MONITORING TO MOBILIZE: RADICAL TRANSPARENCY IN OUR RAPIDLY CHANGING WORLD

Janet Ranganathan, Vice President, World Resources Institute
NEMC, New Orleans, 8-8-18

WRI'S MISSION | To move human society to live in ways that protect Earth's environment and its capacity to provide for the needs and aspirations of current and future generations.

Image: CIFOR

SIX URGENT GLOBAL CHALLENGES

Food

Forests

Water

Climate

Cities

Energy

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OUR APPROACH

Count It

OUR APPROACH

Count It

Change It

OUR APPROACH

PRESENTATION OVERVIEW

1. Our rapidly changing world
2. Monitoring to mobilize
3. Introducing Resource Watch
4. Looking ahead

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THE WORLD WILL NEVER MOVE SLOWER THAN TODAY

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NEW CHALLENGES ARE EMERGING, AT INCREASING SPEED CREATING INSECURITIES AND SURPRISES:

- Rising consumption & commodity prices
- Ecosystem degradation and collapse
- Climate change, water scarcity, ocean acidification, sea level rise
- Energy dependence on Russia in Europe
- Speed and impact of decline of the West, rise of emerging powers
- Impact of unconventional threats
- Failed states and 'black holes'
- Protectionism
- Populism
- Stability of Arab world
- *Increased interdependence and inter-connectivity*

Rank Shift in GDP (PPP)

Rank	2010	2020
1	US	China
2	China	US
3	Japan	India
4	India	Japan
5	Germany	Russia
6	Russia	Germany
7	UK	Brazil
8	France	UK
9	Brazil	France
10	Italy	Mexico
11	Mexico	South Korea
12	South Korea	Indonesia
13	Spain	Italy
14	Canada	Canada
15	Indonesia	Spain

Source: Top 10 largest economies in 2020, Euromonitor International

WE ARE RUNNING INTO PLANETARY CONSTRAINTS

THE RELATIONSHIP BETWEEN HUMANS AND THE ENVIRONMENT IS A TWO-WAY STREET
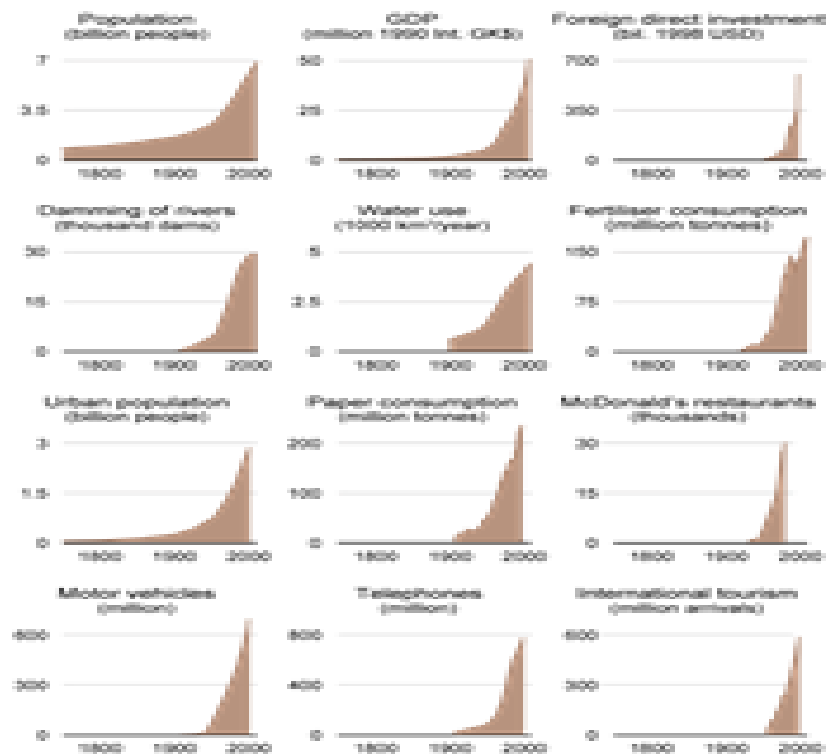
Source: Johan Rockstrom, Stockholm Resilience Center 2013
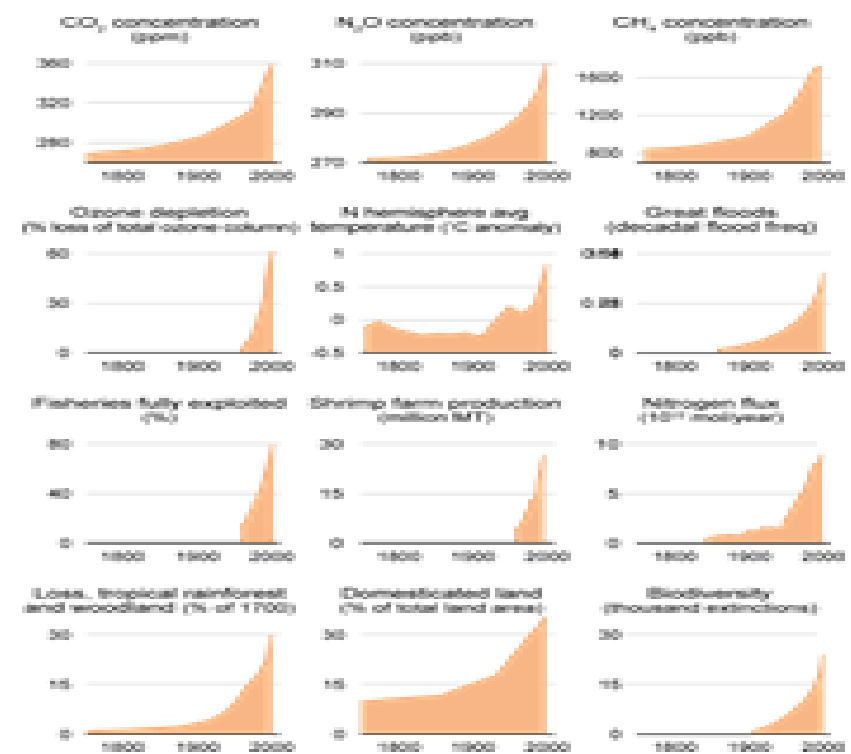
CLIMATE CHANGE WILL MAKE THINGS <u>A LOT</u> WORSE

Source: Climate Change : The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmen2013tal Panel on Climate Change
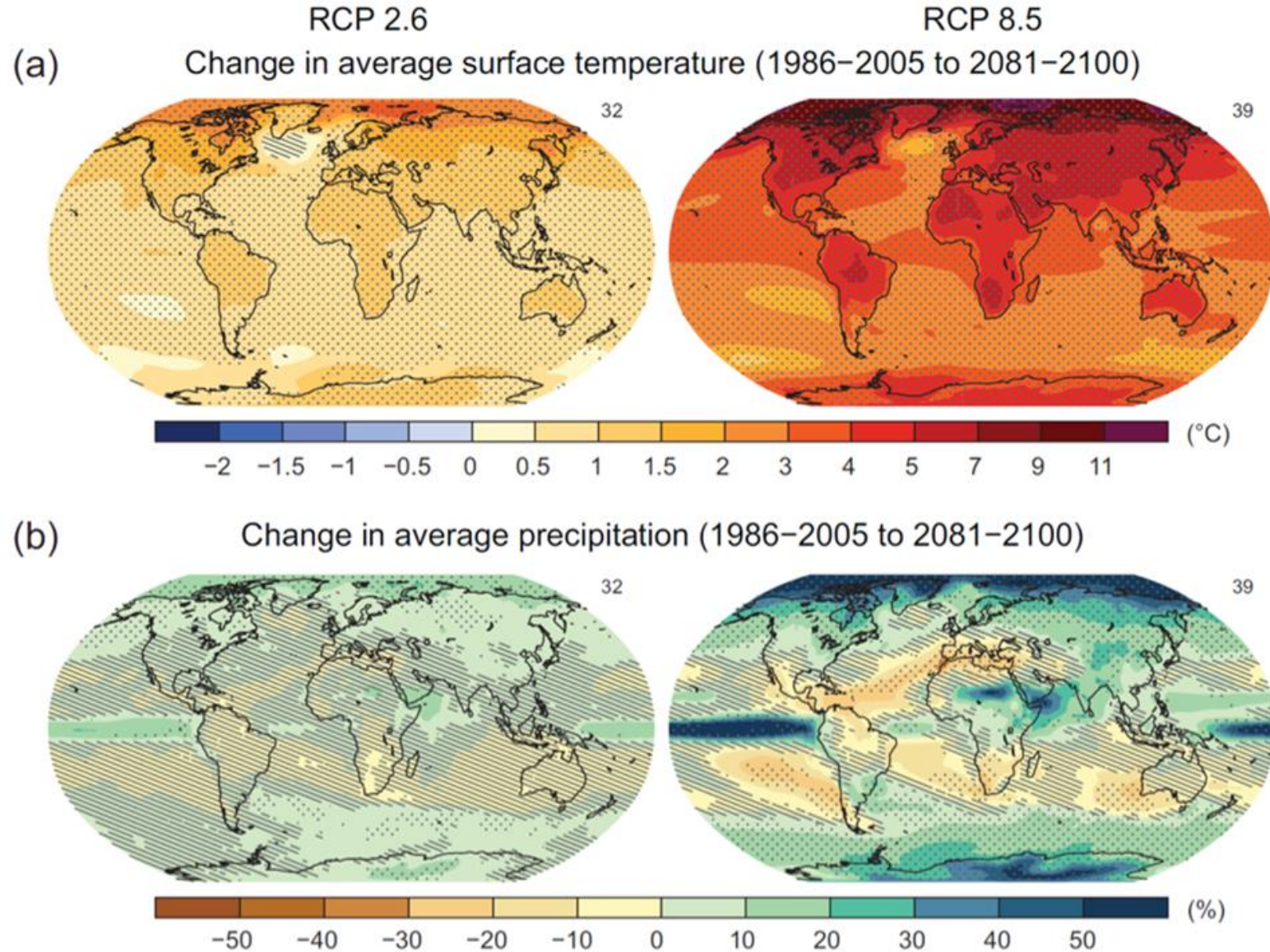
143 MILLION INTERNAL CLIMATE MIGRANTS BY 2050

