The presentation in this PDF was created using the application “Prezi”, which is freely accessible over the web and runs on most browsers.

This static version loses a lot of the contextual information useful to better understand the concepts herein.

To fully experience the contents, this presentation is publicly accessible at:

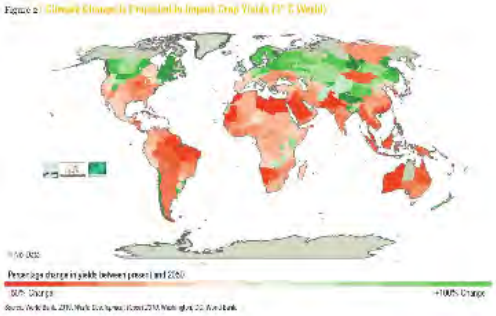
https://prezi.com/30krs1vzrfxh/

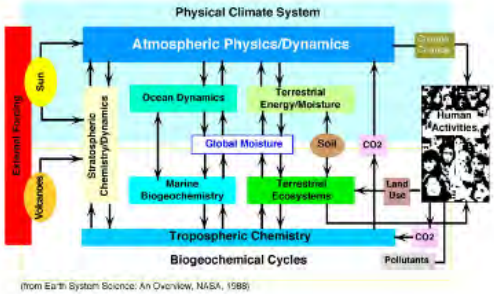
Citizen Observatories

Brian Wee, Ph.D.
Chief of Strategic Alliances
National Ecological Observatory Network (NEON), Inc.

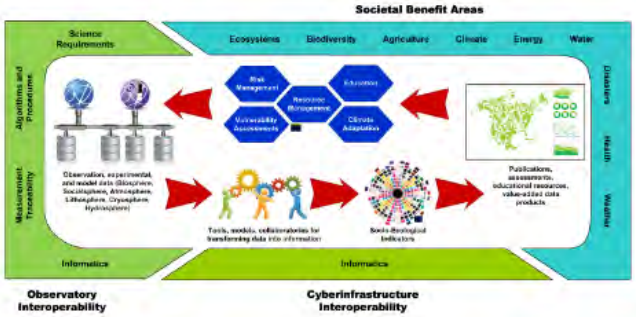
2015-03-25
GEOSS Science and Technology Stakeholder Workshop

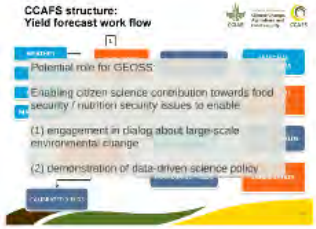
neon





(from Earth System Science: An Overview, NASA, 1988)





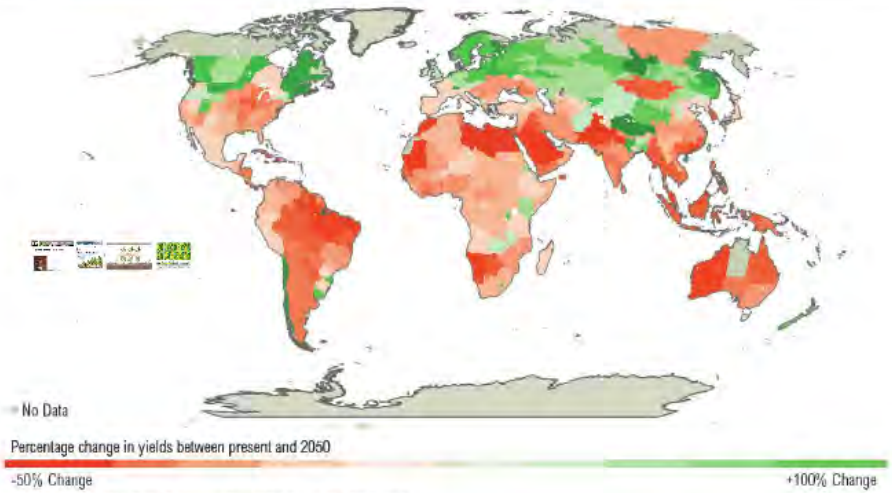
Opportunity: Community Agriculture

Citizen Observatories

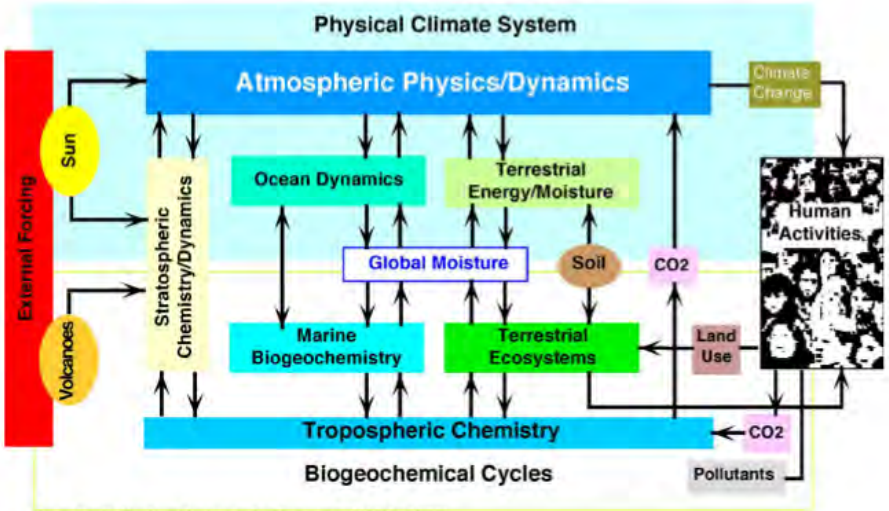
Brian Wee, Ph.D.
Chief of Strategic Alliances
National Ecological Observatory Network (NEON), Inc.

2015-03-25
GEOSS Science and Technology Stakeholder Workshop

Figure 2 | Climate Change is Projected to Impact Crop Yields (3° C World)



Source: World Bank. 2010. *World Development Report 2010*. Washington, DC: World Bank.



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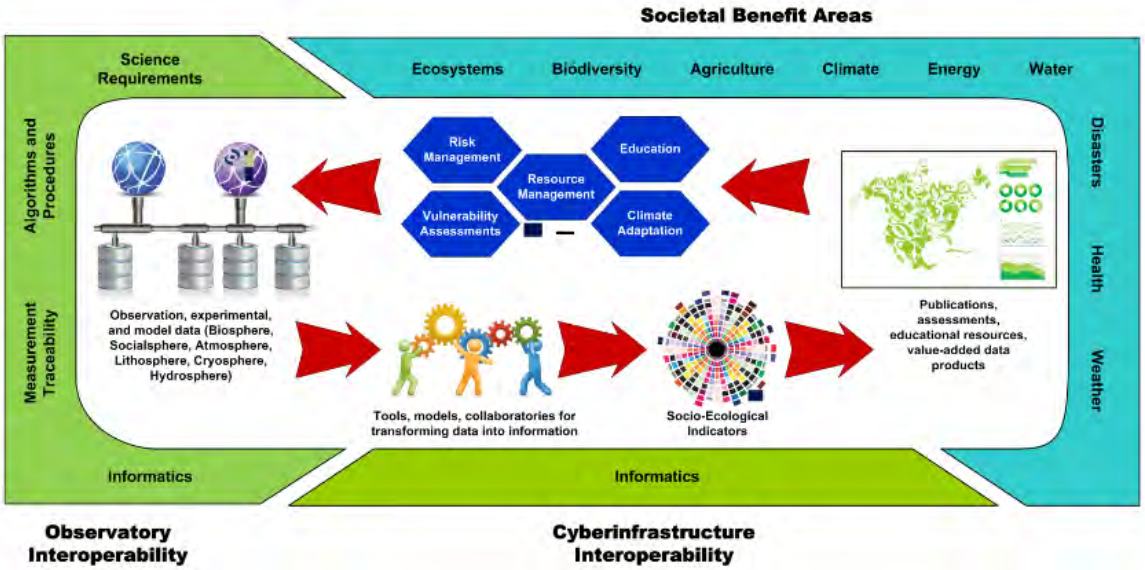
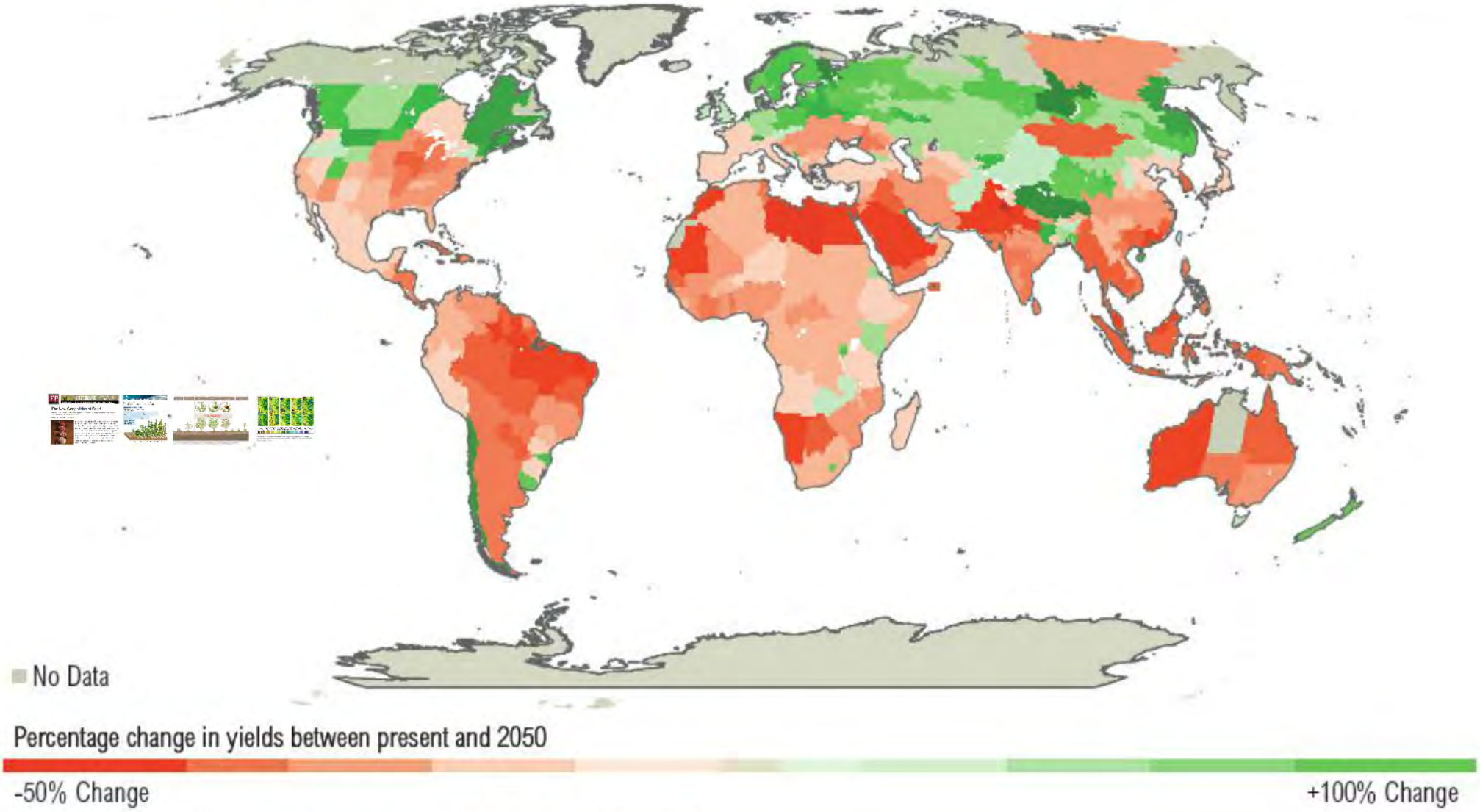


