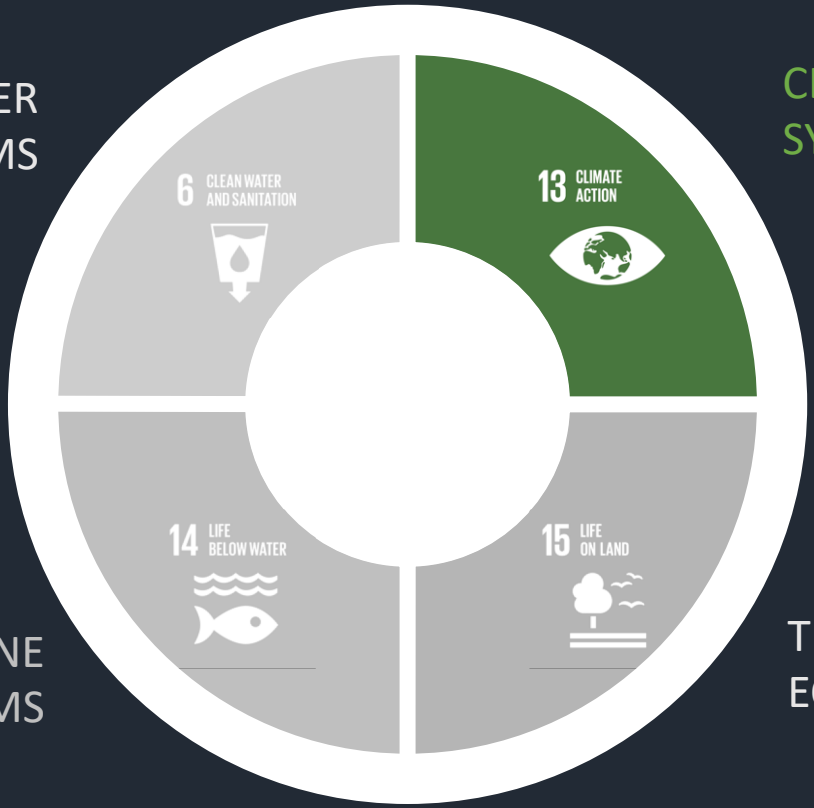
MARINE ECOSYSTEMS

TERRESTRIAL ECOSYSTEMS

Climate has received the most attention & investment

FRESHWATER ECOSYSTEMS

CLIMATE SYSTEMS



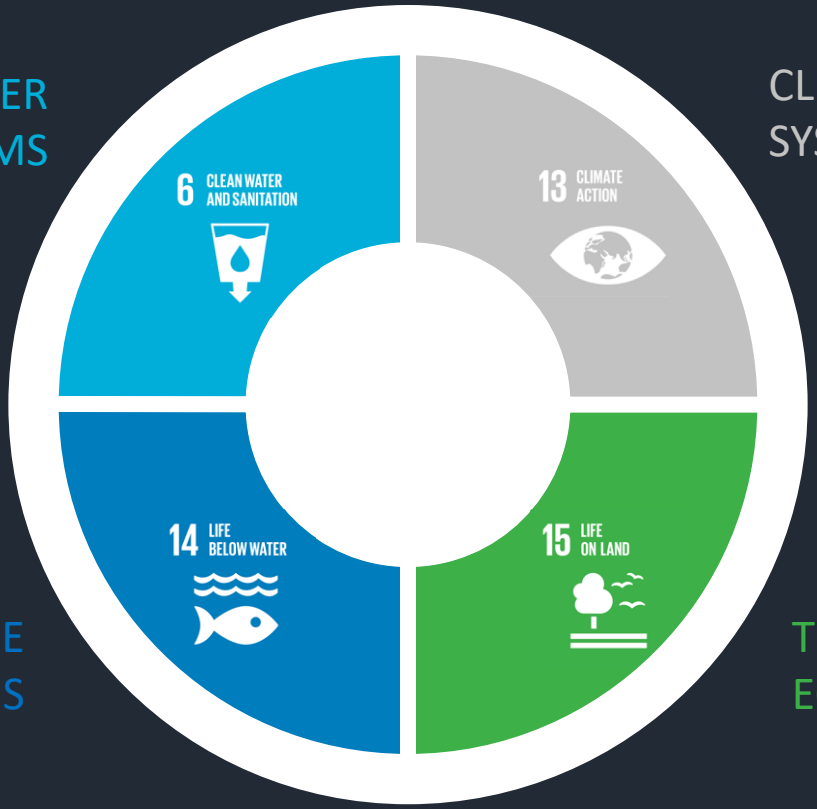
MARINE ECOSYSTEMS

TERRESTRIAL ECOSYSTEMS

The New Deal for Nature & People elevates all needed ecosystems

FRESHWATER ECOSYSTEMS

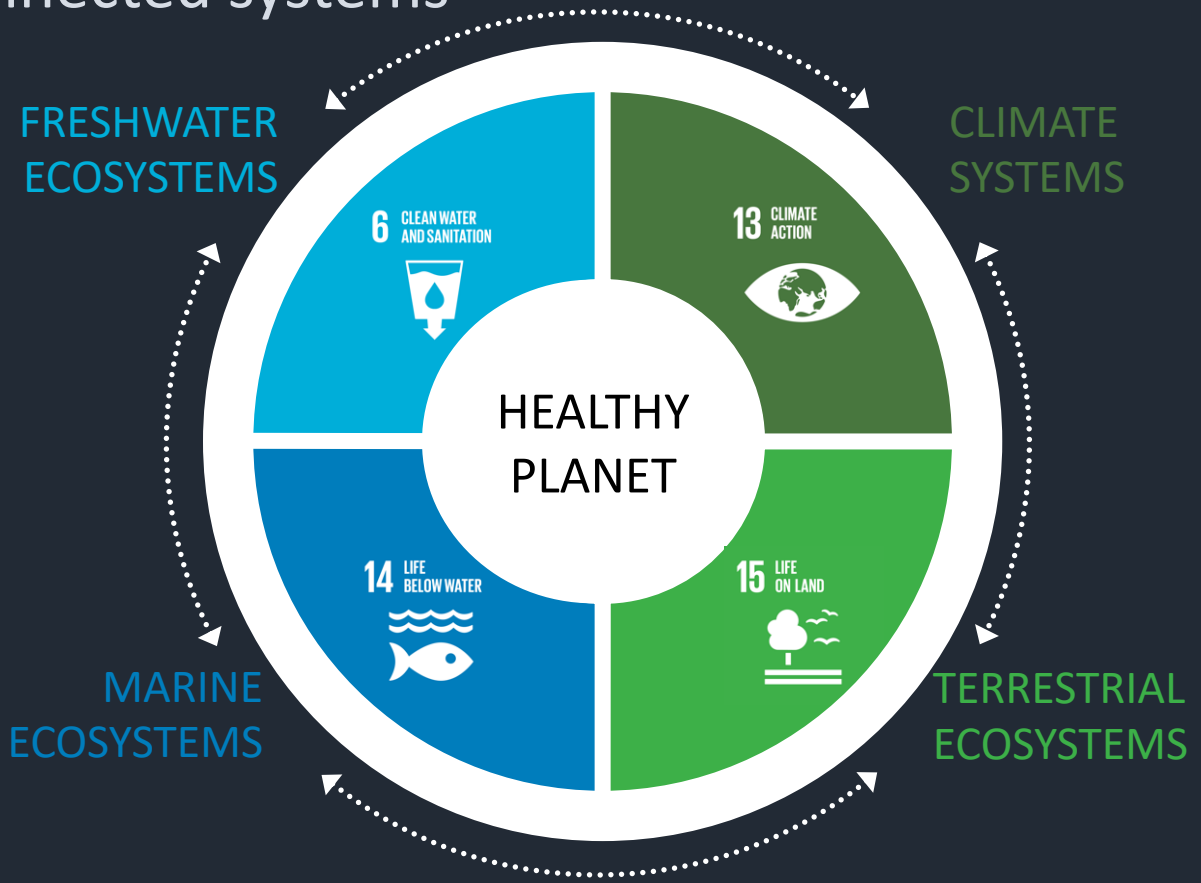
CLIMATE SYSTEMS



MARINE ECOSYSTEMS

TERRESTRIAL ECOSYSTEMS

… and aligns goals and commitments across these interconnected systems



Agricultural production is the largest threat

70% of biodiversity loss

70% of freshwater use

25% of GHG emissions

85% of marine stocks fully exploited

Most chemical use

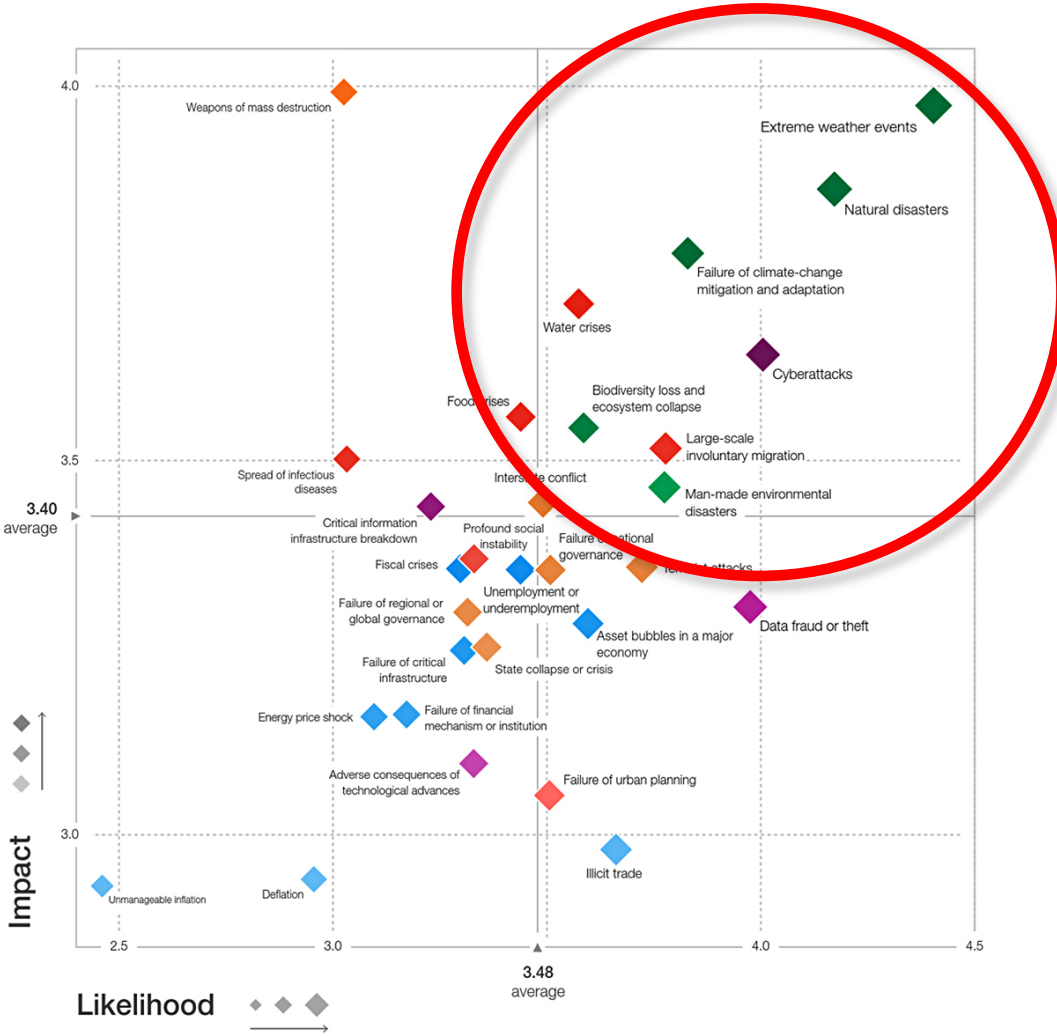
50% of topsoil loss

WORLD ECONOMIC FORUM

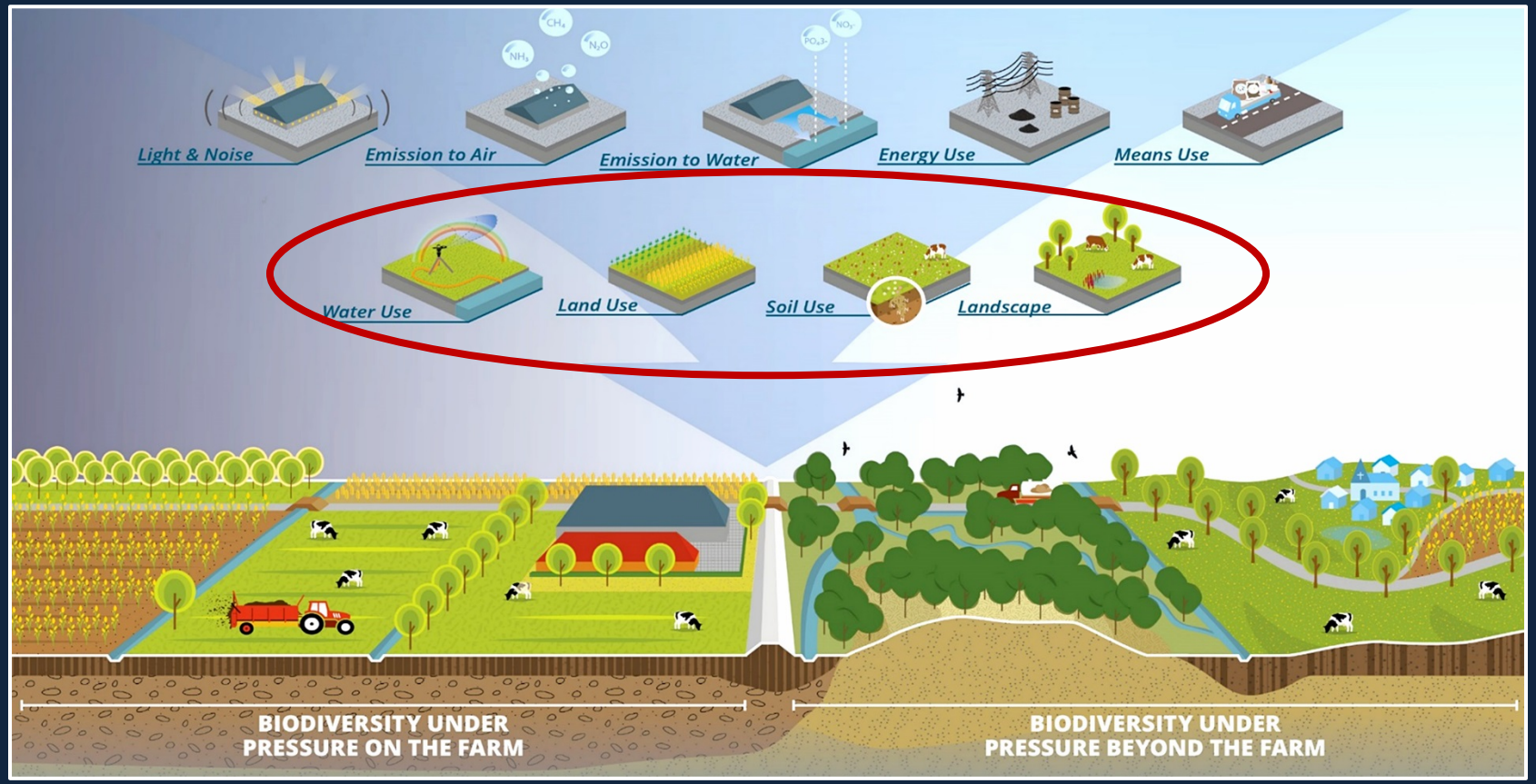
COMMITTED TO IMPROVING THE STATE OF THE WORLD

Insight Report

The Global Risks Report 2018