SUB-SAHARAN AFRICA

86 MILLION

SOUTH ASIA

40 MILLION

LATIN AMERICA

17 MILLION

Source: World Bank, Groundswell: Preparing for Internal Climate Migration

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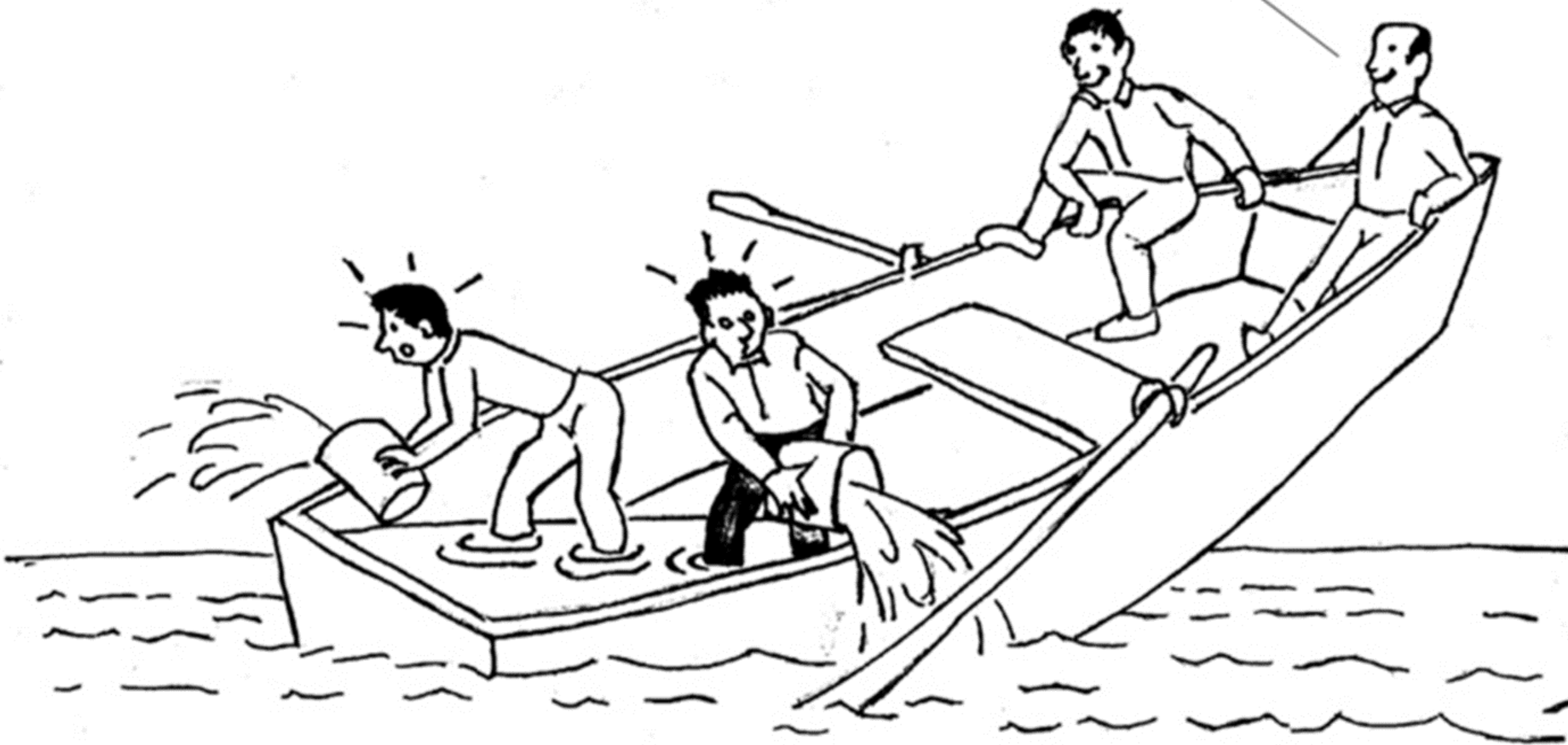
ENVIRONMENTAL AND NATURAL RESOURCE RISKS HAVE RISEN TO BE AMONG THE MOST SERIOUS

Source: Global Risk Report 2017, World Economic Forum

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DRIVERS ARE COMPLEX & INTERCONNECTED
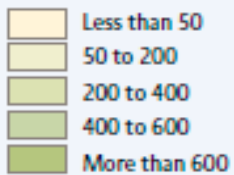
WHAT'S THIS GOT TO DO WITH GLOBAL SECURITY?

BEEF IS RESOURCE-INTENSIVE

Units per year per tonne protein consumed

Plant-based — Animal-based

Categories: Wheat, Rice, Maize, Pulses, Roots and tubers, Fish (farmed), Eggs, Pork, Poultry, Dairy, Beef

Legend:
- Land use – cropland and pasture (hectares)
- Freshwater consumption – rainfall and irrigation (1,000 m^3)
- GHG emissions from agricultural production and land use change (t CO$_2$e)
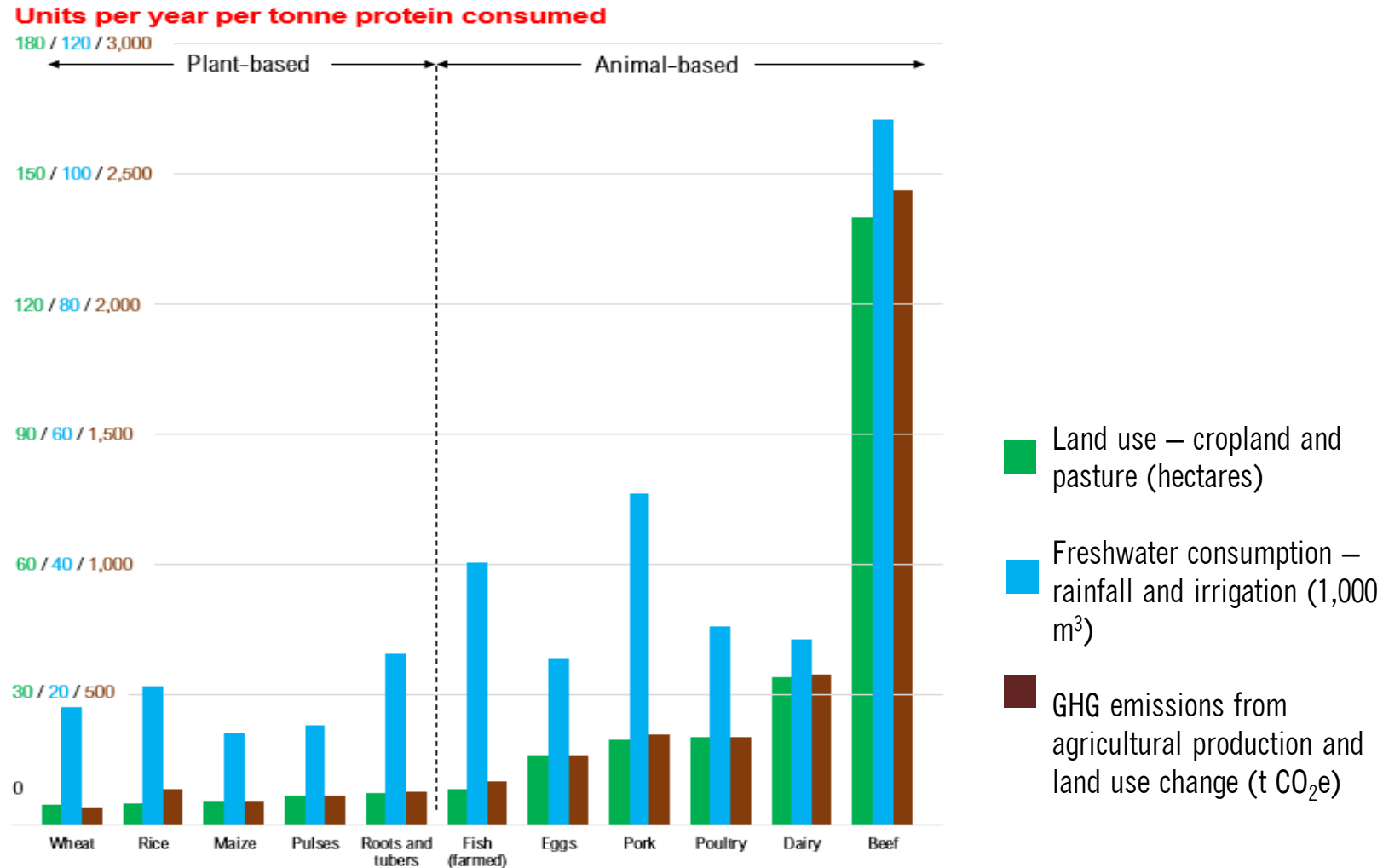
Sources: GlobAgri model (land use and greenhouse gas emissions), authors' calculations from Mekonnen and Hoekstra (2011, 2012) (freshwater consumption) and Waite et al. (2014) (farmed aquatic animal products freshwater consumption).

BEEF CONSUMPTION VARIES WIDELY BY REGION
g beef-based protein/capita/day, 2008
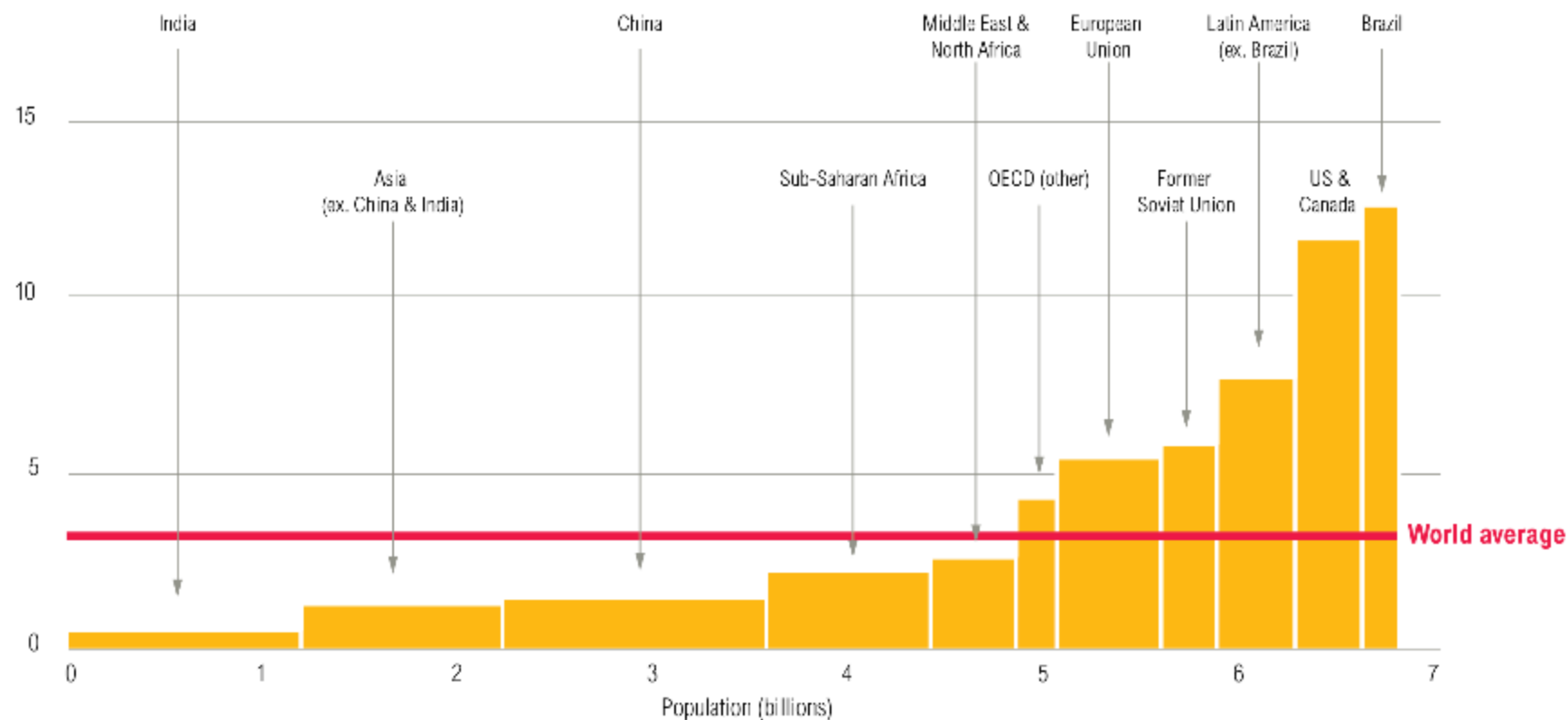
Source: GlobAgri model with source data from FAO (2015) and FAO (2011a). Width of bars is proportional to each region's population. World average per capita consumption was 3.2 g of beef-based protein/capita/day.