CCAFS structure:
Yield forecast work flow

Figure 2 | **Climate Change is Projected to Impact Crop Yields (3° C World)**



Source: World Bank. 2010. *World Development Report 2010*. Washington, DC: World Bank.

FP Foreign Policy

THE FOOD ISSUE | INSIDE THE GEOPOLITICS OF A HUNGRY PLANET

THE NEW GEOPOLITICS OF FOOD · STREET EATS · HOW FOOD EXPLAINS THE WORLD

The New Geopolitics of Food

From the Middle East to Madagascar, high prices are spawning land grabs and ousting dictators. Welcome to the 21st-century food wars.

BY LESTER R. BROWN | MAY/JUNE 2011

In the United States, when world wheat prices rise by 75 percent, as they have over the last year, it means the difference between a $2 loaf of bread and a loaf costing maybe $2.10. If, however, you live in New Delhi, those skyrocketing costs really matter: A doubling in the world price of wheat actually means that the wheat you carry home from the market to hand-grind into flour for chapatis costs twice as much. And the same is true with rice. If the world price of rice doubles, so does the price of rice in your neighborhood market in Jakarta. And so does the cost of the bowl of boiled rice on an Indonesian family's dinner table.

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Figure 1: Phenological development stages of wheat, and some key processes and inputs required for modelling crop growth and yield.