13th Edition



Dairy sector must be part of the solution for Nature



Dairy's carbon footprint

- Dairy is globally 20 percent of global livestock GHG emissions, or around 3 percent of human induced GHG emissions
- The majority of emissions of a gallon of milk produced comes from: 1) feed production/land conversion; 2) enteric fermentation; and 3) manure management
- Due to concerted effort by industry, emission intensity, GHG per kg of milk, has declined by ~11 percent from 2005-2015, but overall emissions have increased by ~18 percent due to growth in the sector
- Large variation in emission intensity exists between and within regions due to differences in management practices – poses opportunity for continuous improvement

Science Based Targets Initiative (SBTi)

- Over 560 companies have committed to setting GHG emissions reductions targets – of which 60 are food companies & retailers
- Example dairy product manufacturers: Arla, Bel Group, Ben& Jerry's, Chobani, Danone, General Mills, Nestle, Schreiber Foods, Stonyfield, Synlait Milk
- Examples of retailers: McDonalds, Mars, Hershey's, Barry Callebaut, Walmart, Tesco, Ahold Delhaize

SCIENCE BASED TARGETS
DRIVING AMBITIOUS CORPORATE CLIMATE ACTION

CDP
DISCLOSURE INSIGHT ACTION

WORLD RESOURCES INSTITUTE

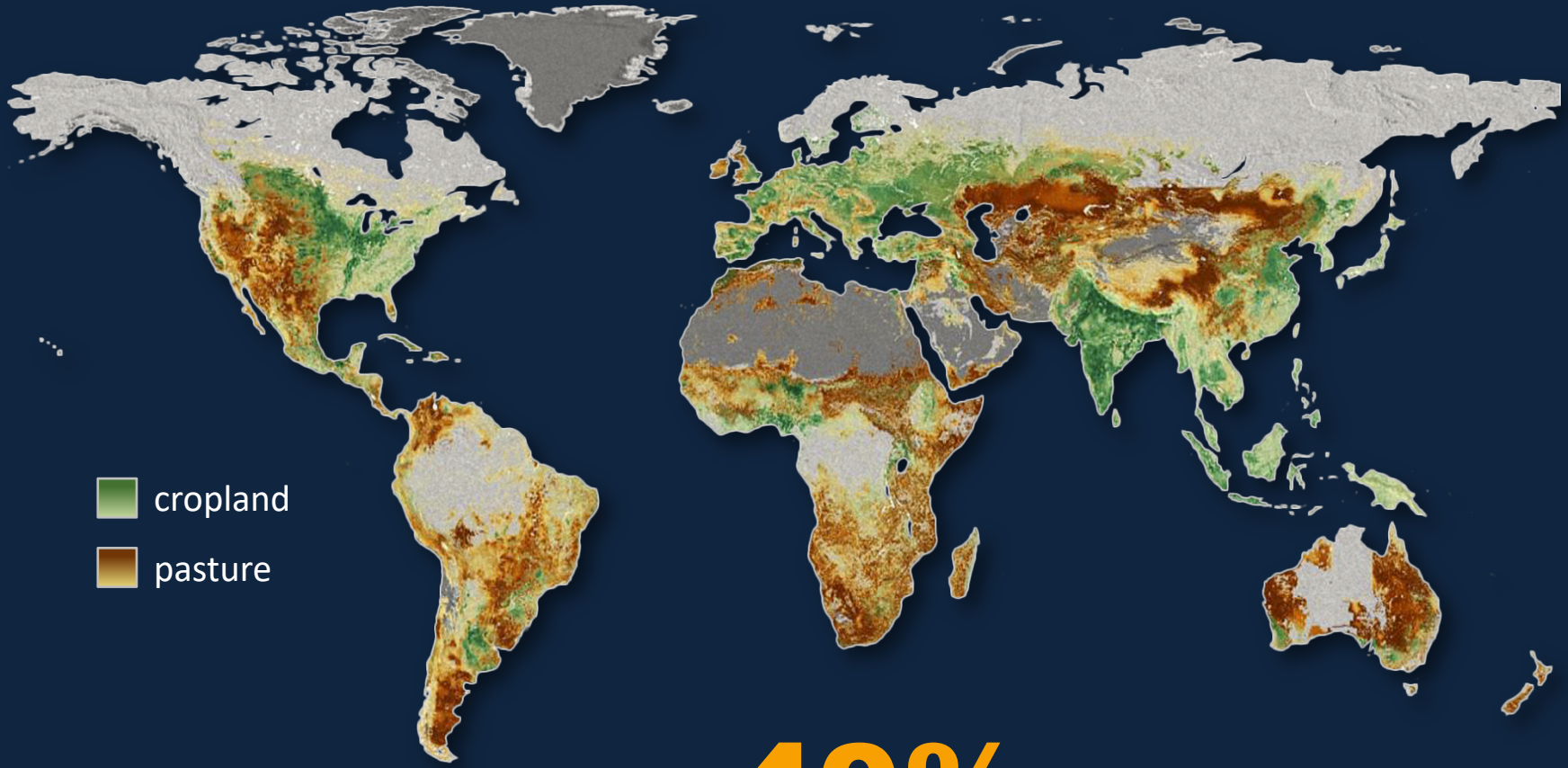
WWF

UN GLOBAL COMPACT

Demand for dairy increasing

- FAO projects food use of dairy products in milk equivalent is projected to increase 63% from 2005/2007 to 2050
- ICAR projects total demand for milk to increase from 76 million tonnes in 2000 to 182 million tonnes in 2030, 54% increase in per capita consumption


How sustainable is your feed?



Source: UMN Global Landscapes Initiative

40% for agriculture

Where will feed come from for a globally expanding dairy sector?