PER CAPITA CONSUMPTION OF ANIMAL-BASED PROTEIN IS RISING

g animal-based protein available/capita/day
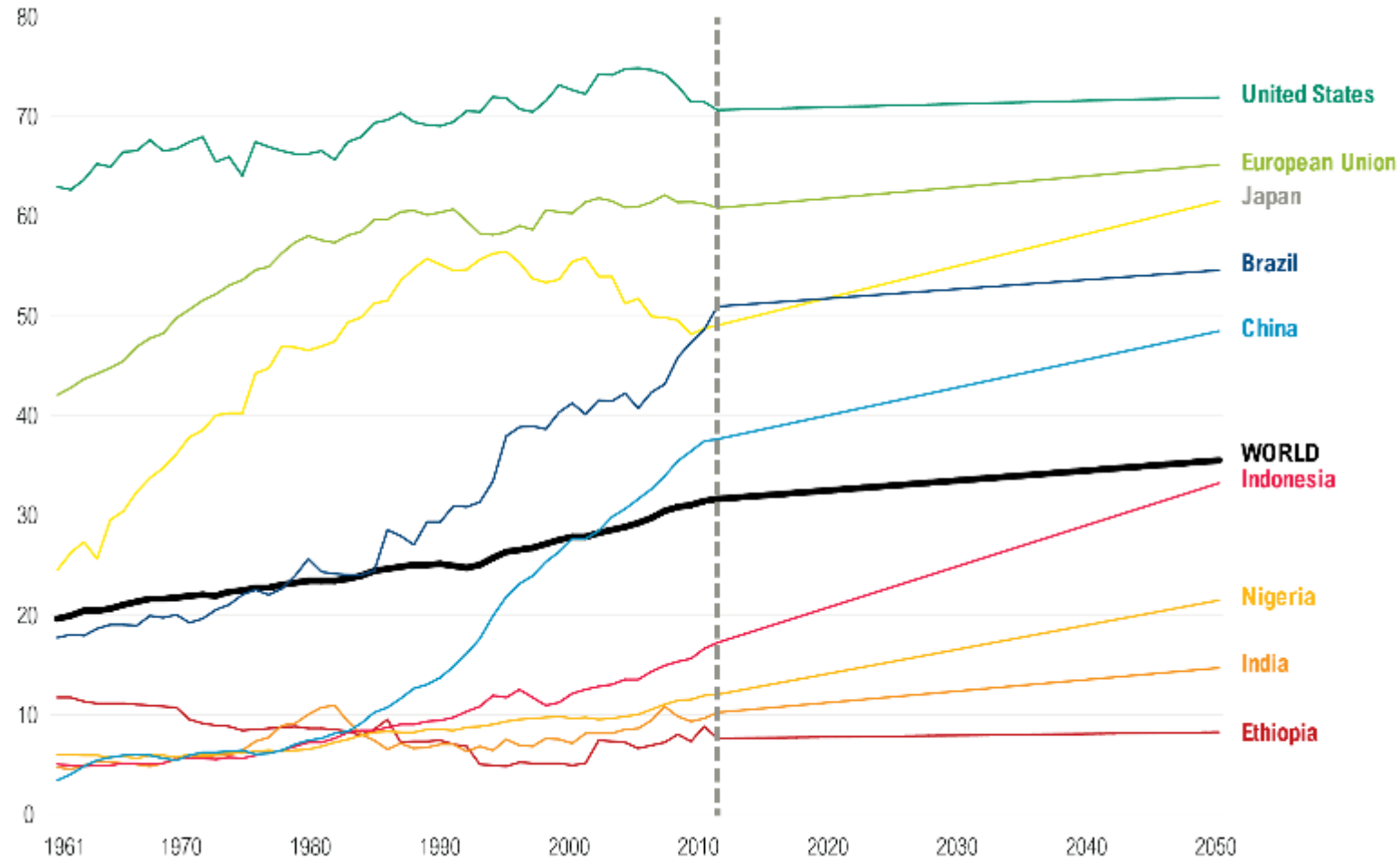
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IT WASN'T REAL MEAT……!

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DATA DRIVES IMPACT

Data ➡ Transparency

Transparency ➡ Accountability

Accountability ➡ Responsibility

⬇

Better decisions

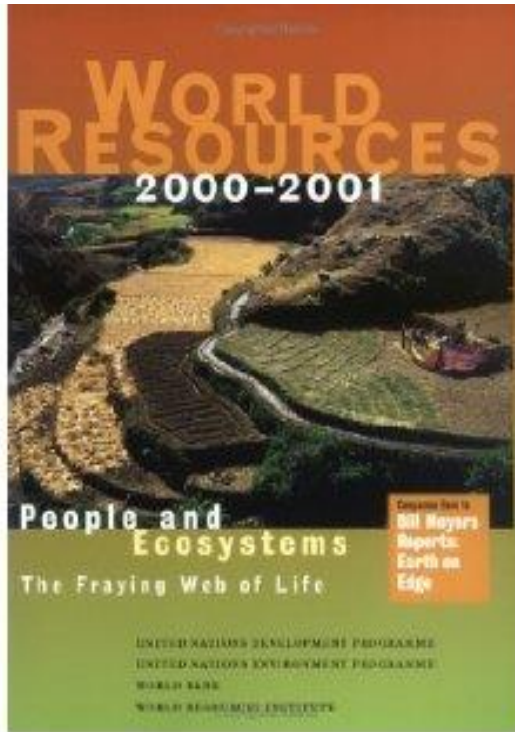| | Energy Consumption by Economic Sector (% of total consumption) | | | | | | | | | | | | | | | |
| | Industry | | | | Transportation | | | | | | Agriculture | | Commercial and Public Services | | Residential | |
| | All Industries | | Iron and Steel | | Total | | Air | | Road | | | | | | | |
	1987	1997	1987	1997	1987	1997	1987	1997	1987	1997	1987	1997	1987	1997	1987	1997
SUB-SAHARAN AFRICA	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Angola	X	11.6	X	0.0	X	12.3	X	6.1	X	6.2	X	X	X	0.0	X	75.6
Benin	X	17.1	X	0.0	X	12.6	X	2.4	X	10.1	X	X	X	0.0	X	70.3
Botswana	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Burkina Faso	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Burundi	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Cameroon	X	17.0	X	0.0	X	11.6	X	1.0	X	10.6	X	X	X	0.5	X	69.7
Central African Rep	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Chad	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Congo	X	14.2	X	0.0	X	18.4	X	6.3	X	12.1	X	X	X	0.0	X	65.7
Congo, Dem Rep	X	21.8	X	0.1	X	5.4	X	1.2	X	4.2	X	X	X	0.0	X	70.9
Côte d'Ivoire	X	7.0	X	0.0	X	16.0	X	3.1	X	12.5	X	1.2	X	12.1	X	62.0
Equatorial Guinea	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Eritrea	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Ethiopia	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Gabon	X	23.2	X	0.0	X	19.6	X	6.7	X	11.0	X	X	X	0.9	X	51.5
Gambia	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Ghana	16.0	14.1	0.0	0.0	11.0	13.2	1.4	1.2	9.0	11.4	0.7	1.0	0.5	0.7	69.8	69.9
Guinea	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Guinea-Bissau	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Kenya	X	11.4	X	0.0	X	12.6	X	4.5	X	7.7	X	6.5	X	0.7	X	67.7
Lesotho	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Liberia	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Madagascar	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Malawi	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Mali	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Mauritania	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Mozambique	X	7.8	X	0.0	X	1.5	X	0.4	X	1.1	X	0.6	X	3.4	X	85.0
Namibia	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Niger	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Nigeria	X	10.9	X	0.1	X	6.7	X	0.7	X	5.9	X	X	X	0.3	X	79.7
Rwanda	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Senegal	X	17.0	X	0.0	X	24.0	X	10.0	X	12.6	X	2.3	X	0.6	X	55.3
Sierra Leone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Somalia	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
South Africa	48.4	36.6	17.6	7.8	21.0	23.5	1.3	2.5	17.9	19.2	2.6	3.4	4.1	5.2	19.3	21.3
Sudan	X	7.4	X	0.0	X	17.8	X	1.0	X	16.9	X	0.1	X	2.0	X	70.9
Tanzania, United Rep	X	11.7	X	0.0	X	1.7	X	0.3	X	1.4	X	3.2	X	0.3	X	79.1
Togo	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Uganda	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Zambia	X	23.6	X	0.1	X	5.1	X	0.9	X	4.2	X	0.7	X	2.0	X	66.6
Zimbabwe	X	12.2	X	2.0	X	10.0	X	1.5	X	8.3	X	9.2	X	3.6	X	61.8
NORTH AMERICA	30.1	26.3	1.4	1.9	35.1	38.1	5.0	5.2	27.9	30.3	1.3	1.2	11.6	12.6	16.0	17.3
Canada	37.9	36.3	3.2	2.5	26.9	27.8	2.7	2.7	20.8	20.2	1.8	2.3	12.7	13.5	16.9	16.6
United States	29.2	25.0	1.1	1.8	36.0	39.5	5.2	5.6	28.7	31.7	1.2	1.1	11.4	12.5	15.9	17.3
C. AMERICA & CARIBBEAN	41.1	39.4	4.2	4.8	30.0	31.8	2.0	2.5	26.3	28.3	2.9	2.4	2.8	3.4	20.6	21.3
Belize	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

LEVERING THE DATA REVOLUTION

A revolution in:
- Data availability
- Processing power
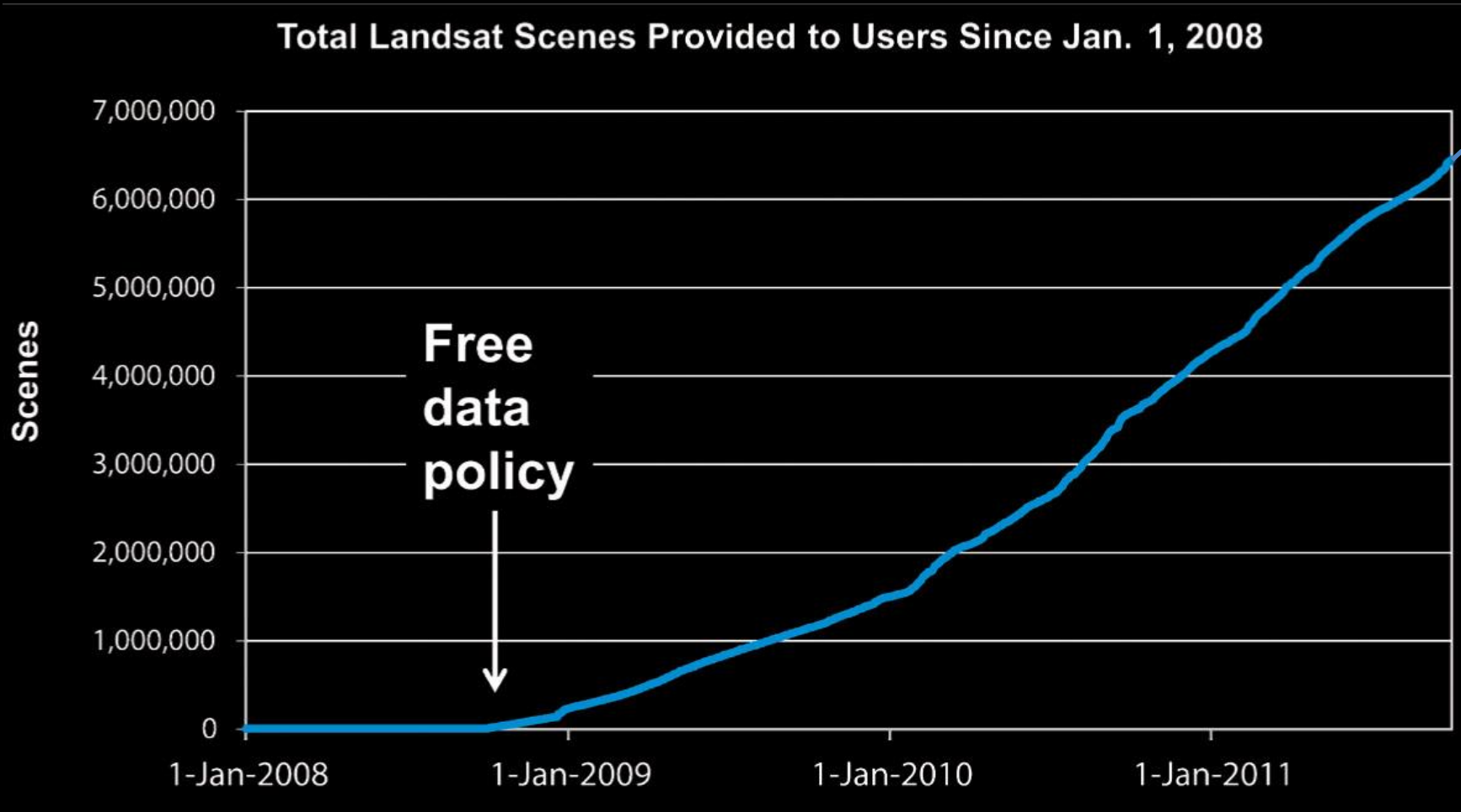- Communication capability