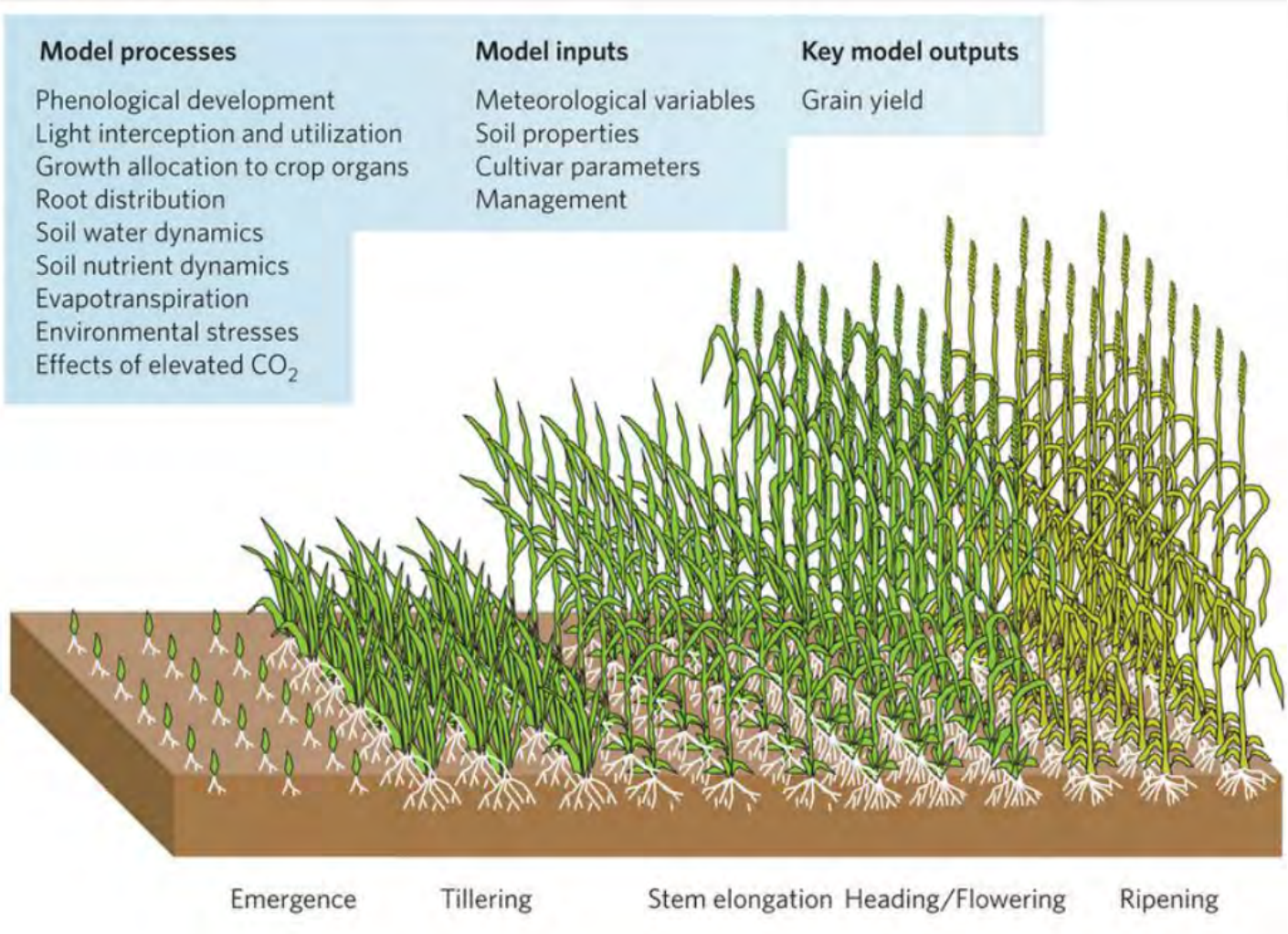
From

Agricultural Impacts: Multi-model yield projections

Timothy R. Carter

Nature Climate Change 3, 784–786 (2013) | doi:10.1038/nclimate1995

Published online 28 August 2013



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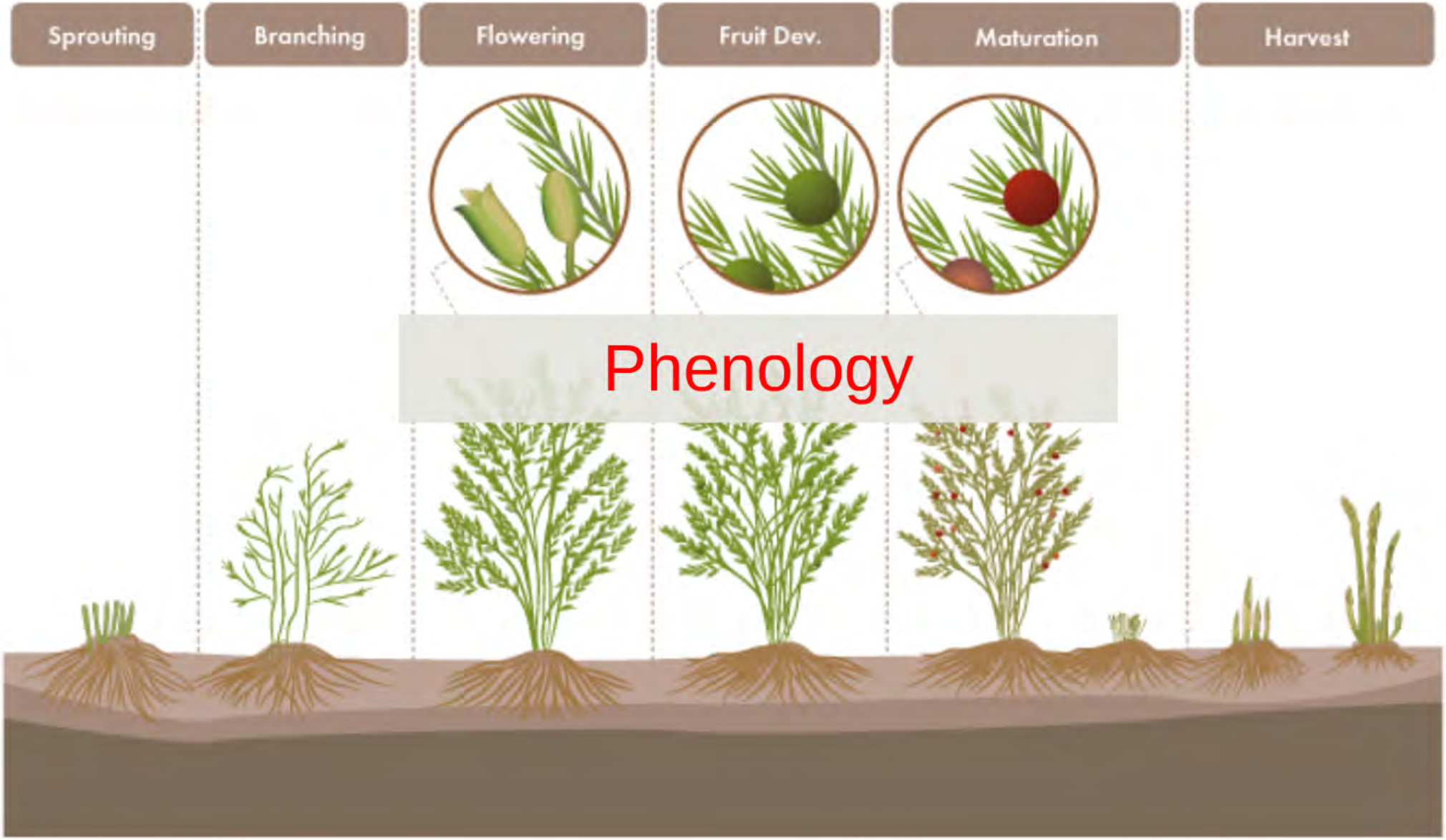
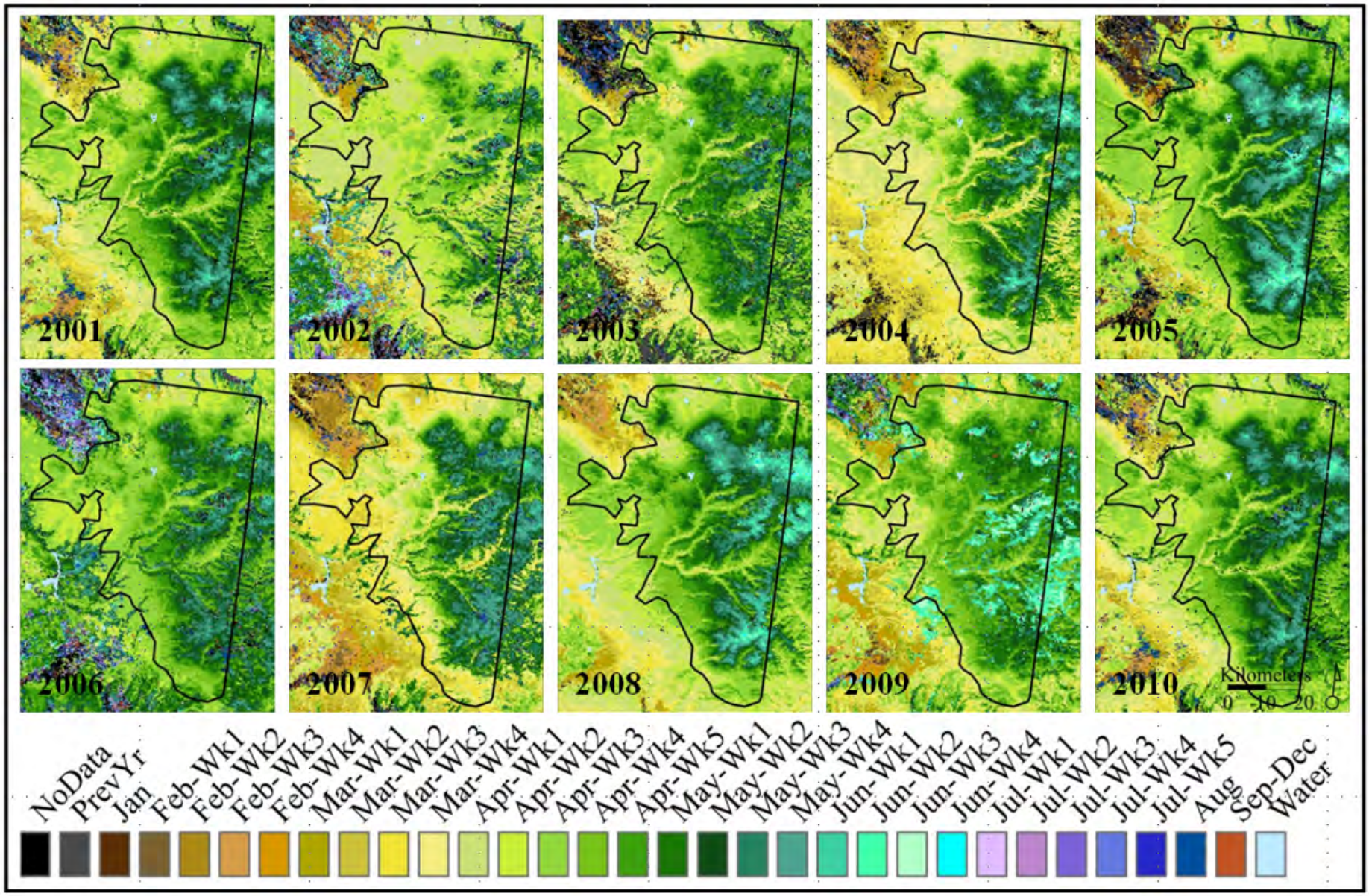
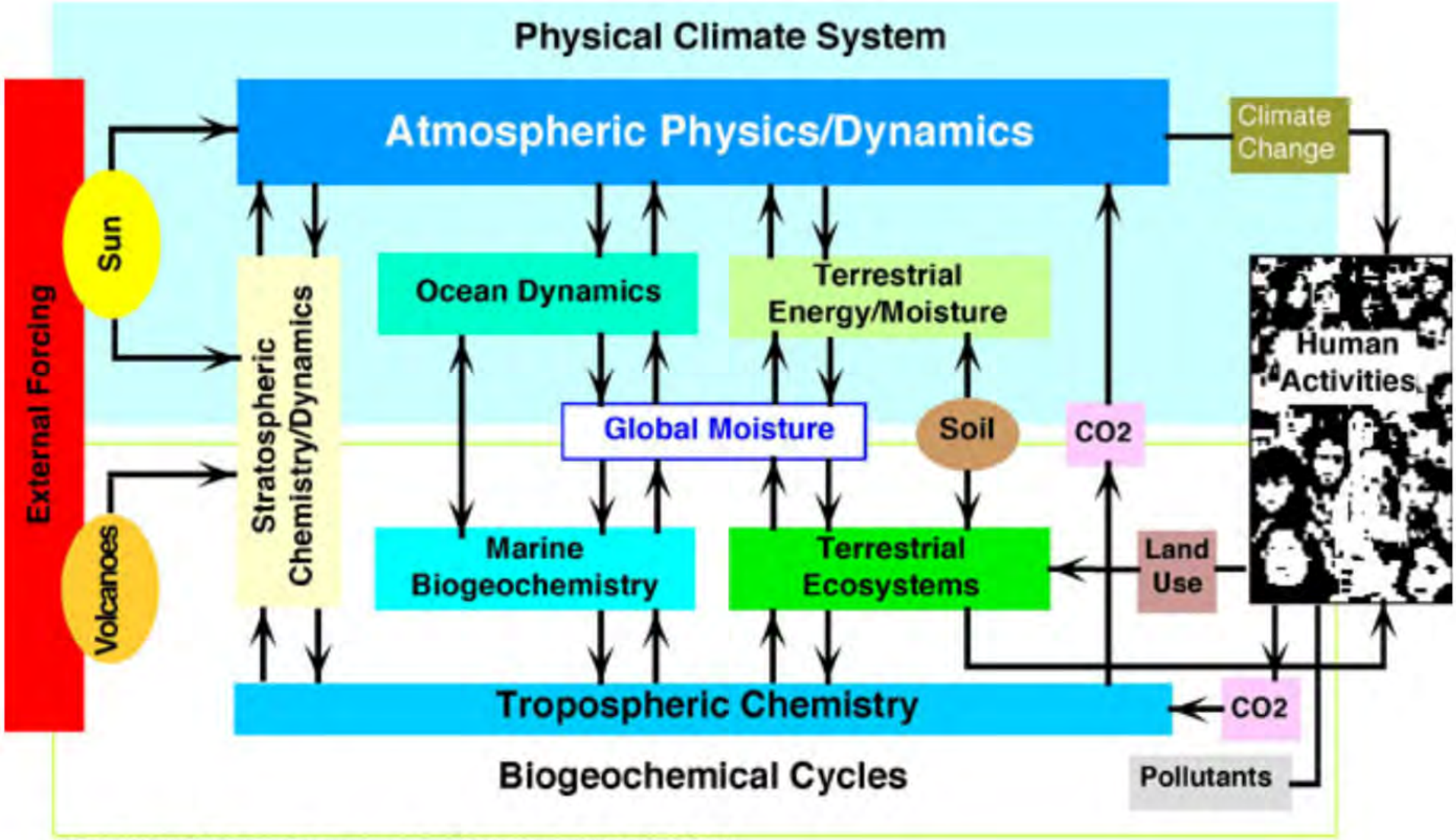