- **45%** of total livestock GHG
- **98%** of total livestock water
- Pasture and land for feed: almost **80%** total agricultural land

Source: FAO, 2013. Mekonnen-Hoekstra, 2012

Soybean meal content in animal feed, Europe

9.4%
Pig

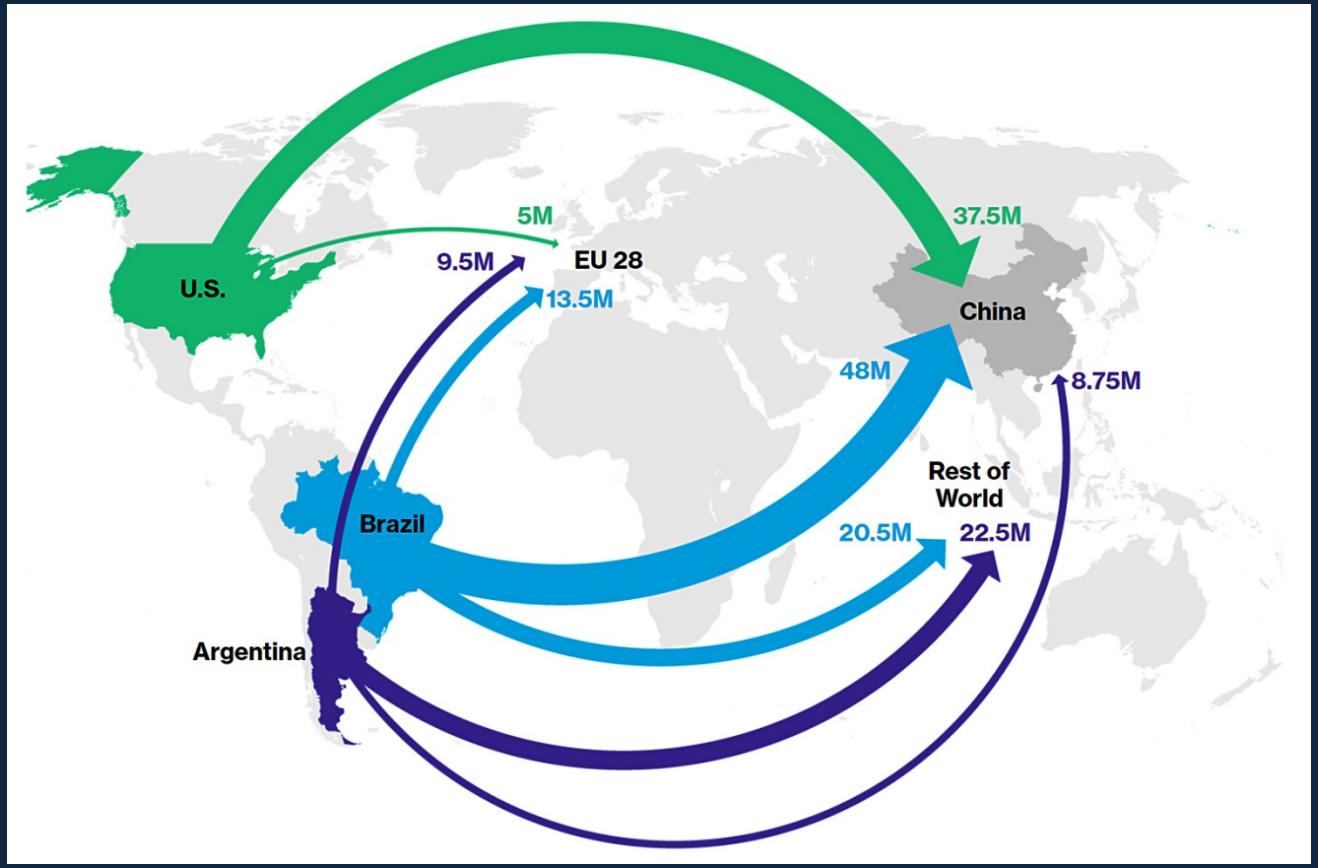
26%
Poultry for meat

15.4%
Eggs

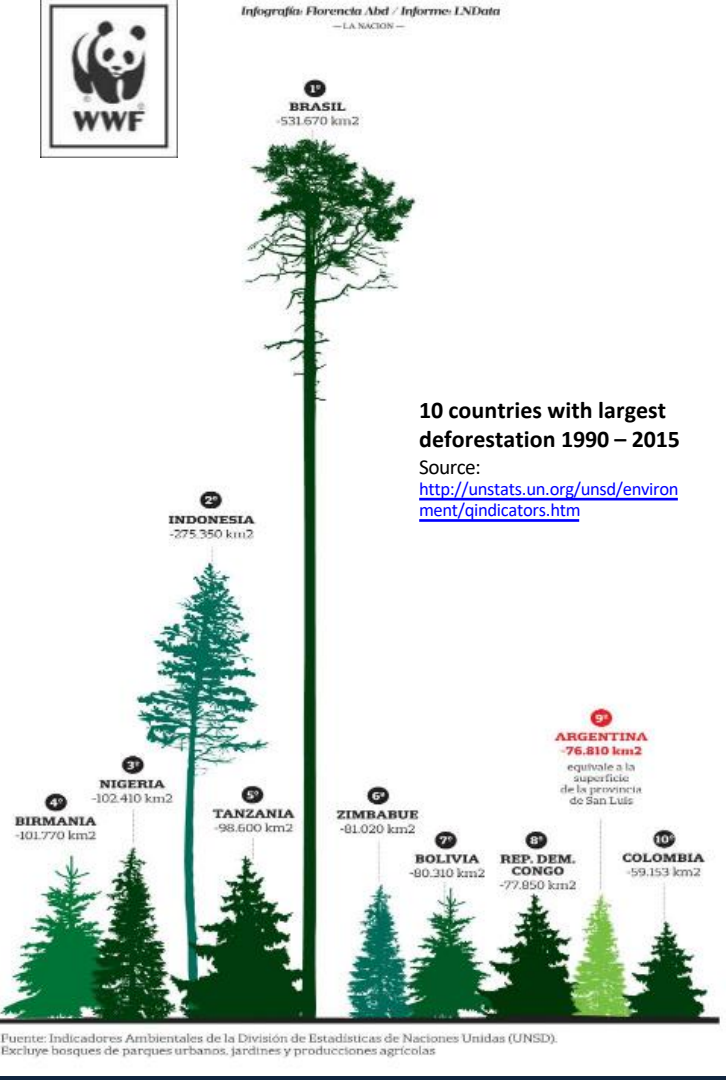
15.4%
Dairy cattle

Source: European Soy Monitor, IDH, IUCN, 2019

Global soy trade



Source: Rabobank



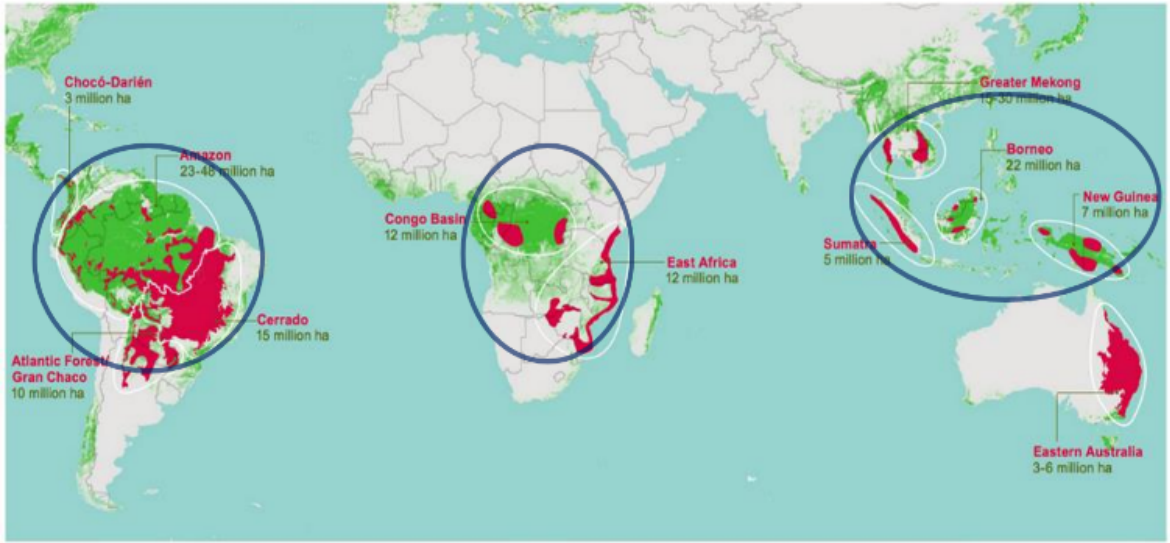
10 countries with largest deforestation 1990 – 2015