Image: blog.knowledgent.com

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FACILITATED BY OPEN DATA + OPEN GOVERNMENT

Ensuring good quality, timely information about forests is available to everyone

GFW MADE POSSIBLE BY OPEN LANDSAT ARCHIVE

Total Landsat Scenes Provided to Users Since Jan. 1, 2008

Free data policy

GLOBAL FOREST WATCH

GLOBAL
FOREST
WATCH

Tree cover loss (zoom in for most accurate viewing)   Lat/long -6.600000, 140.780000

▶   2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016

Google   Google Earth Engine   CARTO   Show footer   Imagery ©2017 , DigitalGlobe, Landsat / Cop

Peru

Self-proclaimed "sustainable" company United Cacao was caught clearing intact rainforest with WRI's deforestation alert, and has subsequently faced significant reputational, legal, and financial damage

Uganda

National Forest Authority rangers discovered an Illegal logging camp using WRI's Forest Watcher app, shut down the operation, and fined the culprits

Nigeria

Using WRI's maps and data, a local community successfully lobbied its government to return 13,000 hectares of land grabbed for palm oil concessions

DRIVING PRIVATE SECTOR COMMITMENTS

597 companies

Committed to deforestation-free supply chains

Photo: Craig Morey

Oil palm

Major companies like Unilever, Cargill, and Mondelez are using WRI's data tools to identify their highest risk palm oil suppliers

UNIVERSITY OF MARYLAND

USAID FROM THE AMERICAN PEOPLE

NORWEGIAN MINISTRY OF THE ENVIRONMENT

esri

IDB Inter-American Development Bank

Google

Imazon

Unilever

Orbital Insight

MONGABAY

planet.

GREENPEACE

GORDON AND BETTY MOORE FOUNDATION

MARS

DigitalGlobe

RESOLVE

Walmart

Center for Global Development

WOODS HOLE RESEARCH CENTER

UNEP

Transparent World

GLOBAL FOREST WATCH
A GROWING PARTNERSHIP
globalforestwatch.org/partners

Descartes Labs

vizzuality.

citibank

agrosatélite
applied geotechnology

Cargill

OSINFOR

MAPBIOMAS

FMO
Finance for Development

gef

MINISTRY OF FOREIGN AFFAIRS OF DENMARK
DANIDA | INTERNATIONAL DEVELOPMENT COOPERATION

FORESTRY DEVELOPMENT AUTHORITY

IUCN RED LIST

Ministry of Foreign Affairs of the Netherlands

Santander

the Jane Goodall Institute

Carrefour

DFID Department for International Development

Mondelēz International

And many others.....

AQUEDUCT PROVIDES GLOBAL WATER RISK INFORMATION FOR 15.000 WATER BASINS
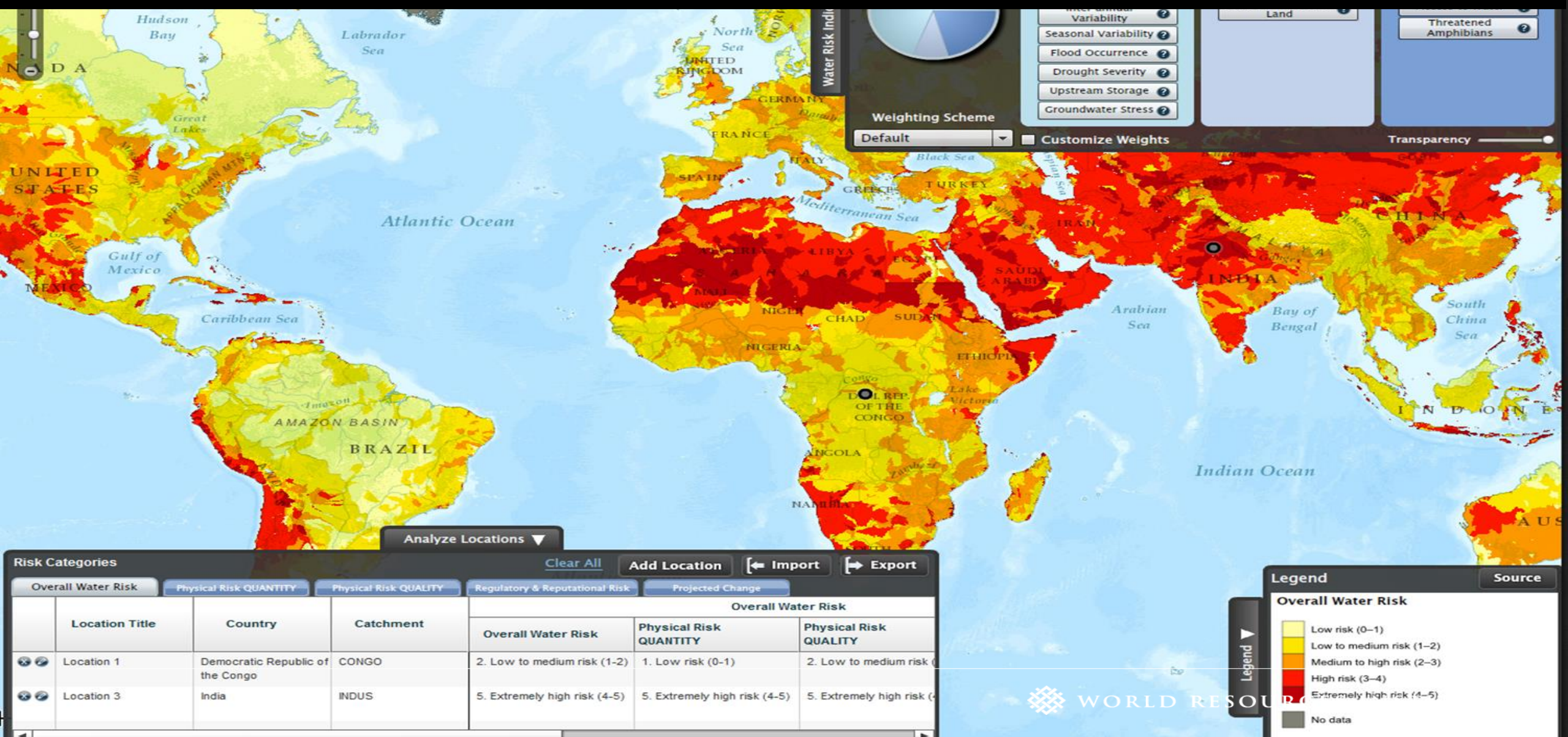
55% OF CURRENT POWER PLANT CAPACITY WILL SEE WATER STRESS GROW 2 TO 8 TIMES WORSE BY 2025

Change in Water Stress by 2025 and Power Plants
(IPCC Scenario A1B)
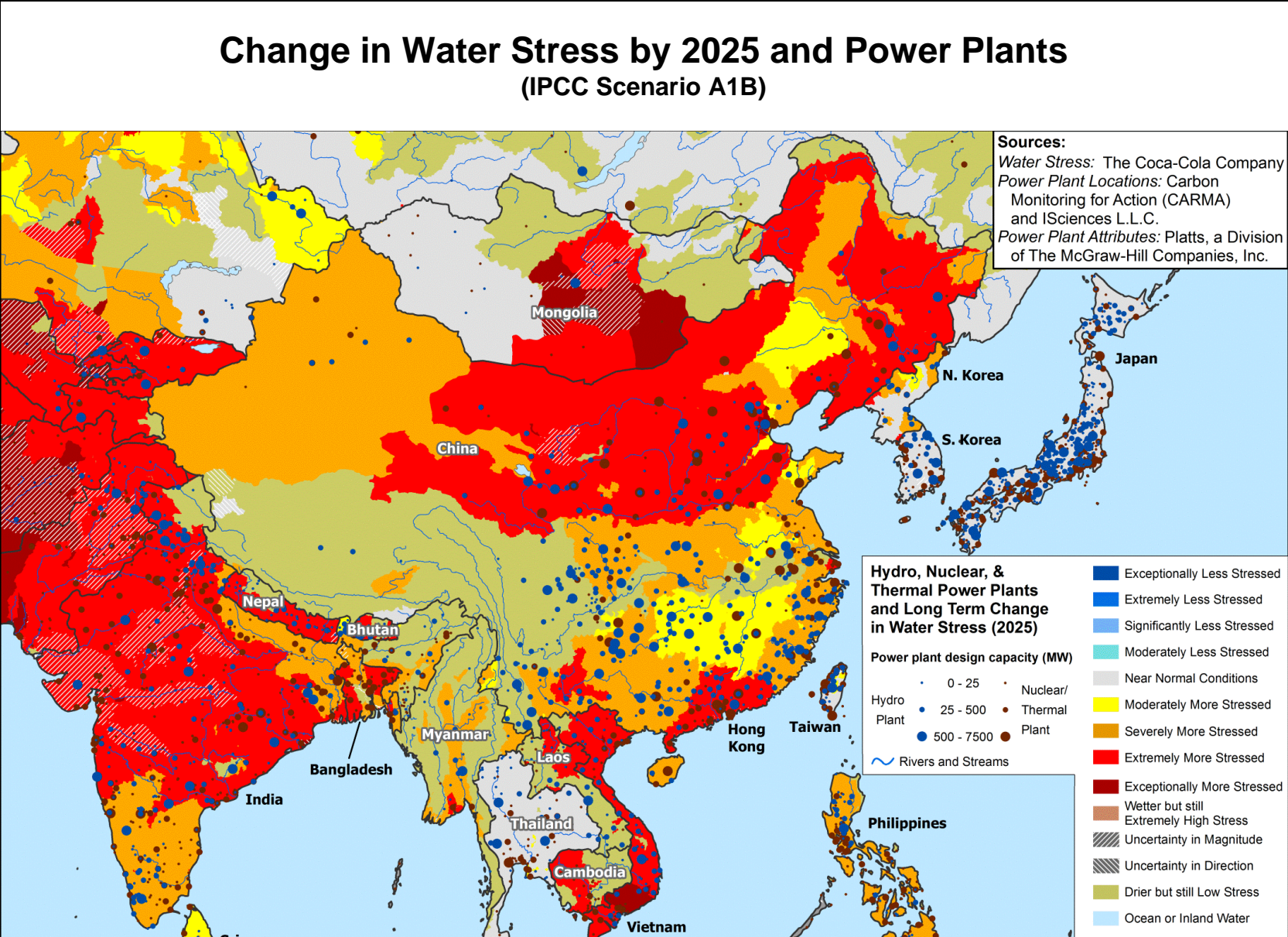
INVESTORS USE AQUEDUCT MAPS OB BLOOMBERG TERMINAL

Aqueduct maps on Bloomberg terminals reach

320,000

subscribers

Image: Raiffeisenverband Salzburg/Wikimedia Commons

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LESSONS LEARNED

- Be relentlessly user-centric

- Meet users where they are

- Co-develop and co-brand

- Be open-source and open-access

- Build "apps"

- Tell stories around data

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PRESENTATION OVERVIEW

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RESOURCEWATCH

Let's tune in to our
planet's signals together

ResourceWatch.org

RESOURCE WATCH

Data   Topics   Blog   About   Get Involved

Monitoring the Planet's Pulse

Resource Watch provides trusted and timely data for a sustainable future.

Explore data

Feedback

Latest stories

Discover data insights on the Resource Watch blog.