Source: http://www.sqm.com/en-us/productos/nutricionvegetaldeespecialidad/cultivos/esparrago.aspx#tabs-4



Ten-year time series of annual start of growing season for aspen woodlands in southwest Colorado (38º N, 108º W). Source: USGS EROS Data Center



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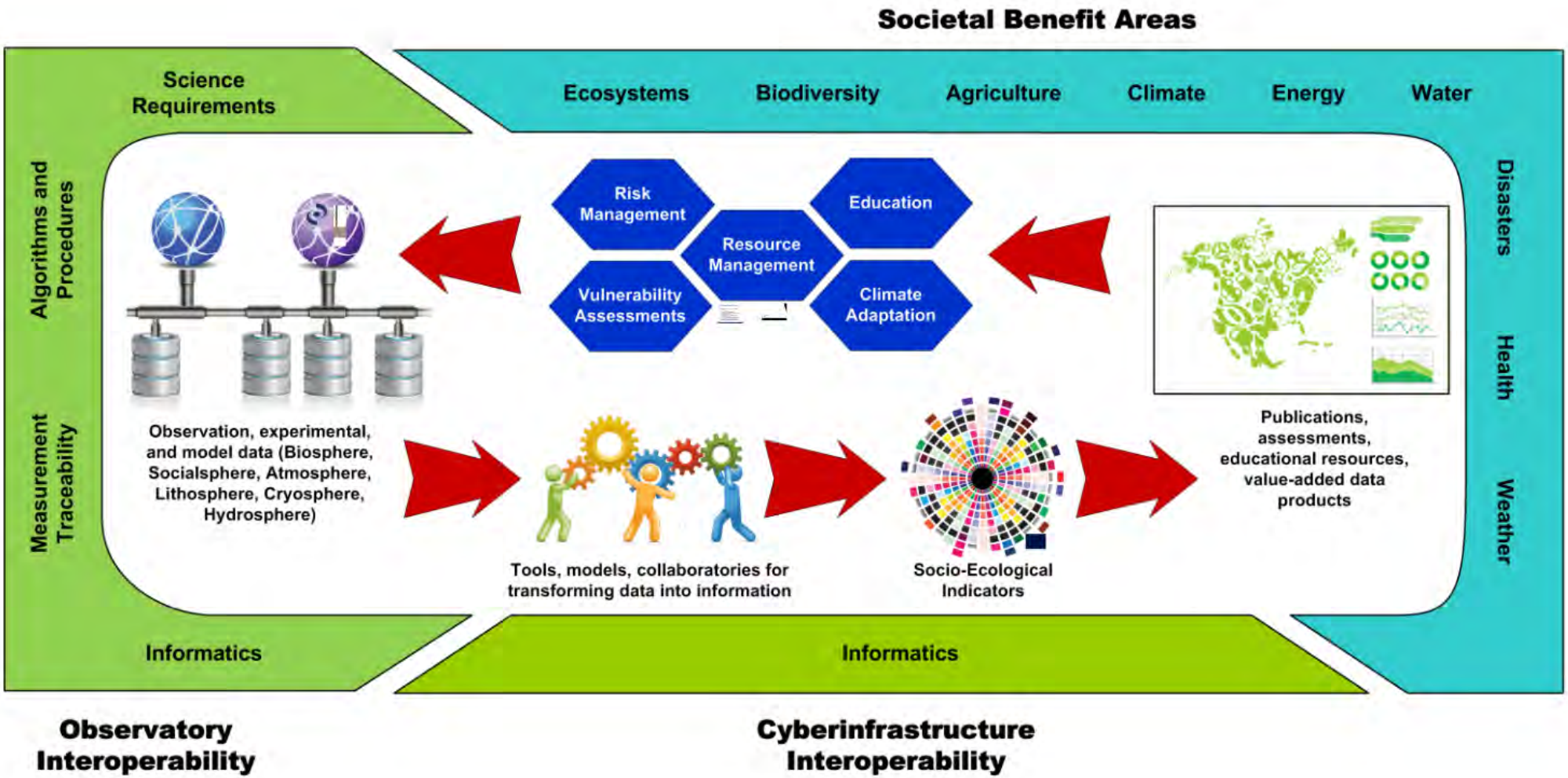
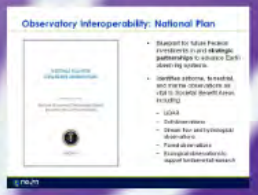
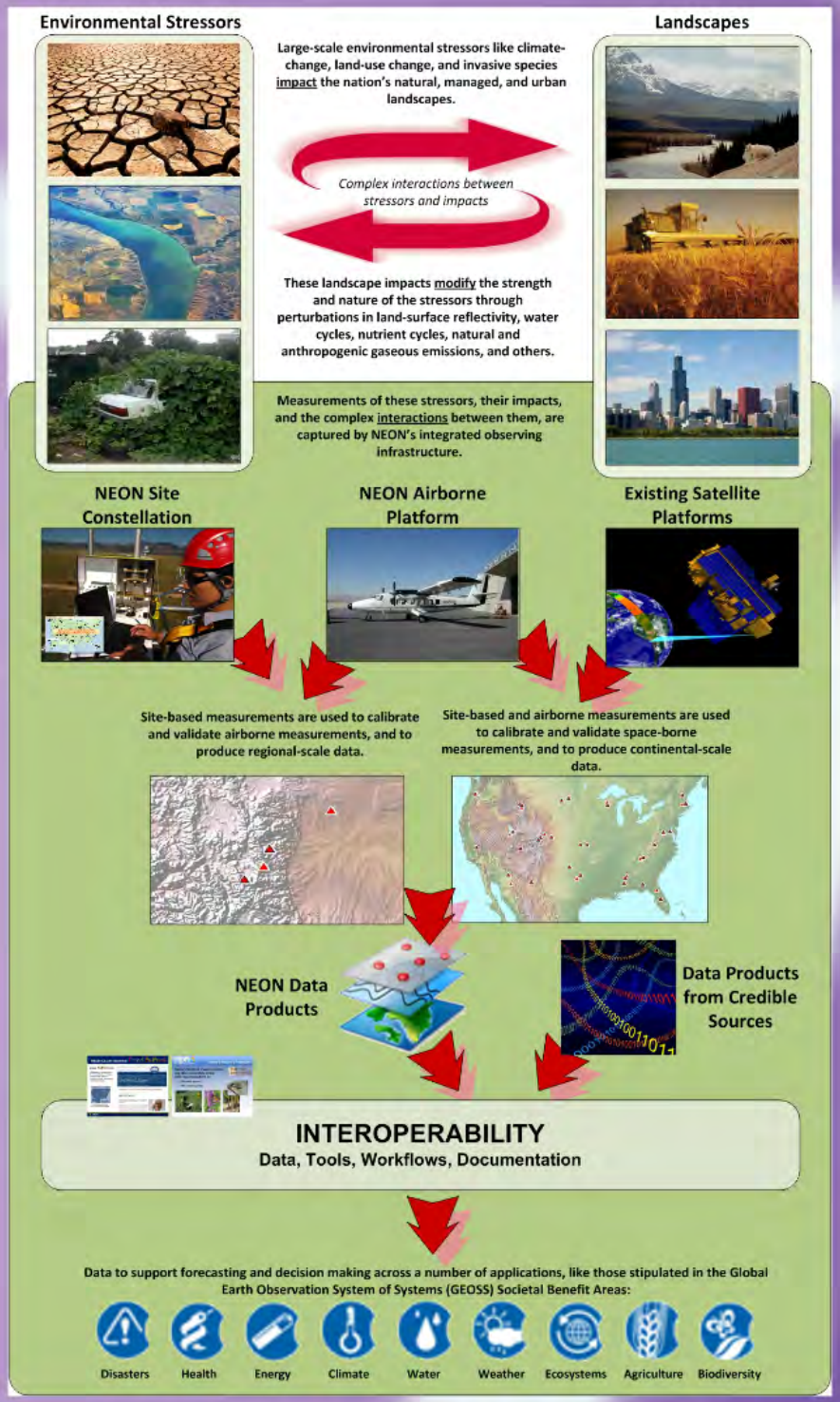