Source: http://unstats.un.org/unsd/environment/qindicators.htm

By 2030, over 80% of future deforestation will be confined to just 11 places

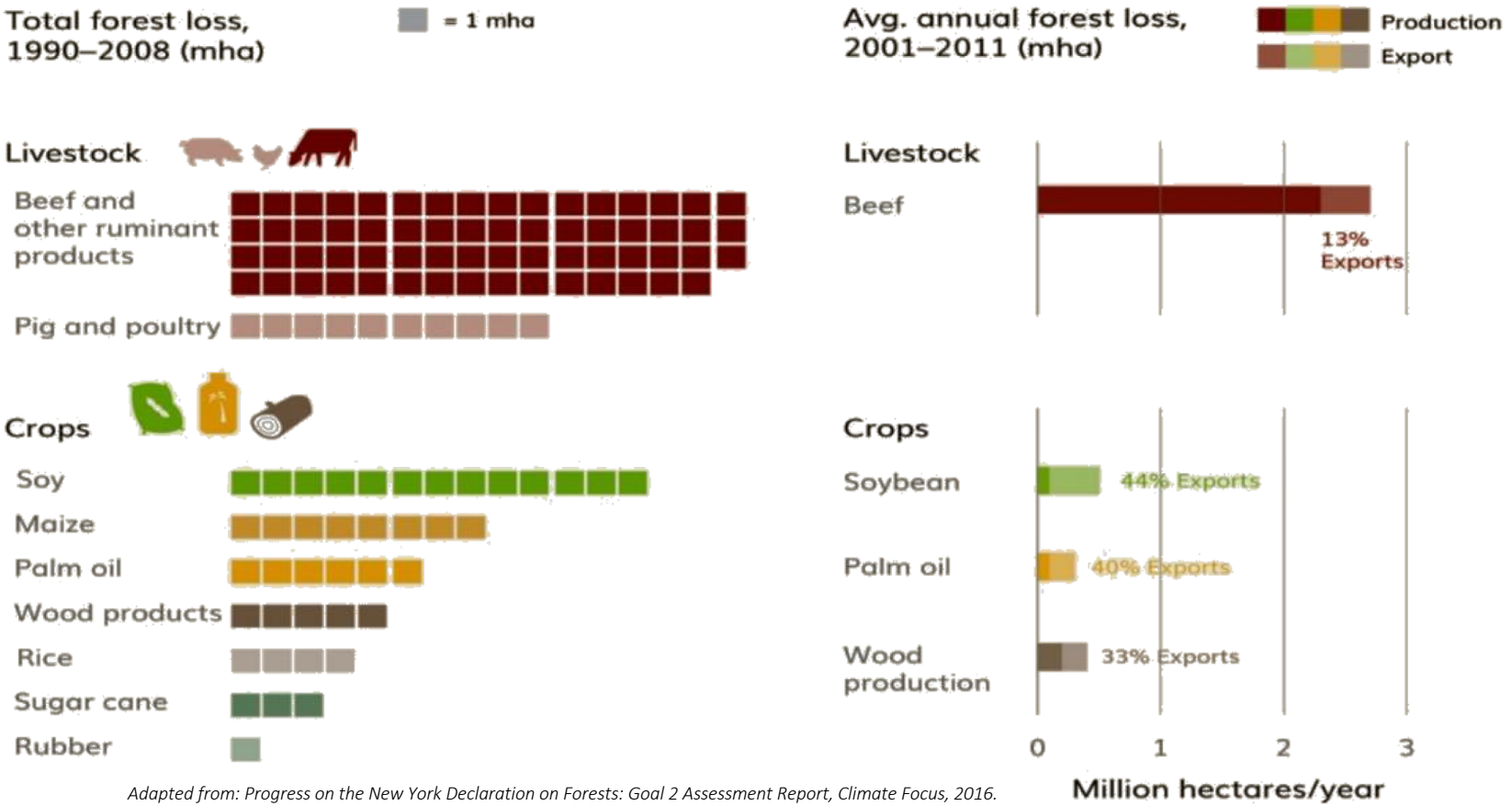
MAP OF DEFORESTATION FRONTS

Projected 2015 - 2030



WWF Living Forest Report 2015

Beef and Soy: Leading Drivers of Deforestation



Adapted from: Progress on the New York Declaration on Forests: Goal 2 Assessment Report, Climate Focus, 2016.

The Cerrado is a critical landscape under threat

- Neo-tropical savanna covering 24% of Brazil's territory
- 5% of the world's biodiversity, including at least: 11,430 plants (40% endemic), 1,800 tree species, 250 mammals, 856 birds, over 450 reptiles & amphibians, 1,300 fishes
- Source of 8 out of 12 Brazilian river basins and so is an essential source of freshwater
- Brazil's breadbasket – 61% of soy area
- Half the regional rainfall and temperature is regulated by the presence of native vegetation

The Cerrado

The Cerrado Manifesto

The undersigned civil society organizations call for immediate action in defense of the Cerrado by companies that purchase soy and meat from within the biome, as well as by investors active in these sectors. This includes the adoption of effective policies and commitments to eliminate deforestation and conversion of native vegetation and disassociate their supply chains from recently converted areas.