APR 10, 2018

It's Not Just Cape Town: 4 Shrinking Reservoirs to Watch

APR 10, 2018

Get Started with Resource Watch

by Resource Watch Staff

RESOURCEWATCH

Explore

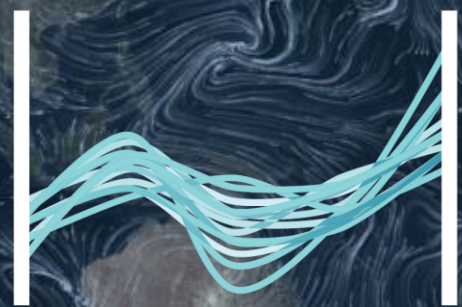🔍 Search and filter datasets ⌄

1-12 / 208 datasets

Most viewed ↓
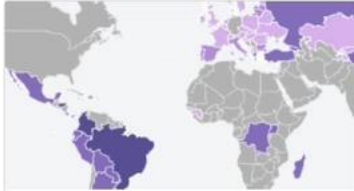
Gini Index ☆
Source: WBG

Annual, Economic, Geospatial, Historica   more...

Add to map   Details

Fires (VIIRS) ⭐
Source: NASA

Daily, Fire, Forest, Geospatial, Near rea   more...

Add to map   Details

Reservoirs and Dams ⭐
Source: Lehner et al.

Dam, Energy, Fresh water, Geospatial,   more...

Add to map   Details
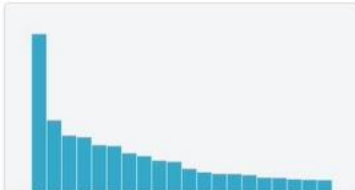
World Database on Protected Areas ☆
Source: UNEP-WCMC/IUCN

Geospatial, Monthly, Protected area, Tal   more...

Add to map   Details

Vulnerability to Climate Change Index ☆

Global Power Plant Database ⭐
Source: Global Energy

Leaflet | © OpenStreet

Feedback

Monitoring the Planet's Pulse

Resource Watch provides trusted and timely data for a sustainable future.

Explore data

Feedback

Latest stories

Discover data insights on the Resource Watch blog.

APR 10, 2018

It's Not Just Cape Town: 4 Shrinking Reservoirs to Watch

APR 10, 2018

Get Started with Resource Watch

by Resource Watch Staff

Resource Watch is open source so others can build on it & contribute to it

A Public-Private Partnership

PREP Coordination

WORLD RESOURCES INSTITUTE

United States Global Change Research Program

Government Partners

NOAA — National Oceanic and Atmospheric Administration, U.S. Department of Commerce

NASA

U.S. Department of the Interior, March 3, 1849

SONOMA COUNTY Climate Resilience Team

NGO Partners

futurearth — research for global sustainability

Pepperwood PRESERVE — Inspiring conservation through science

EcoAdapt

S.T.A.R.T — global change SysTem for Analysis, Research & Training

ESIP — MAKING DATA MATTER

SEI — STOCKHOLM ENVIRONMENT INSTITUTE

York Institute for Tropical Ecosystems — KITE

THE COLLIDER — Market-Driven Climate Solutions — thecollider.org

O.S.C.A.R.

INTELLIGENT ECOSYSTEMS INSTITUTE

GEO GROUP ON EARTH OBSERVATIONS

Private Sector Partners

ACCLIMATISE — building climate resilience

LMI

The Weather Company — An IBM Business

amazon web services

VIZONOMY

Google

CARTO

esri

Microsoft

EarthKnowledge — SOFTWARE SOLUTIONS FOR GLOBAL CHANGE

azavea

COASTAL RISK CONSULTING

vizzuality.

FORUM ONE

Descartes Labs

PARTNERSHIP FOR RESILIENCE & PREPAREDNESS

PARTNERSHIP FOR
RESILIENCE
&PREPAREDNESS
BETA

Enabling collective action to manage climate risks

Explore

CORE DATASETS   **ALL DATASETS**

Filter results ↓   hurricane   🔍

Hurricane Tracks - Cat 1-2 Hurricanes Small Scale (1848-present) -- Global

NOAA

This Historical Hurricane Tracks web site provides visualizations of storm tracks derived from the 6-hourly (0000, 0600, 1200, 1800 UTC) center locations and intensities for subtropical depressions and storms, extratropical storms, tropical depressions and storms, and all hurricanes, from 1848 through the previous Atlantic hurricane season (June 1 through November 30) as recorded in the International Best Track Archive for Climate Stewardship (IBTrACS, http://www.ncdc.noaa.gov/oa/ibtracs/index.php) data set.

hurricane   storm   geospatial   global   storm_intensity

typhoon   raster

Hurricane Tracks - Cat 3-5 Hurricanes Large Scale (1848-present) -- Global

NOAA

This Historical Hurricane Tracks web site provides visualizations of storm tracks derived from the 6-hourly (0000, 0600, 1200, 1800 UTC) center locations and intensities for subtropical depressions and storms, extratropical storms, tropical depressions and storms, and all hurricanes, from 1848 through the previous Atlantic hurricane season (June 1 through November 30) as recorded in the International Best Track Archive for Climate Stewardship (IBTrACS, http://www.ncdc.noaa.gov/oa/ibtracs/index.php) data set.

hurricane   global   geospatial   storm   storm_intensity

typhoon   raster

Hurricane Tracks - Cat 3-5 Hurricanes Large Scale (1848-present) -- Global

↓ DOWNLOAD   ↗ LEARN MORE   ◉ MAP

Description: Users may use this site to search for storms by location, ocean basin, hurricane category/scale, storm name, and atmospheric pressure.

Topics:

Area: Global

HURRICANE TRACKS - CAT 3-5 HURRICANES LARGE SCALE (1848-PRESENT) -- GLOBAL

H5	H4
H3	H2
H1	SS; TS
SD; TD	DS; ET
MX; N/A	

PARTNERSHIP FOR RESILIENCE & PREPAREDNESS
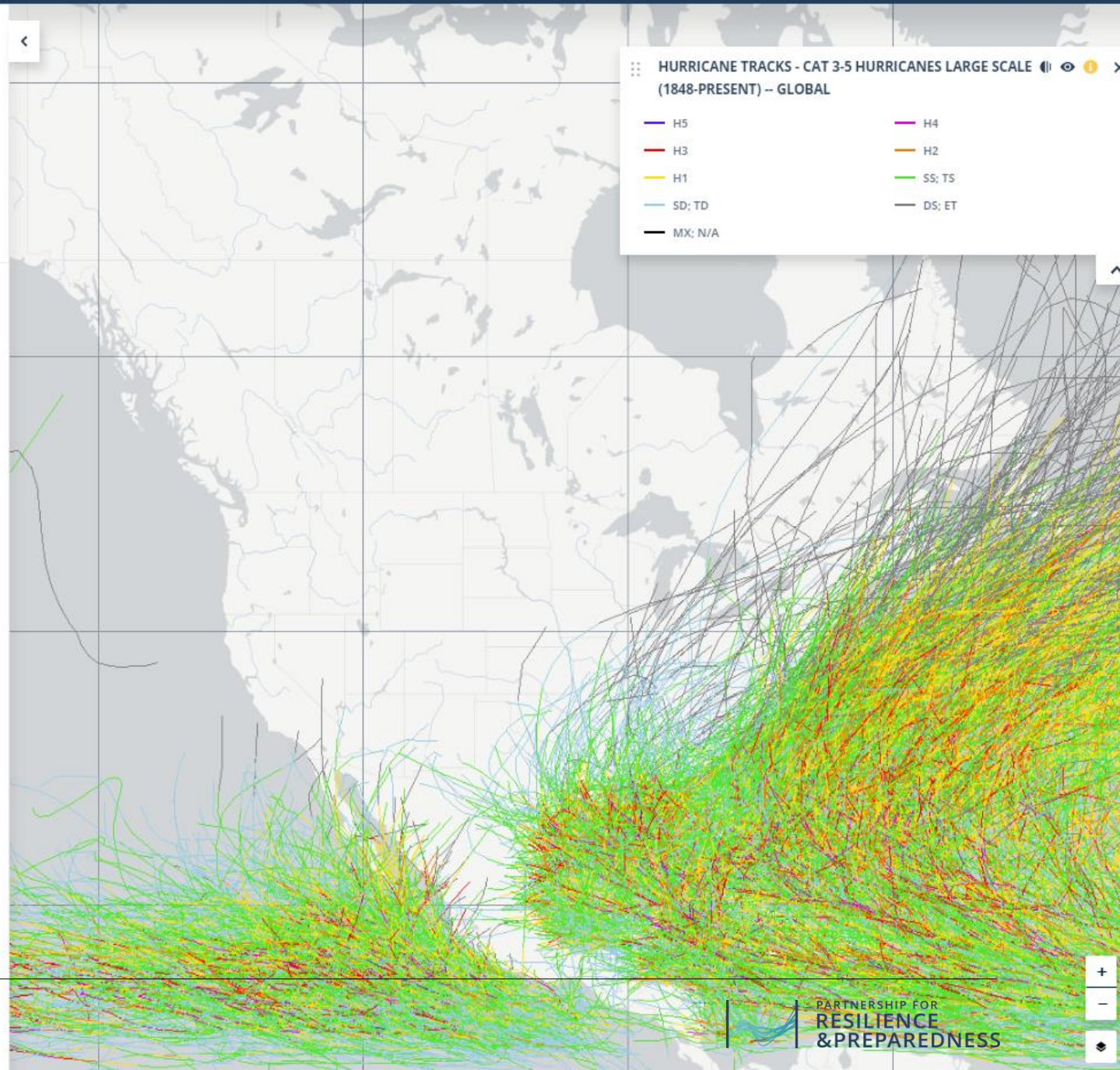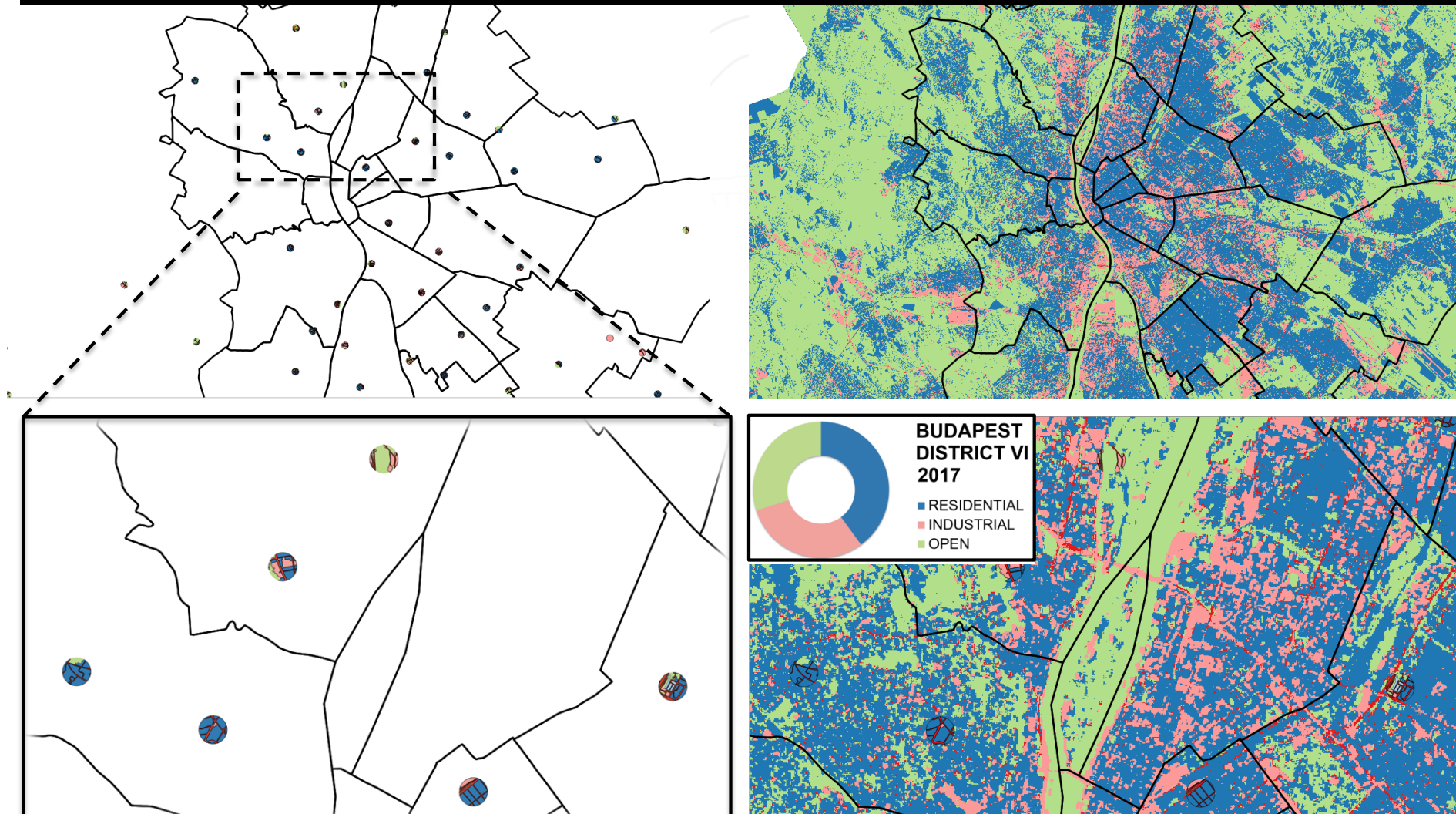
PERSONALIZABLE DASHBOARDS
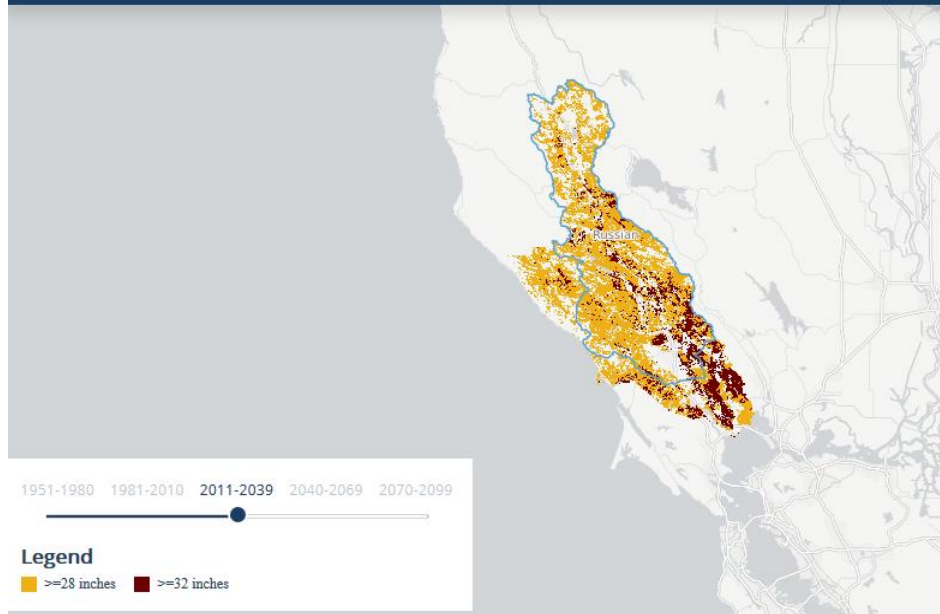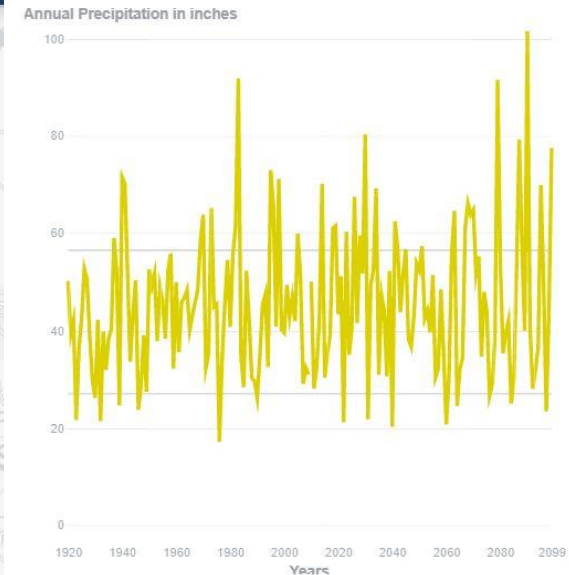
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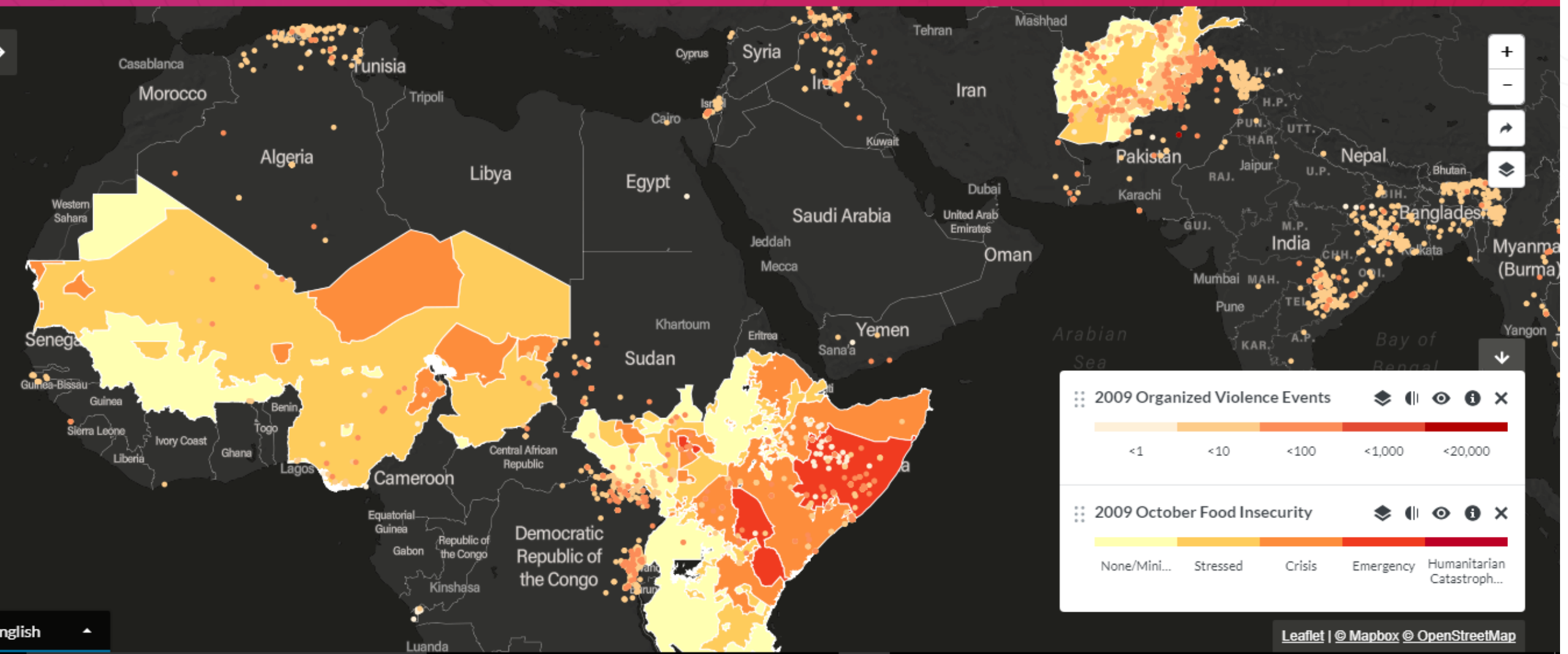3. Introducing Resource Watch
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URBAN LAND USE

A GLOBAL URBAN LAND USE MAP ENABLED BY MACHINE LEARNING

BUDAPEST DISTRICT VI 2017
- RESIDENTIAL
- INDUSTRIAL
- OPEN

Manual 1% of 200 cities (2014) → Automated 100% of 4200 cities (1984 – Present, yearly)
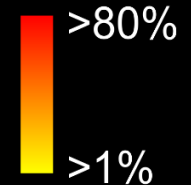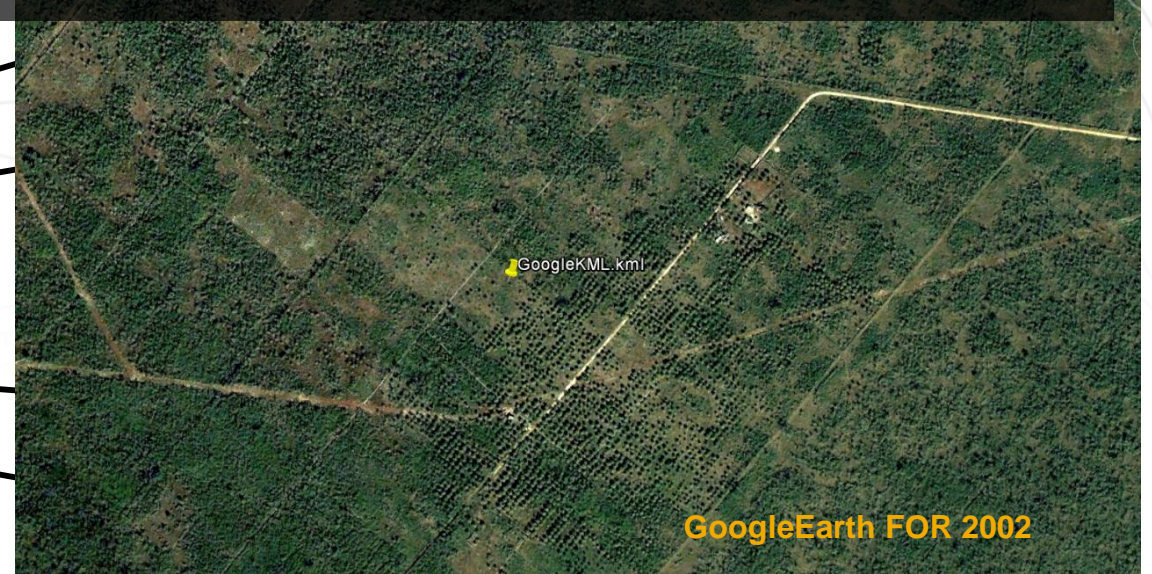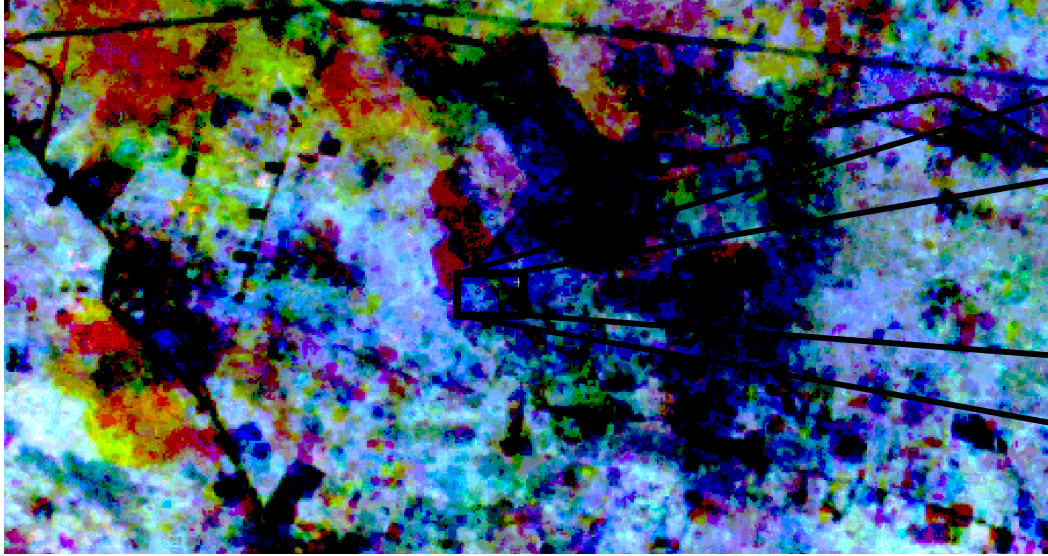
WATER, SECURITY, CONFLICT