CCAFS structure:
Yield forecast work flow


INTEROPERABILITY


Integration of US Observation Assets


Observatory Interoperability: National Plan


Environmental Stressors
Landscapes
Large-scale environmental stressors like climate-change, land-use change, and invasive species impact the nation's natural, managed, and urban landscapes.
Complex interactions between stressors and impacts
These landscape impacts modify the strength and nature of the stressors through perturbations in land-surface reflectivity, water cycles, nutrient cycles, natural and anthropogenic gaseous emissions, and others.
Measurements of these stressors, their impacts, and the complex interactions between them, are captured by NEON's integrated observing infrastructure.
NEON Site Constellation
NEON Airborne Platform
Existing Satellite Platforms
Site-based measurements are used to calibrate and validate airborne measurements, and to produce regional-scale data.
Site-based and airborne measurements are used to calibrate and validate space-borne measurements, and to produce continental-scale data.
NEON Data Products
Data Products from Credible Sources
INTEROPERABILITY
Data, Tools, Workflows, Documentation
Data to support forecasting and decision making across a number of applications, like those stipulated in the Global Earth Observation System of Systems (GEOSS) Societal Benefit Areas:
Disasters
Health
Energy
Climate
Water
Weather
Ecosystems
Agriculture
Biodiversity

Environmental Stressors

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NEON Site Constellation

NEON Airborne Platform

Existing Satellite Platforms

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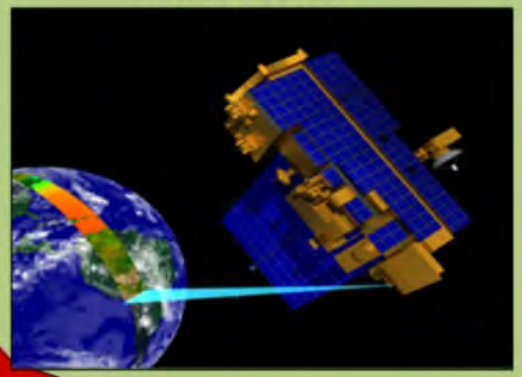
NEON Airborne Platform

Existing Satellite Platforms



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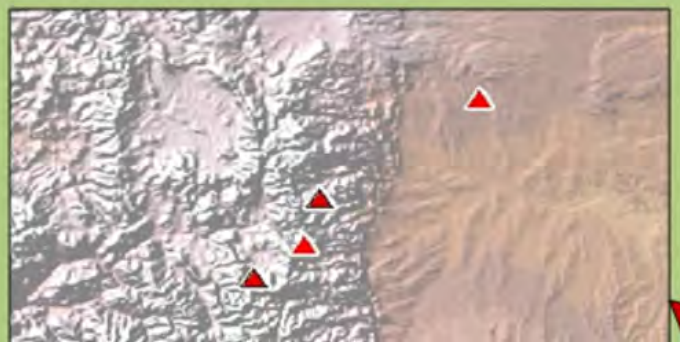
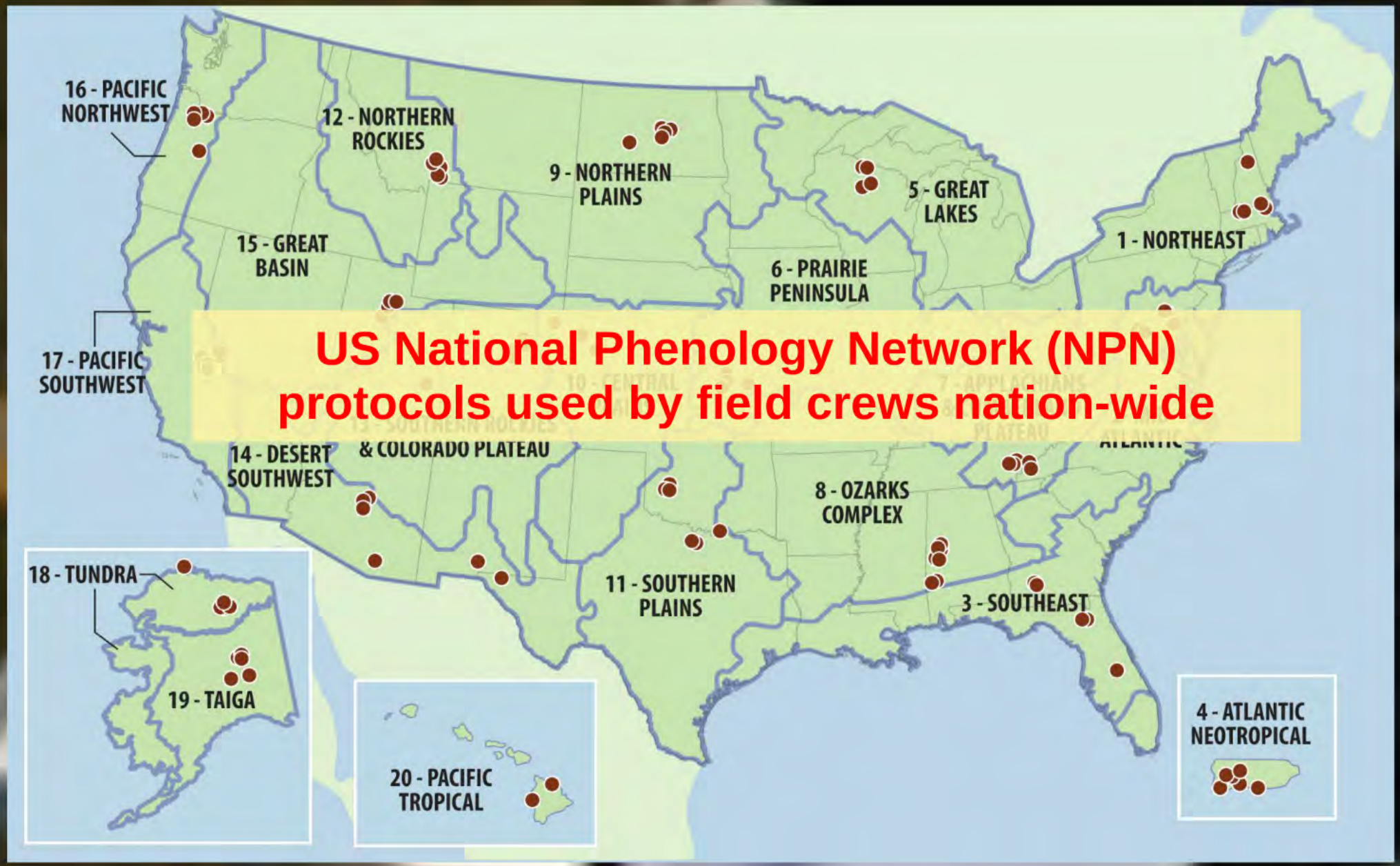
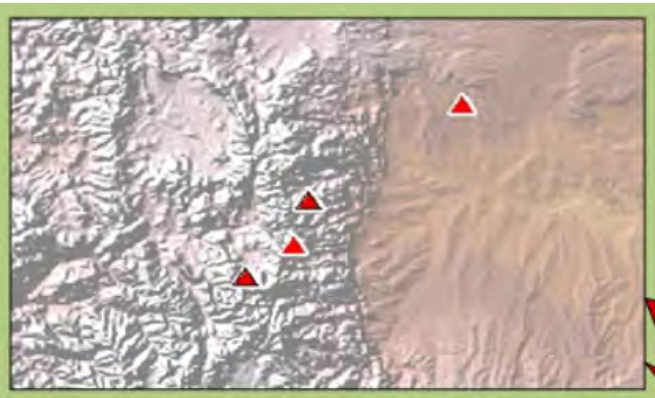
Site-based and airborne measurements are used to calibrate and validate space-borne measurements, and to produce continental-scale data.





US National Phenology Network (NPN) protocols used by field crews nation-wide



NEON Data Products

Data Products from Credible Sources

INTEROPERABILITY

Data, Tools, Workflows, Documentation

Data to support forecasting and decision making across a number of applications, like those stipulated in the Global Earth Observation System of Systems (GEOSS) Societal Benefit Areas:


Disasters


Health


Energy


Climate


Water


Weather

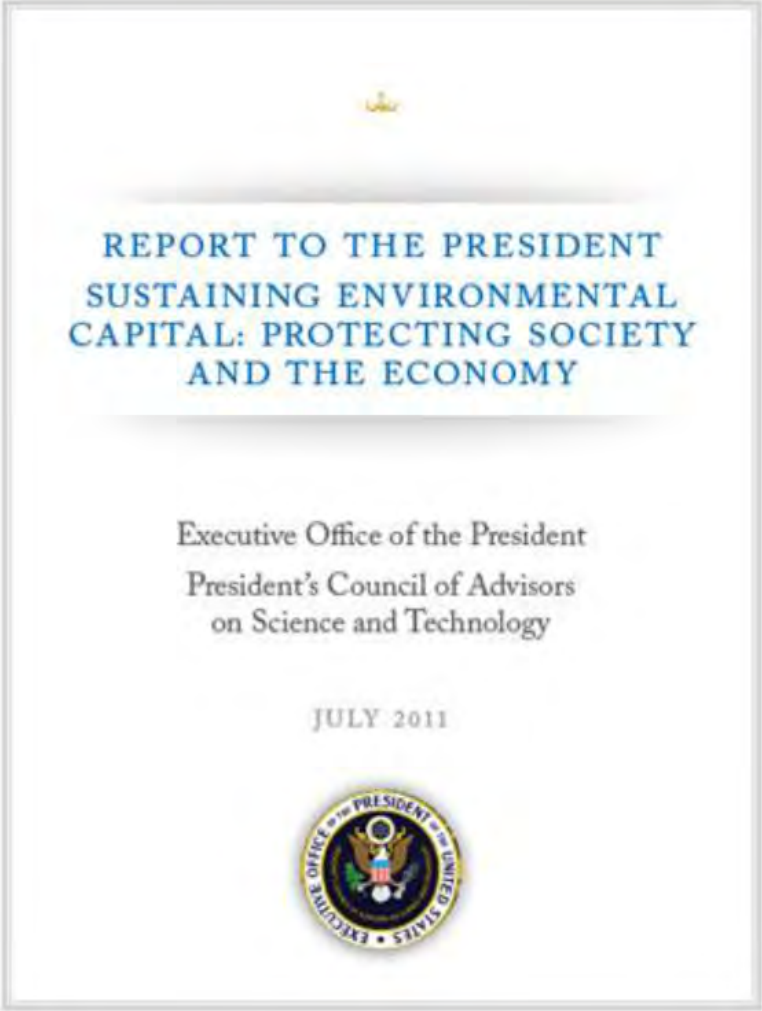

Ecosystems


Agriculture


Biodiversity

Integration of US Observation Assets

"…**collaboration in monitoring** could rapidly improve the information base available for assessment and management…. recommendations should be developed for **integrating** the existing monitoring networks with the help of state-of-the art **informatics**"



REPORT TO THE PRESIDENT

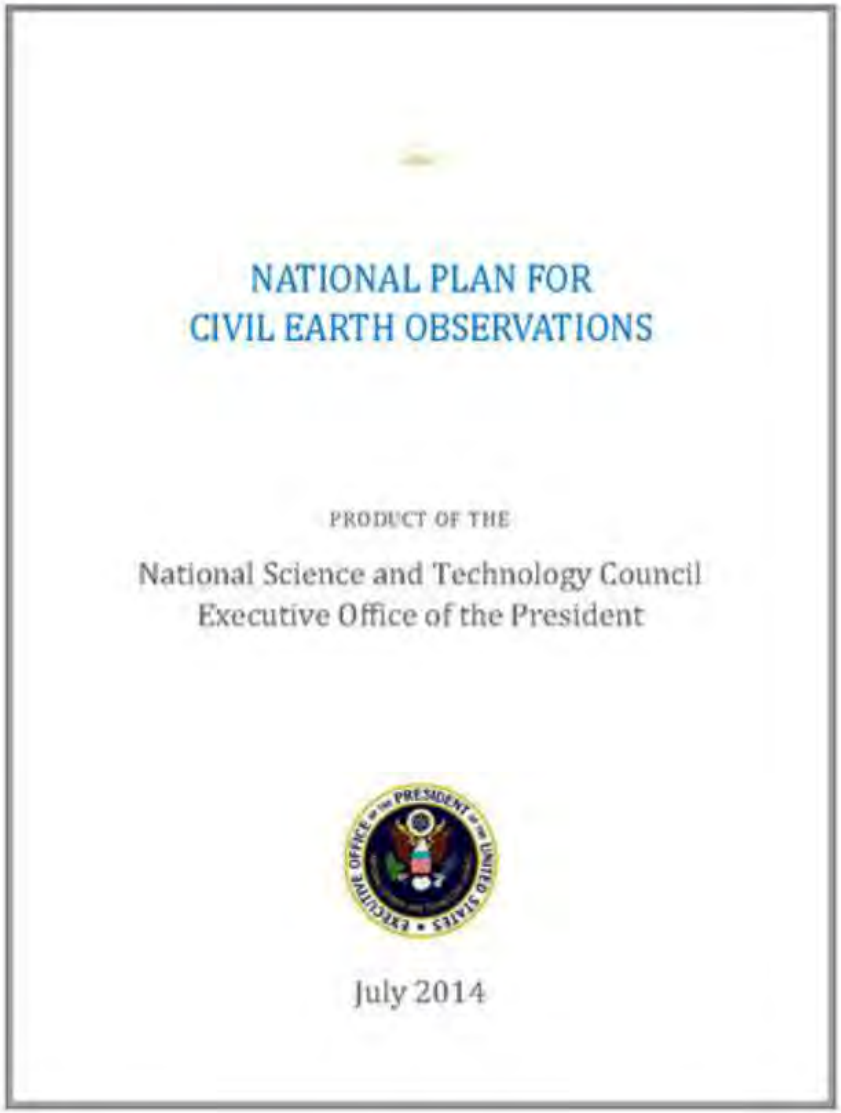
SUSTAINING ENVIRONMENTAL CAPITAL: PROTECTING SOCIETY AND THE ECONOMY

Executive Office of the President

President's Council of Advisors on Science and Technology

JULY 2011

Observatory Interoperability: National Plan



NATIONAL PLAN FOR
CIVIL EARTH OBSERVATIONS

PRODUCT OF THE

National Science and Technology Council
Executive Office of the President

July 2014

- Blueprint for future Federal investments in and **strategic partnerships** to advance Earth observing systems.
- Identifies airborne, terrestrial, and marine observations as vital to Societal Benefit Areas, including:
  - LiDAR
  - Soil observations
  - Stream flow and hydrological observations
  - Forest observations
  - Ecological observations to support fundamental research

NEON Citizen Science: Project BudBurst

www. BudBurst.org

A **network** of people across the United State monitoring plants as the seasons change to better understand changing climates.

Nationwide Observations

15,000 people involved
over 19,000 observations

the WHITE HOUSE PRESIDENT BARACK OBAMA

BLOG | PHOTOS & VIDEO | BRIEFING ROOM | ISSUES | the ADMINISTRA

Home • The Administration • Champions of Change

Champions of Change
WINNING the FUTURE ACROSS AMERICA

Home | Blog | Nominate a Champion | Previous Champions

The Stories Plants Can Tell: NEON's Project BudBurst

Posted by Dr. Sandra Henderson on June 25, 2013 at 11:18 AM EDT

E-Mail | Tweet | Share | +

Sandra Henderson is being honored as a Champion of Change for her dedication to increasing public engagement in science and science literacy.

Every plant has a story to tell. At my home in Erie, Colorado, I monitor a variety of plants including Common lilac, Quaking aspen, and Red columbine. Each morning feels like a little treasure hunt as I make my rounds to check out the plants! As one of the founders of NEON's Project Budburst, I was able to combine my longtime experience in

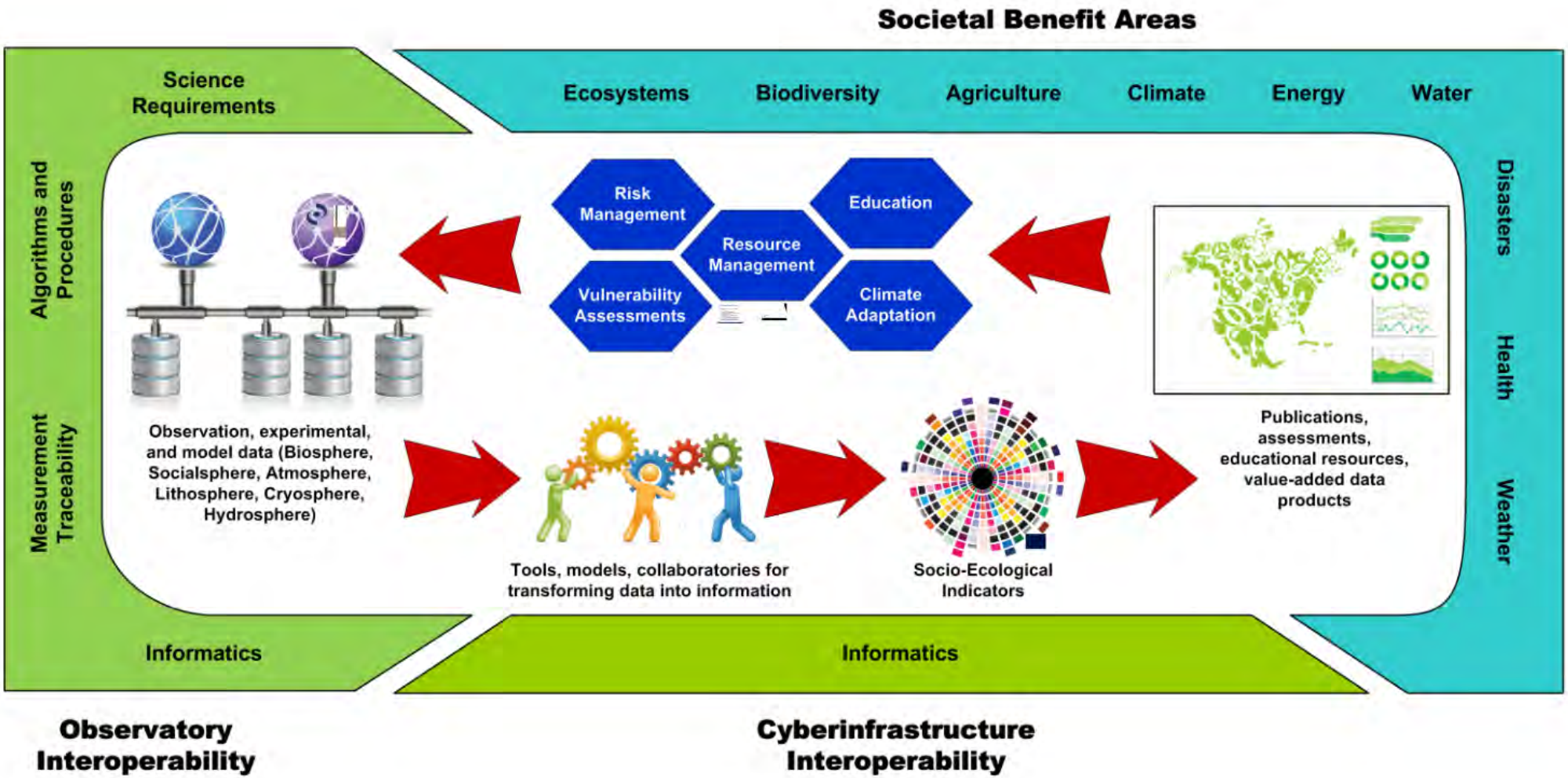
USA npn National Phenology Network

What is *Nature's Notebook*?