September 11th. 2017

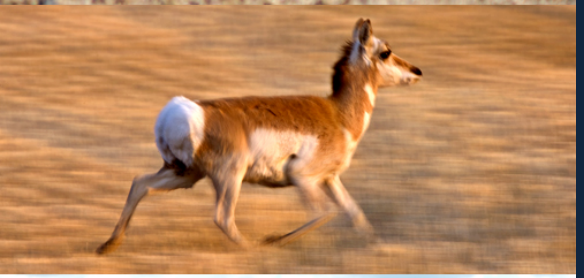
MANIFESTO COSIGNERS

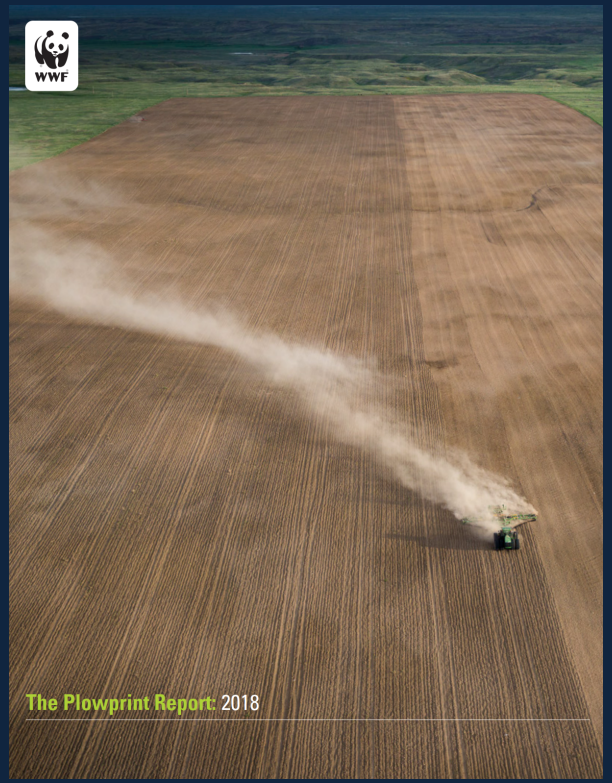
- WWF-Brazil
- Greenpeace Brazil
- Amazon Environmental Research Institute (IPAM)
- Institute of Agricultural and Forest Management and Certification (Imaf
- The Nature Conservancy (TNC)
- Earth Innovation Institute (EII)
- Institute for Society, Population and Nature (ISPN)
- Conservation International – Brazil (CI-Brasil)
- Association for the Preservation of the Upper Itajaí Valley (APREMAV)
- Green Initiative
- GeoLab/USP
- Lagesa/UFMG
- Lapig/UFG
- PHS
- Life Center Institute (ICV)
- Amazon Institute of People and Environment (IMAZON)
- Socio-Environmental Institute (ISA)
- Pro-Nature Foundation (Funatura)
- Conservation Strategy Fund (CSF)
- Minas Gerais Association for Environmental Defense (AMDA
- LABAQUAC/Hippocampus Project
- Ecological Research Institute (IPÊ)
- Boticário Group Foundation for Nature Protection
- BVRio Institute
- Law for a Green Planet Institute
- Amigos da Terra - Amazônia Brasileira
- Wildlife Conservation Society – Brazil (WCS-Brazil)
- Institute for the Conservation and Sustainable Development of the Amazon (IDESAM)
- Çarakura Institute
- Biodiversitas Foundation
- American Man Museum Foundation (FUMDHAM)
- National Wildlife Federation (NWF)
- Ecoa – Ecology and Action
- GTA Network
- Zero Deforestation Group
- Forest Code Observatory

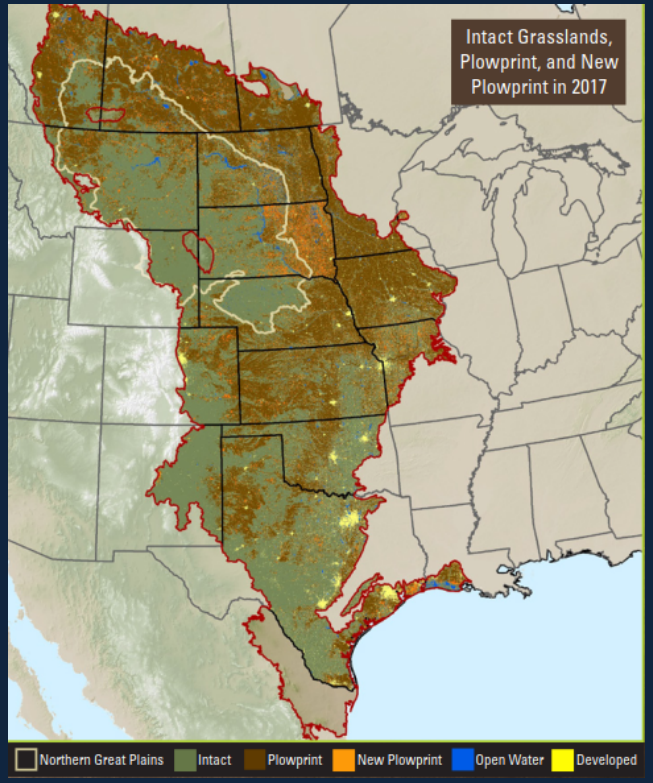
The North American Great Plains

- **Nearly 70% of land still intact in the Northern Great Plains, most species still here though not all**
- **288,000 square miles (746,000 sq km) spanning eleven U.S. states, two Canadian provinces and Mexico**
- **One of four places left globally where large expanses of temperate grasslands are still intact**

The Plowprint report tracks grasslands conversion in the Great Plains







AMAZON

3.2 BILLION METRIC TONS OF CARBON DIOXIDE EMISSIONS

were released into the atmosphere due to plow-up of the grasslands from 2009-2015.

THIS IS THE EQUIVALENT OF 670 MILLION EXTRA CARS ON THE ROAD!

TRILLIONS OF GALLONS OF WATER ARE FILTERED THROUGH THE PLAINS.

Each Unplowed Acre Can Store Thousands of Gallons of Water.

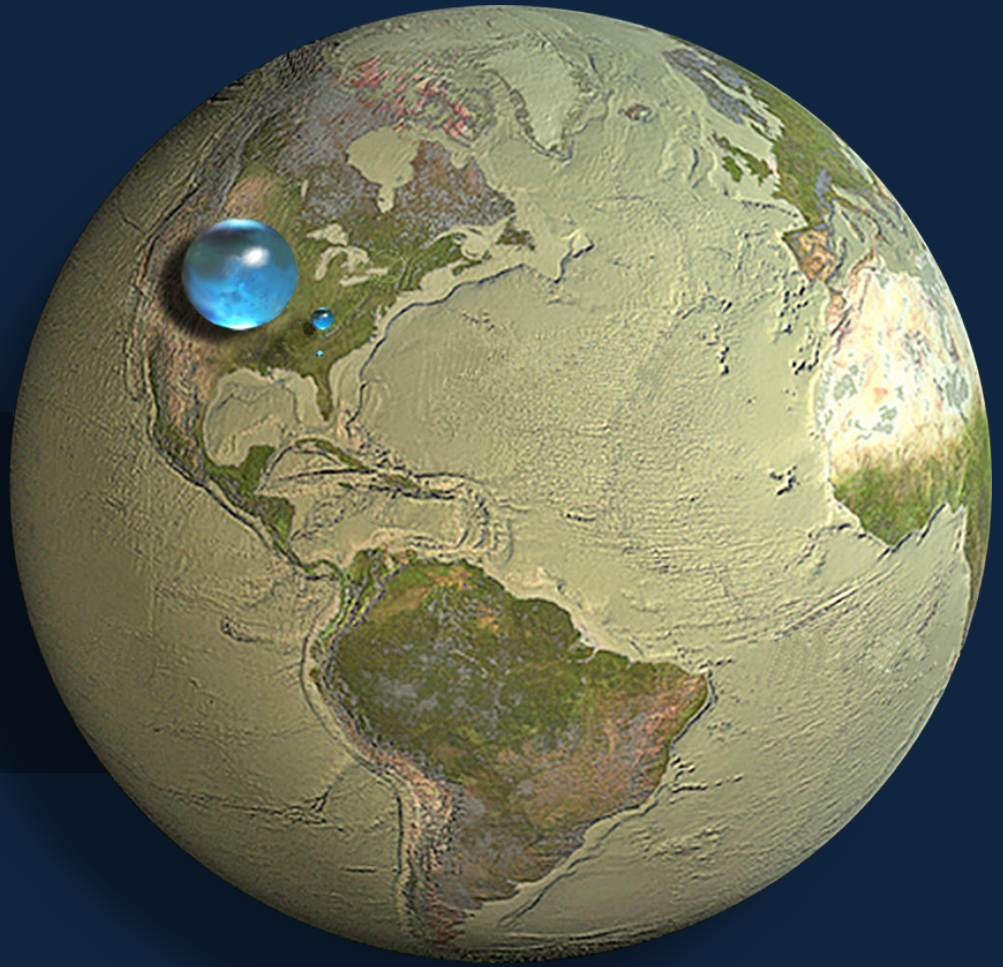
THIS WATER BECOMES DRINKING WATER FOR MILLIONS OF PEOPLE & SUPPORTS HEALTHY FISHERIES IN THE GULF OF MEXICO.