LAND USE CHANGE

South America southern hemisphere growing season soybean cultivated area

2015-2016 growing season soybean cover

>80%

>1%

Source: University of Maryland

RESTORATION

2001 – 2009 – 2016 IN RED – BLUE – GREEN

GoogleEarth FOR 2002

GoogleEarth FOR 2015
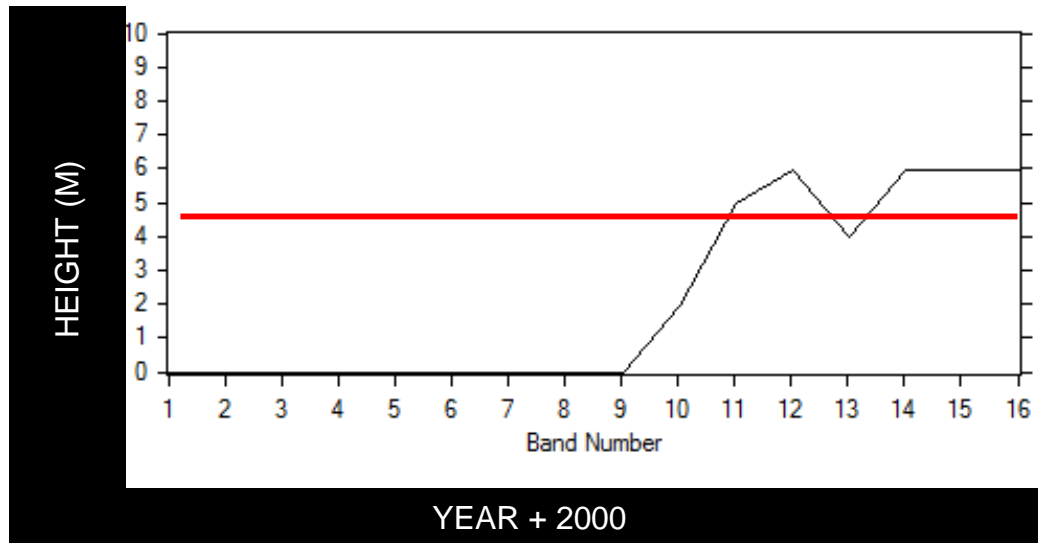
WHAT'S UNDER THE RESOURCE WATCH HOOD?

WRI "built on Resource Watch" apps

External "built on Resource Watch" apps

Surfacing where users are

RESOURCEWATCH API

Data Sources

RESOURCEWATCH
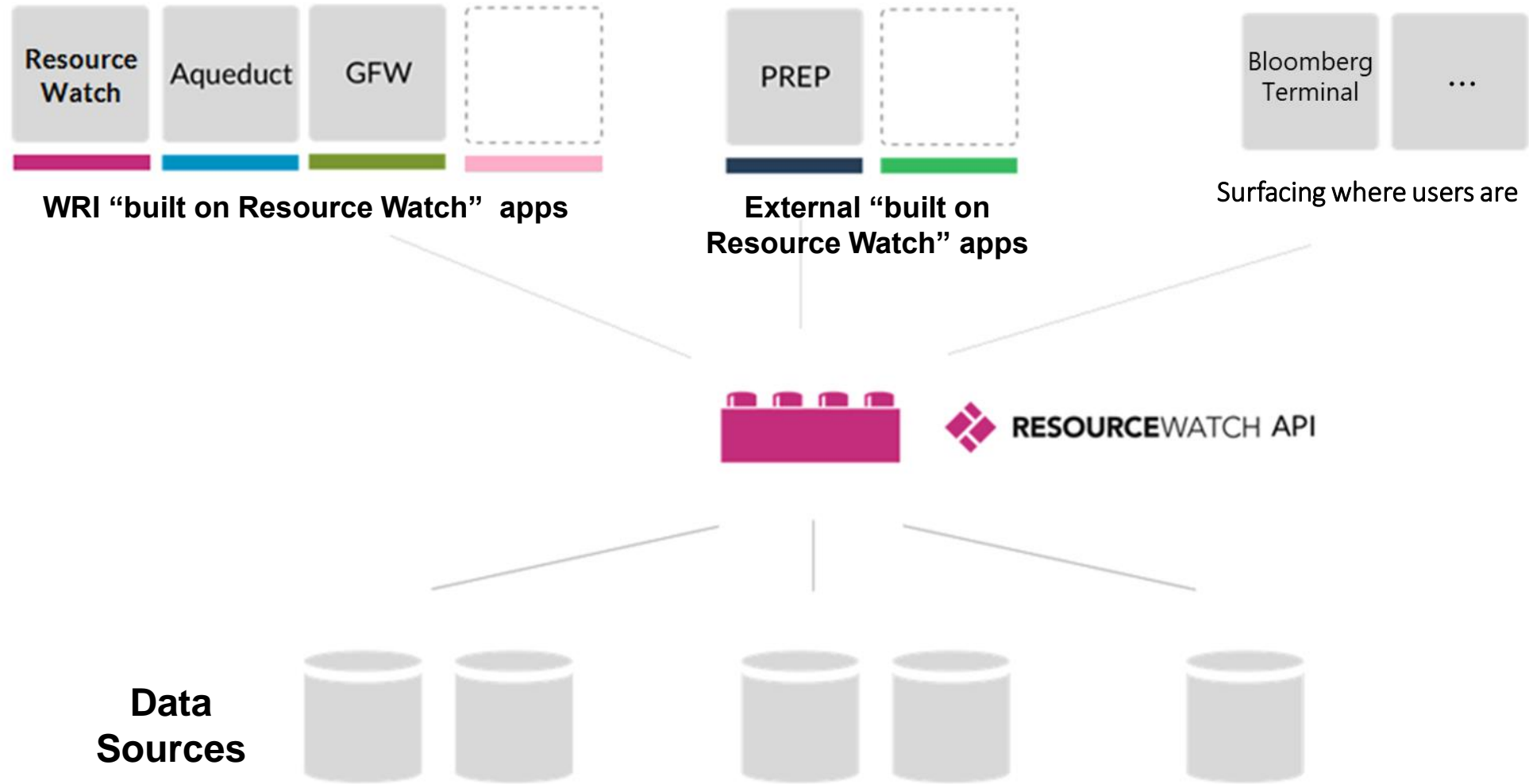
MODIS
daily 250m/pixel
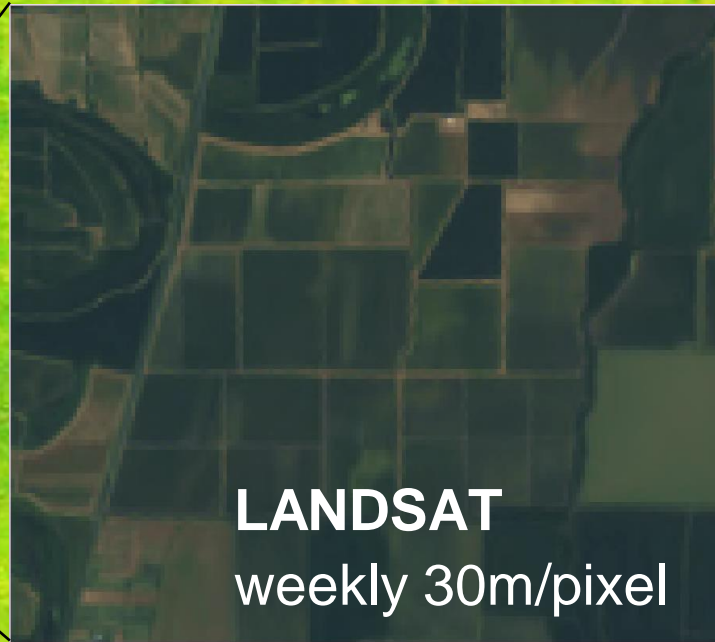
LANDSAT
weekly 30m/pixel
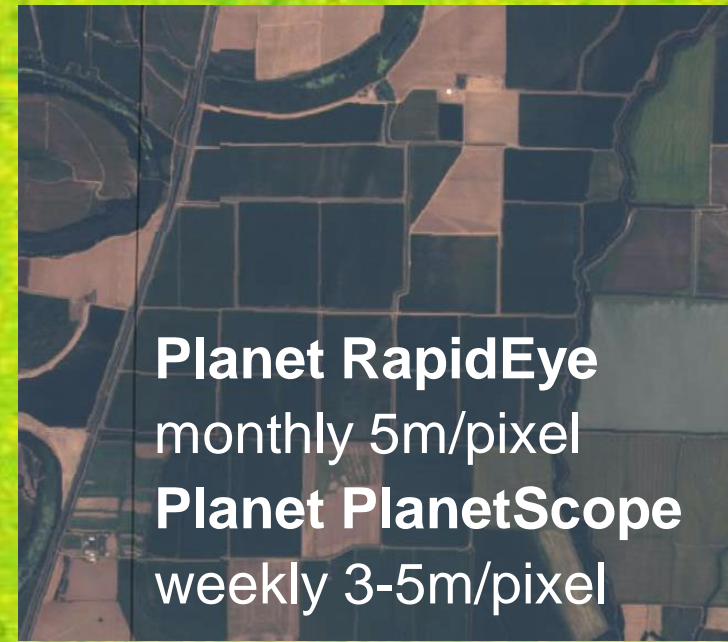
Planet RapidEye
monthly 5m/pixel
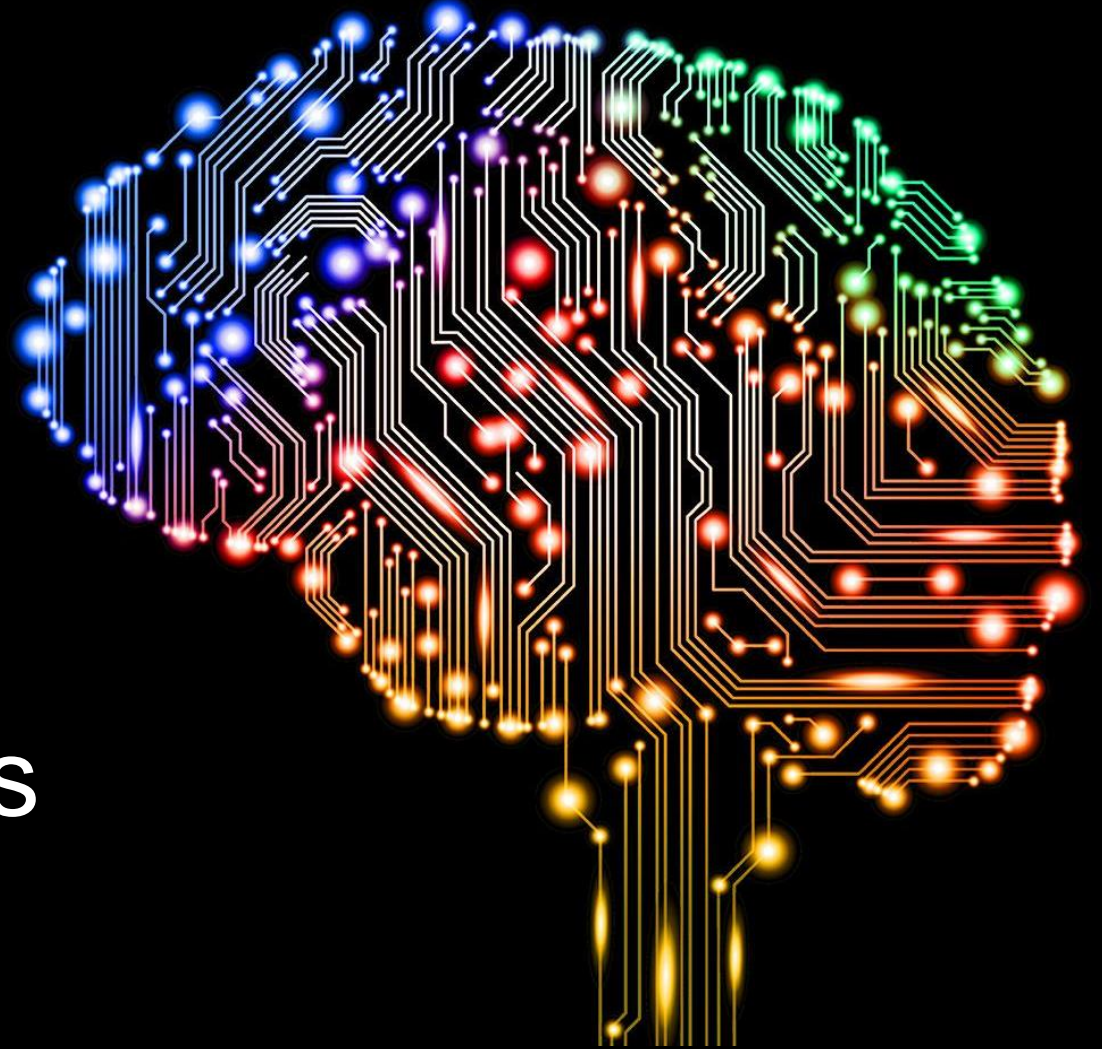**Planet PlanetScope**
weekly 3-5m/pixel