nature's notebook
a project of the USA-NPN

Nature's Notebook engages scientists and citizen scientists to collect phenology observations on:

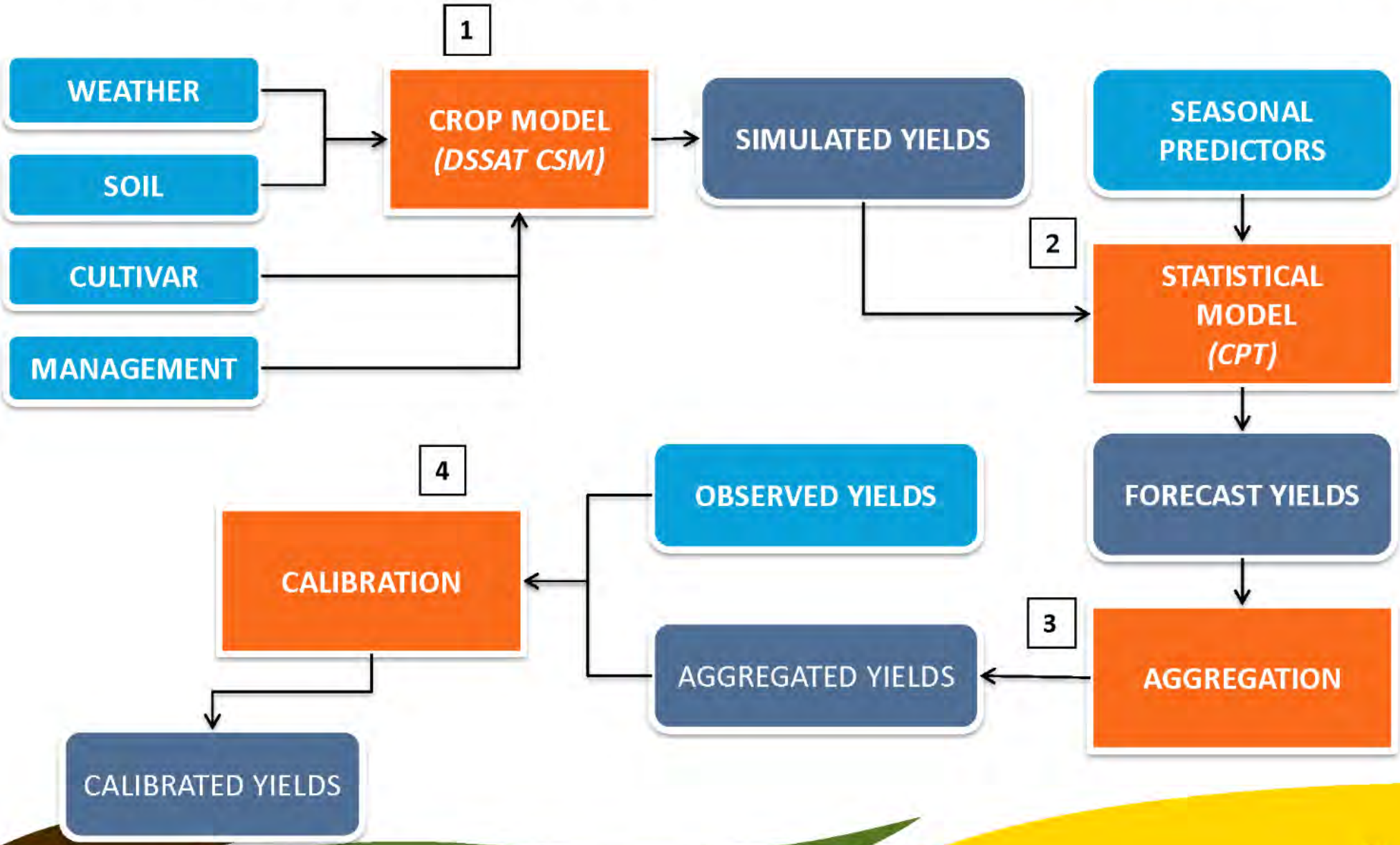
- 258+ plant species
- 160+ animal species



CCAFS structure:
Yield forecast work flow

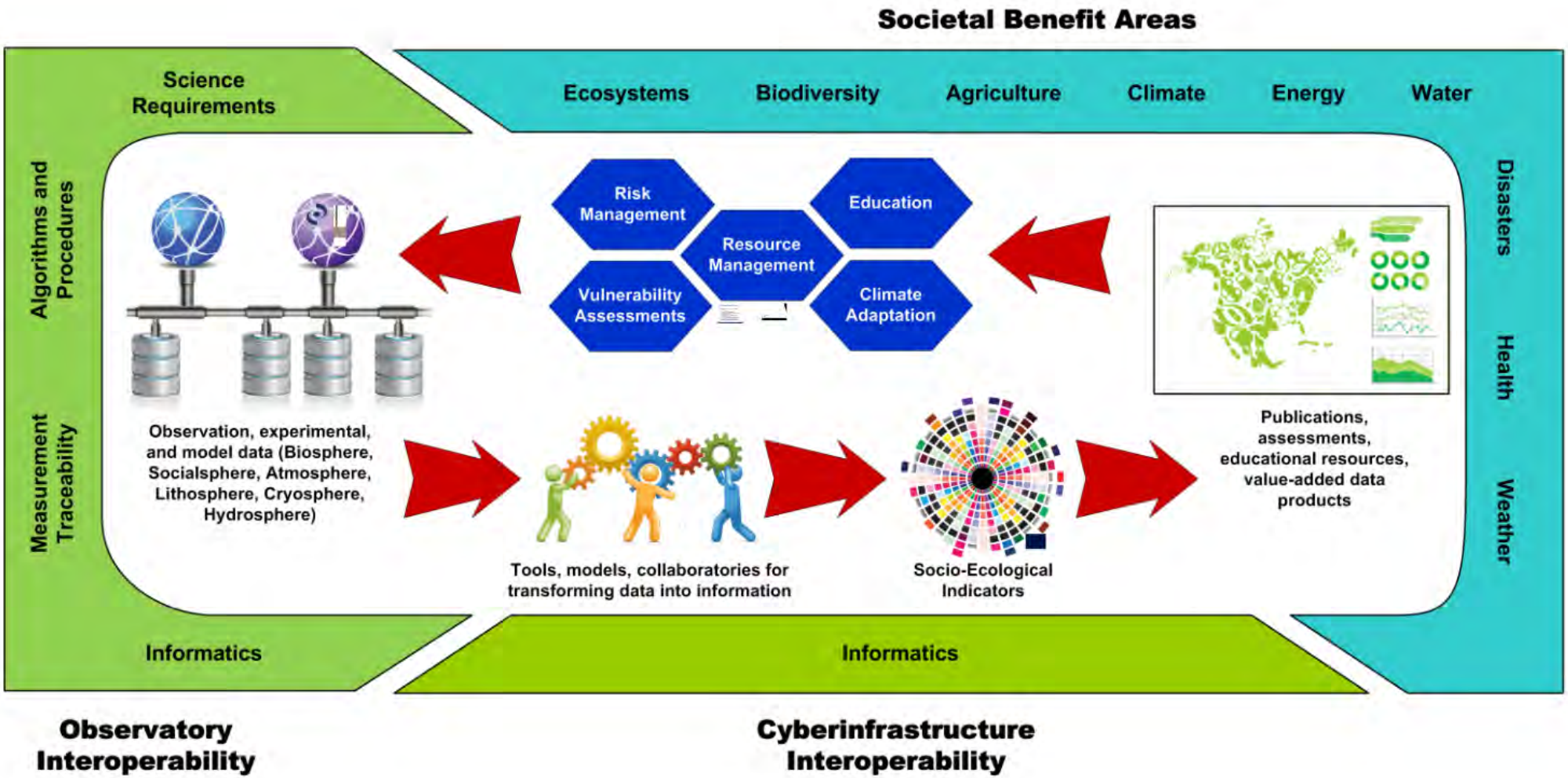
CCAFS structure: Yield forecast work flow