The Nature Conservancy
GLOBAL
SOIL BIODIVERSITY
INITIATIVE A SCIENTIFIC EFFORT
THE SAMUEL ROBERTS
NOBLE
FOUNDATION
FOODSHOT GLOBAL
SOIL
HEALTH
PARTNERSHIP
FFAR
Foundation for Food
and Agriculture Research
ECOSYSTEM
SERVICES MARKET
CONSORTIUM
THE
LAND
INSTITUTE
SOIL HEALTH
INSTITUTE
RODALE
INSTITUTE

Freshwater in a single drop

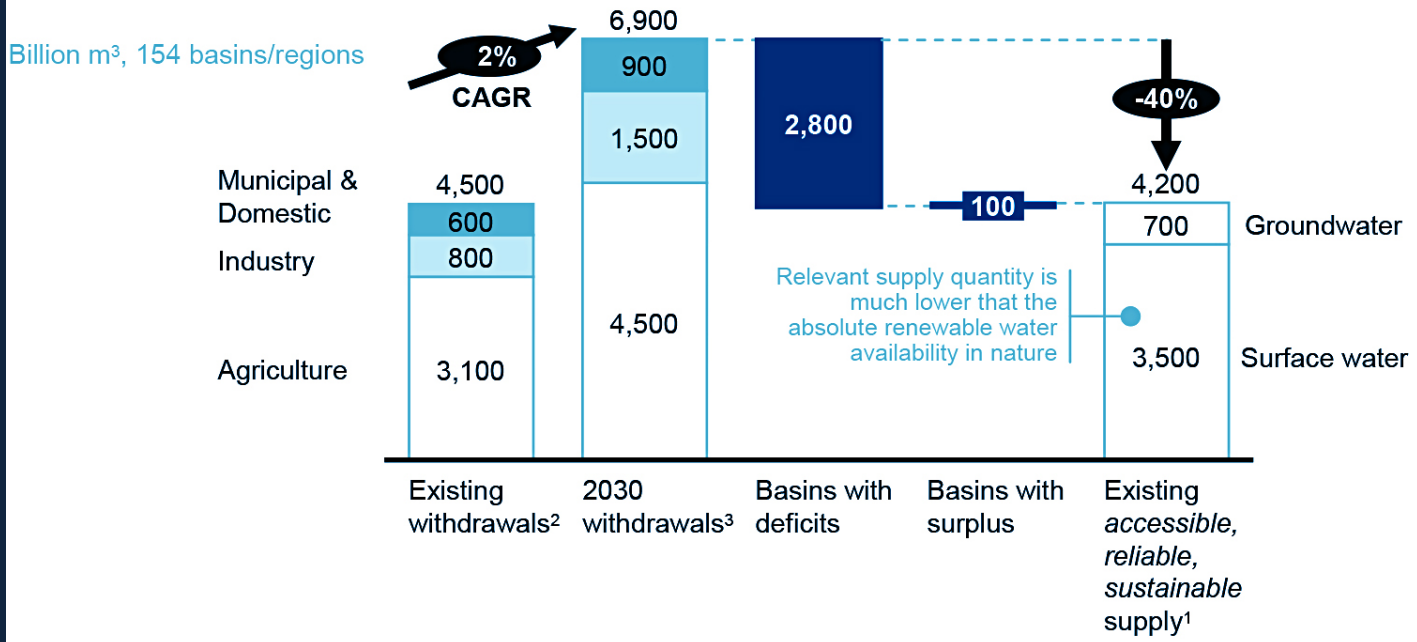
All water on, in, and above the Earth

- Liquid fresh water
- Freshwater lakes and rivers



Source: USGS

GLOBAL WATER GAP of 40% by 2030



1 Existing supply which can be provided at 90% reliability, based on historical hydrology and infrastructure investments scheduled through 2010; net of environmental requirements
2 Based on 2010 agricultural production analyses from IFPRI
3 Based on GDP, population projections and agricultural production projections from IFPRI; considers no water productivity gains between 2005-2030

SOURCE: Water 2030 Global Water Supply and Demand model; agricultural production based on IFPRI IMPACT-WATER base case

THE WATER RISK FILTER

www.waterriskfilter.panda.org

WWF has leveraged our extensive local networks and global expertise to develop strategies to facilitate collective action in WWF's priority rivers, and engage communities, businesses and government at an unprecedented scale to improve water management. The focus on collective action is essential to highlight our shared dependence on and responsibility for this vital resource. Together, we can develop solutions to achieve sustainably and equitably managed freshwater ecosystems that meet the needs of all users.

The Water Risk Filter helps users progress along the five steps of water stewardship, starting with step 2: knowledge of impact. It also inspires companies to take internal action (step 3) and join collective action initiatives (step 4) by providing concrete risk mitigation responses.

Water Risk Filter

Physical Water Risk
high
low

1. Assess your water risks

	COMPANY related risk results	BASIN related risk results
Physical risk	2.1	3.4
Scarcity (quantity)	2.2	2.9
Pollution (quality)	1.4	4.0
Impact on ecosystems		4.0
Supplier's water risks	2.4	
Regulatory risk	1.5	3.2
Reputation risk	2.8	2.8
Total company and basin risk	2.2	3.3

2. Learn how to mitigate your risks

3. Join local collective action initiatives

WWF's strategy in China focuses on bringing stakeholders together at four levels: site, industrial park, sub-basin, and national. Successful pilots can be leveraged to help improve broader water management and governance.

PRODUCED IN COLLABORATION WITH KFW DEG

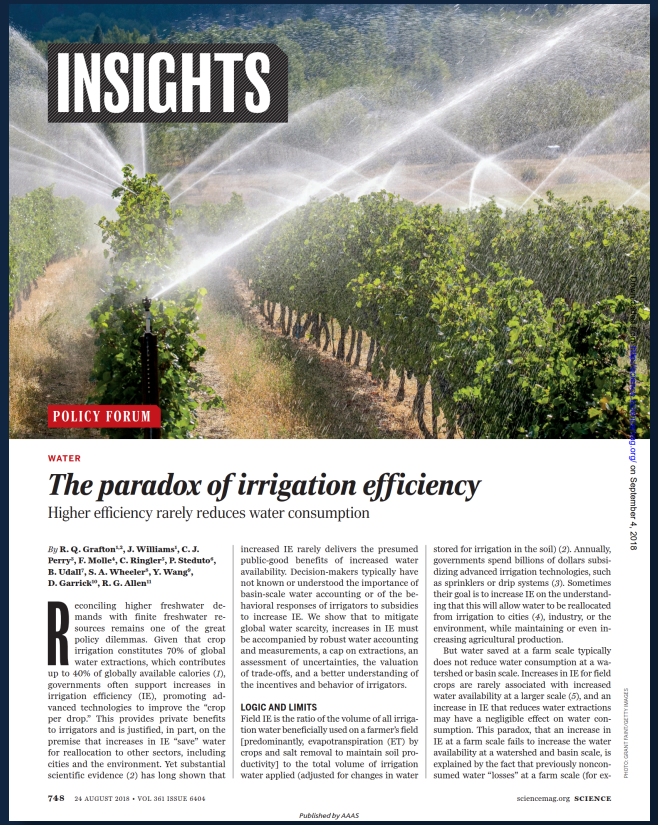
ALLIANCE FOR
WATER STEWARDSHIP

WWF Ceres
AgWater Challenge

ADM DANONE NORTH AMERICA DIAGEO General Mills HAIN CELESTIAL

Hormel Foods Kellogg's PEPSICO TARGET

Water Accounting: A systems approach



INSIGHTS

POLICY FORUM

WATER

The paradox of irrigation efficiency

Higher efficiency rarely reduces water consumption

By **R. Q. Grafton[1,2], J. Williams[3], C. J. Perry[2], F. Molle[4], C. Ringler[5], P. Steduto[6], B. Udall[7], S. A. Wheeler[8], Y. Wang[9], D. Garrick[10], R. G. Allen[11]**