Landsat NIR/SWIR
weekly 30m/pixel
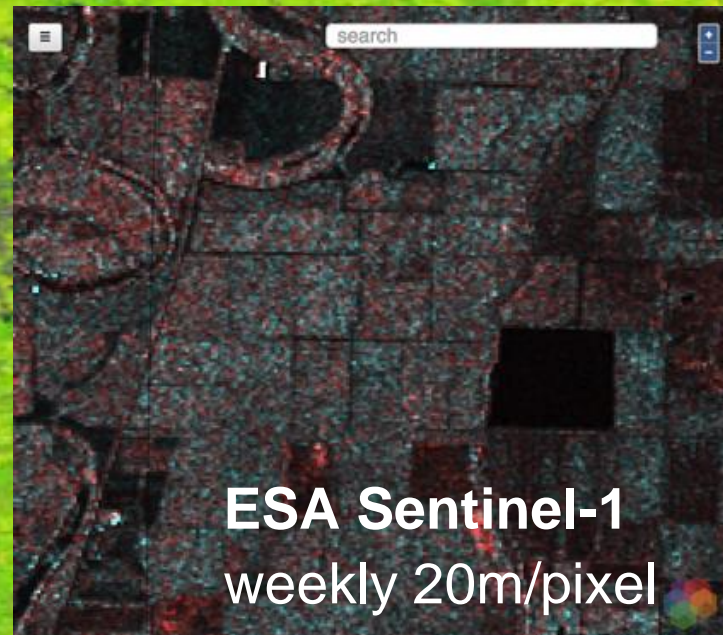
ESA Sentinel-1
weekly 20m/pixel
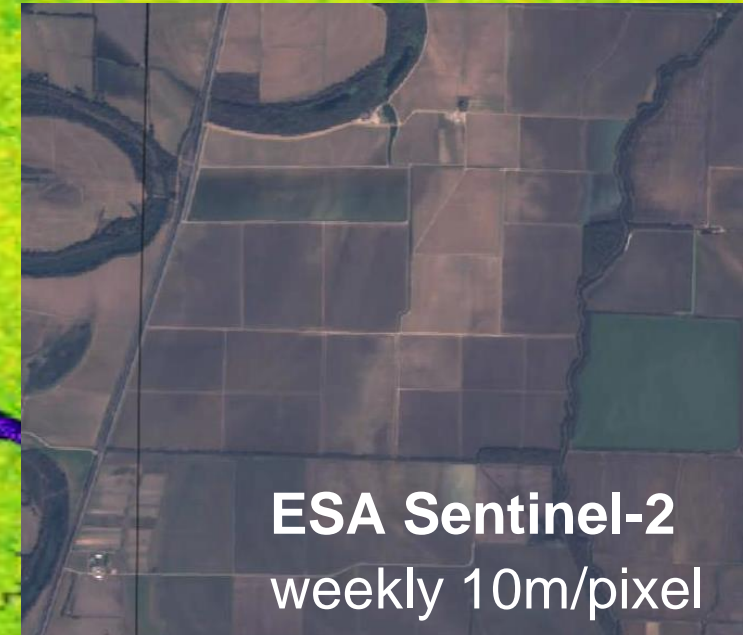
ESA Sentinel-2
weekly 10m/pixel

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ARTIFICAL INTELLIGENCE – THE NEW FRONTIER

- Machine learning

- Predictive alerts

- Intelligent user interfaces

- More to come……

SYSTEMS WILL BECOME FASTER, MORE USEFUL

FAST COMPANY

This AI Watches Satellite Photos And Says "It Looks Like You're About To Cut Down A Forest. Could You Not?"

Artificial intelligence can find subtle changes, like new roads, that indicate when deforestation is imminent so it can be stopped before it happens.

TEXT MINING
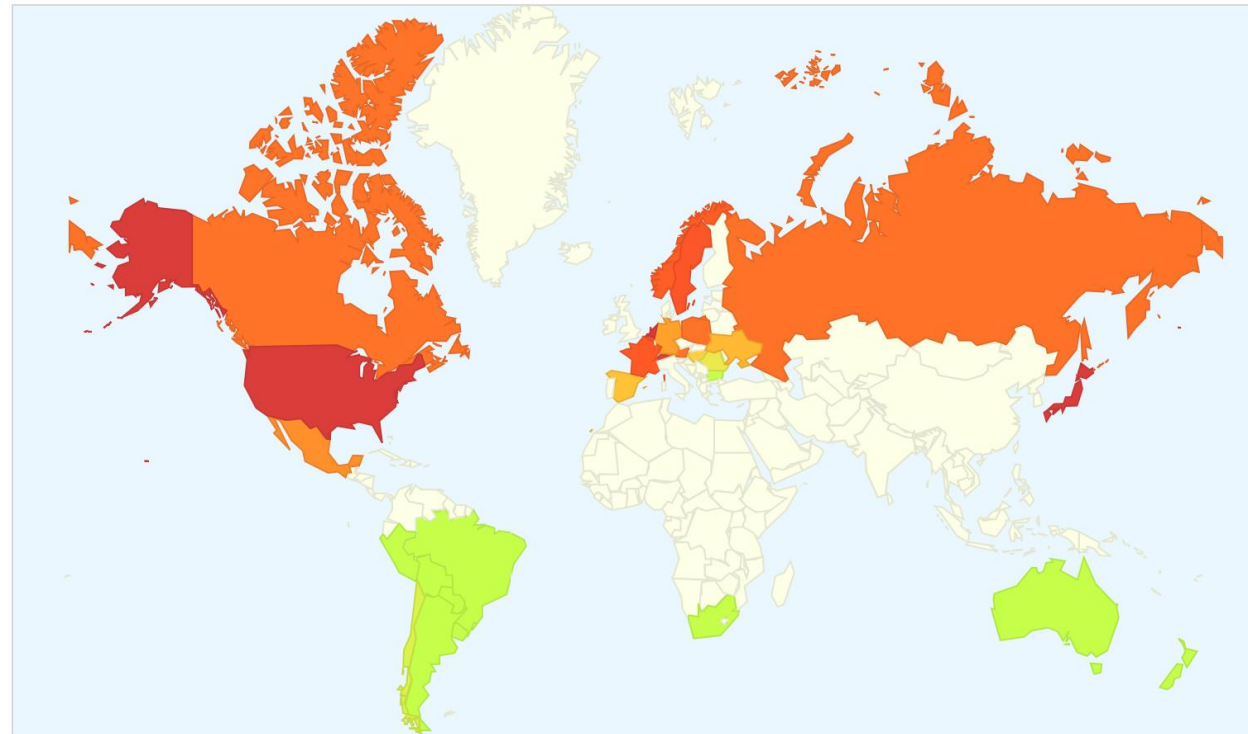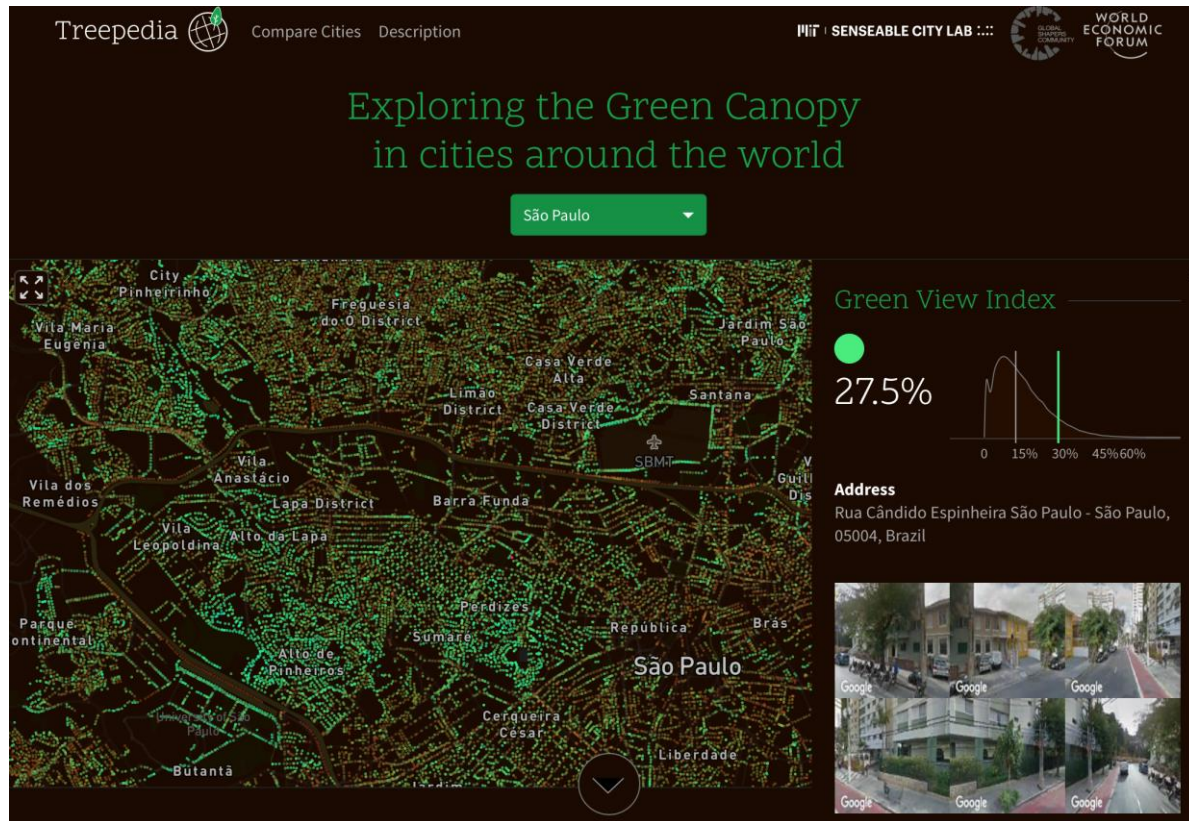
COMPUTER VISION

MOBILE "TOP-UP" DATA TO ASSESS POVERTY

Image: Flickr/Bioversity International

PREDICTING CROP YIELDS

Image: Flickr/Sarah H

WORLD RESOURCES INSTITUTE

"THAT'S your Ark for the Big Data flood? Noah, you will need a lot more storage space!"

Janet.Ranganathan@wri.org

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