Reconciling higher freshwater demands with finite freshwater resources remains one of the great policy dilemmas. Given that crop irrigation constitutes 70% of global water extractions, which contributes up to 40% of globally available calories (*1*), governments often support increases in irrigation efficiency (IE), promoting advanced technologies to improve the "crop per drop." This provides private benefits to irrigators and is justified, in part, on the premise that increases in IE "save" water for reallocation to other sectors, including cities and the environment. Yet substantial scientific evidence (*2*) has long shown that increased IE rarely delivers the presumed public-good benefits of increased water availability. Decision-makers typically have not known or understood the importance of basin-scale water accounting or of the behavioral responses of irrigators to subsidies to increase IE. We show that to mitigate global water scarcity, increases in IE must be accompanied by robust water accounting and measurements, a cap on extractions, an assessment of uncertainties, the valuation of trade-offs, and a better understanding of the incentives and behavior of irrigators.

LOGIC AND LIMITS

Field IE is the ratio of the volume of all irrigation water beneficially used on a farmer's field [predominantly, evapotranspiration (ET) by crops and salt removal to maintain soil productivity] to the total volume of irrigation water applied (adjusted for changes in water stored for irrigation in the soil) (*2*). Annually, governments spend billions of dollars subsidizing advanced irrigation technologies, such as sprinklers or drip systems (*3*). Sometimes their goal is to increase IE on the understanding that this will allow water to be reallocated from irrigation to cities (*4*), industry, or the environment, while maintaining or even increasing agricultural production.

But water saved at a farm scale typically does not reduce water consumption at a watershed or basin scale. Increases in IE for field crops are rarely associated with increased water availability at a larger scale (*5*), and an increase in IE that reduces water extractions may have a negligible effect on water consumption. This paradox, that an increase in IE at a farm scale fails to increase the water availability at a watershed and basin scale, is explained by the fact that previously nonconsumed water "losses" at a farm scale (for ex-

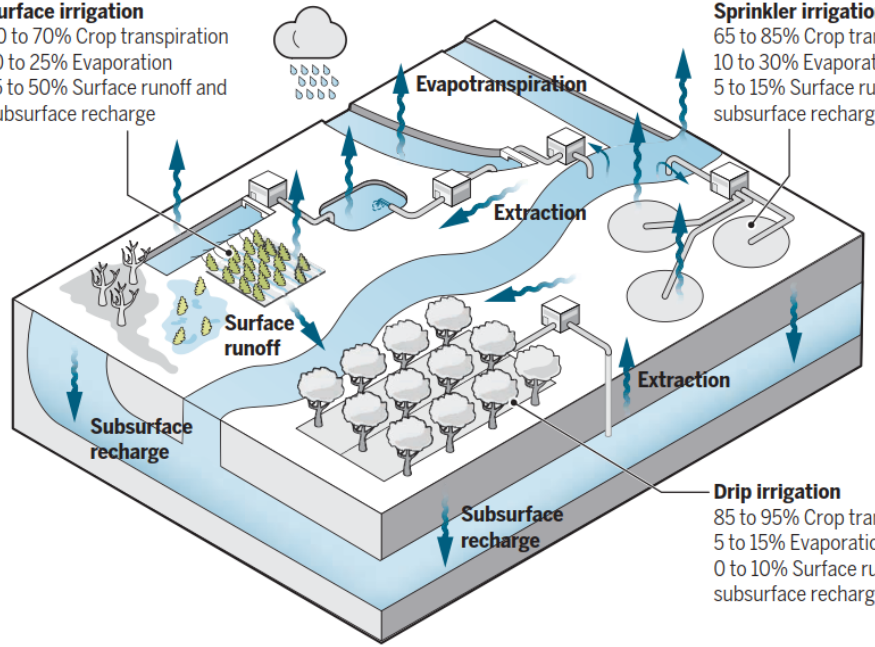
Published by AAAS

Accounting for water

The paradox of irrigation efficiency (surface, sprinkler, and drip) and the water inflows and outflows can be seen in a watershed example. Ranges of crop transpiration, evaporation, runoff, and recharge are authors' judgment of possible values. These values depend on crop and soil types, weather, and other factors.

Surface irrigation
40 to 70% Crop transpiration
10 to 25% Evaporation
15 to 50% Surface runoff and subsurface recharge

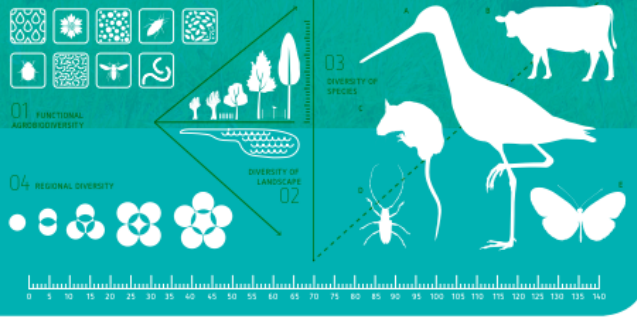
Sprinkler irrigation
65 to 85% Crop transpiration
10 to 30% Evaporation
5 to 15% Surface runoff and subsurface recharge



Drip irrigation
85 to 95% Crop transpiration
5 to 15% Evaporation
0 to 10% Surface runoff and subsurface recharge

Improved manure management

BIODIVERSITY MONITOR FOR THE DAIRY FARMING SECTOR



A new tool for standardised quantification of biodiversity-enhancing performance in the dairy sector

Rabobank

FrieslandCampina

WWF


Less waste & improved
infrastructure

Need to develop a landscape-level framework and metric for livestock production systems

Received: 18 December 2018 | Revised: 2 April 2018 | Accepted: 30 April 2018
DOI: 10.1111/gcb.14321

RESEARCH REVIEW

WILEY Global Change Biology

Defining a land boundary for sustainable livestock consumption

Hannah H. E. Van Zanten[1] | Mario Herrero[2] | Ollie Van Hal[1] | Elin Röös[3] | Adrian Muller[4,5] | Tara Garnett[6] | Pierre J. Gerber[1,7] | Christian Schader[4] | Imke J. M. De Boer[1]

Int J Life Cycle Assess (2016) 21:747–758
DOI 10.1007/s11367-015-0944-1

CrossMark

LCA OF NUTRITION AND FOOD CONSUMPTION

Global food supply: land use efficiency of livestock systems

Hannah H. E. van Zanten[1,2] · Herman Mollenhorst[1] · Cindy W. Klootwijk[1] · Corina E. van Middelaar[1] · Imke J. M. de Boer[1]

Dairy can be part of the solution

1. Bring GHG emissions in line with the Paris Agreement
2. Halt land conversion and degradation – commit to conversion-free commodities
3. Sustainably intensify production within the carrying capacity of local resources, especially water
4. Balance nutrient cycles throughout the entire farming system
5. Maintain soil health and biodiversity richness to ensure robust, healthy agroecosystem function and the future production of food


Thank you
WWF