RESEARCH PROGRAM ON Climate Change, Agriculture and Food Security



CCAFS — Climate Change, Agriculture and Food Security

Photo: Neil Palmer/CIAT



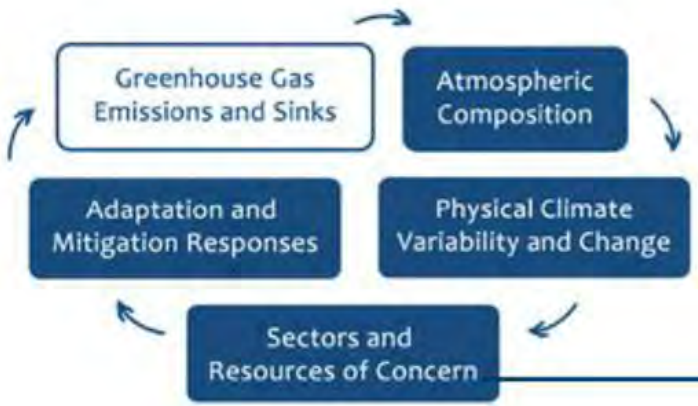
CCAFS structure:
Yield forecast work flow

Indicators: proposed USGCRP indicators

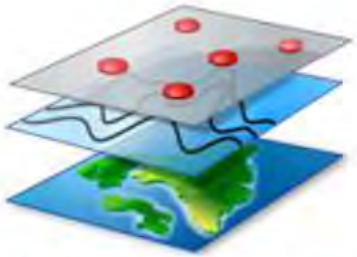
Proposed agricultural indicators may ultimately include:

globalchange.gov
U.S. Global Change Research Program

National Climate Change Indicators

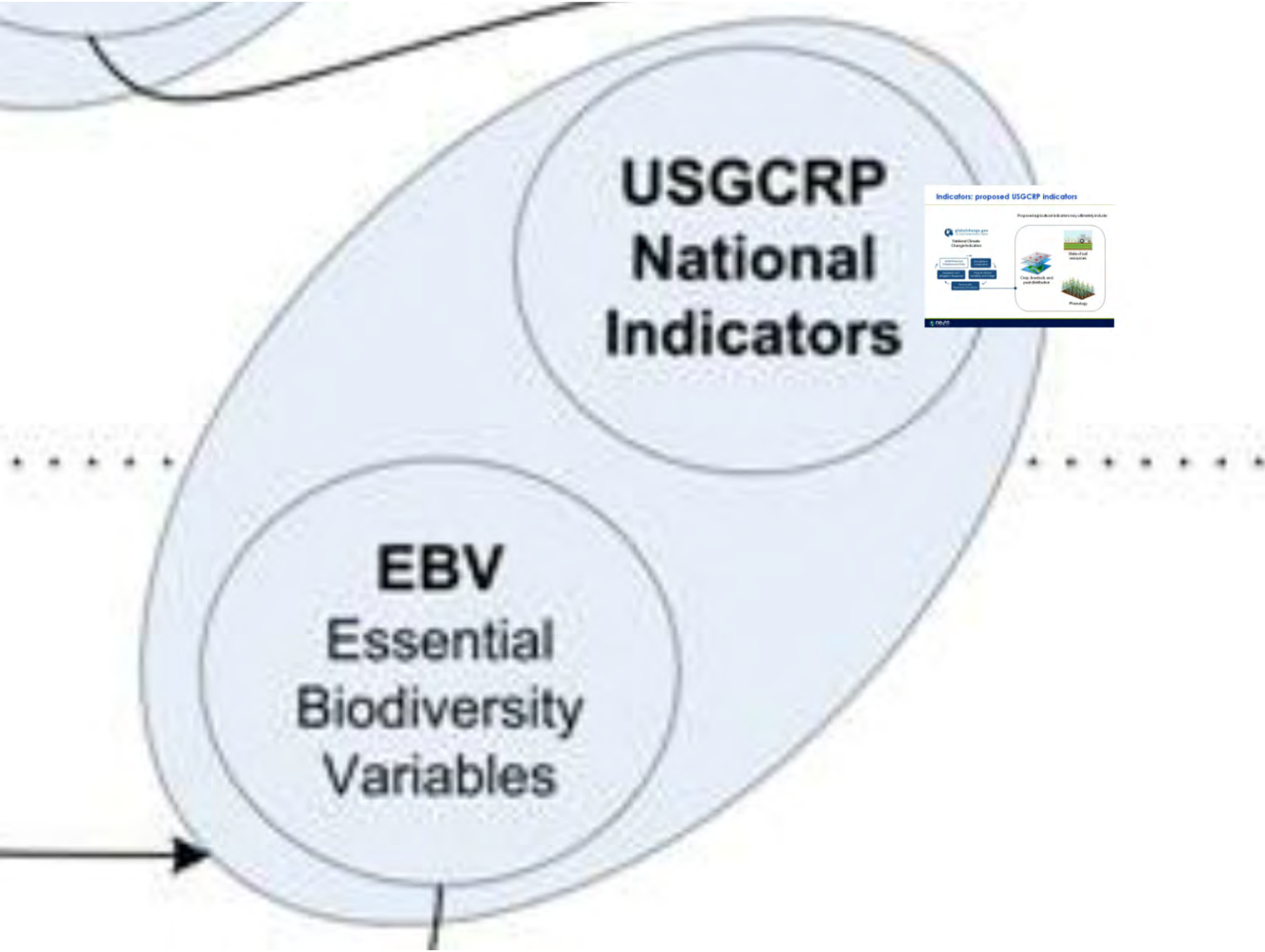


State of soil resources

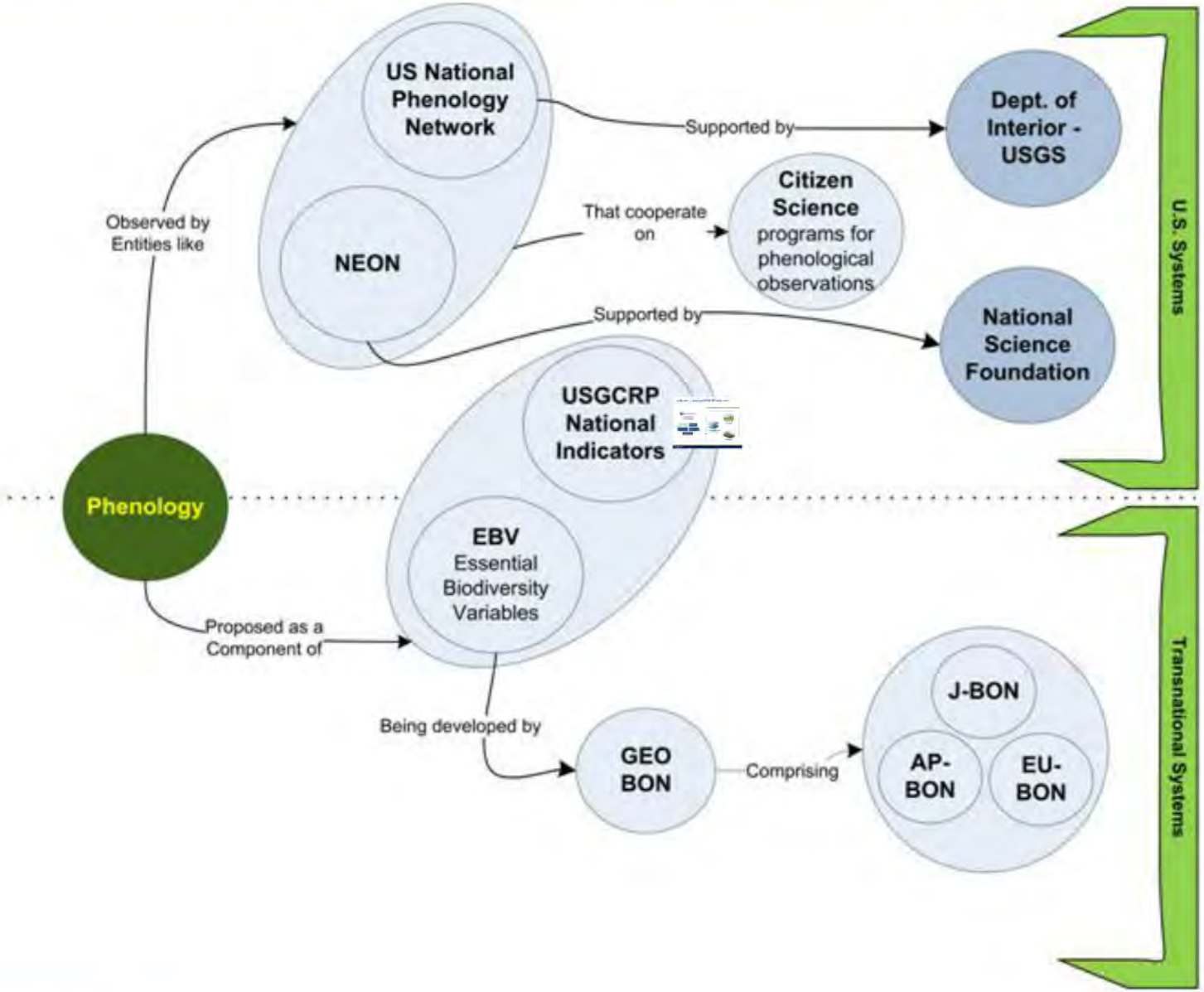


Crop, livestock, and pest distribution

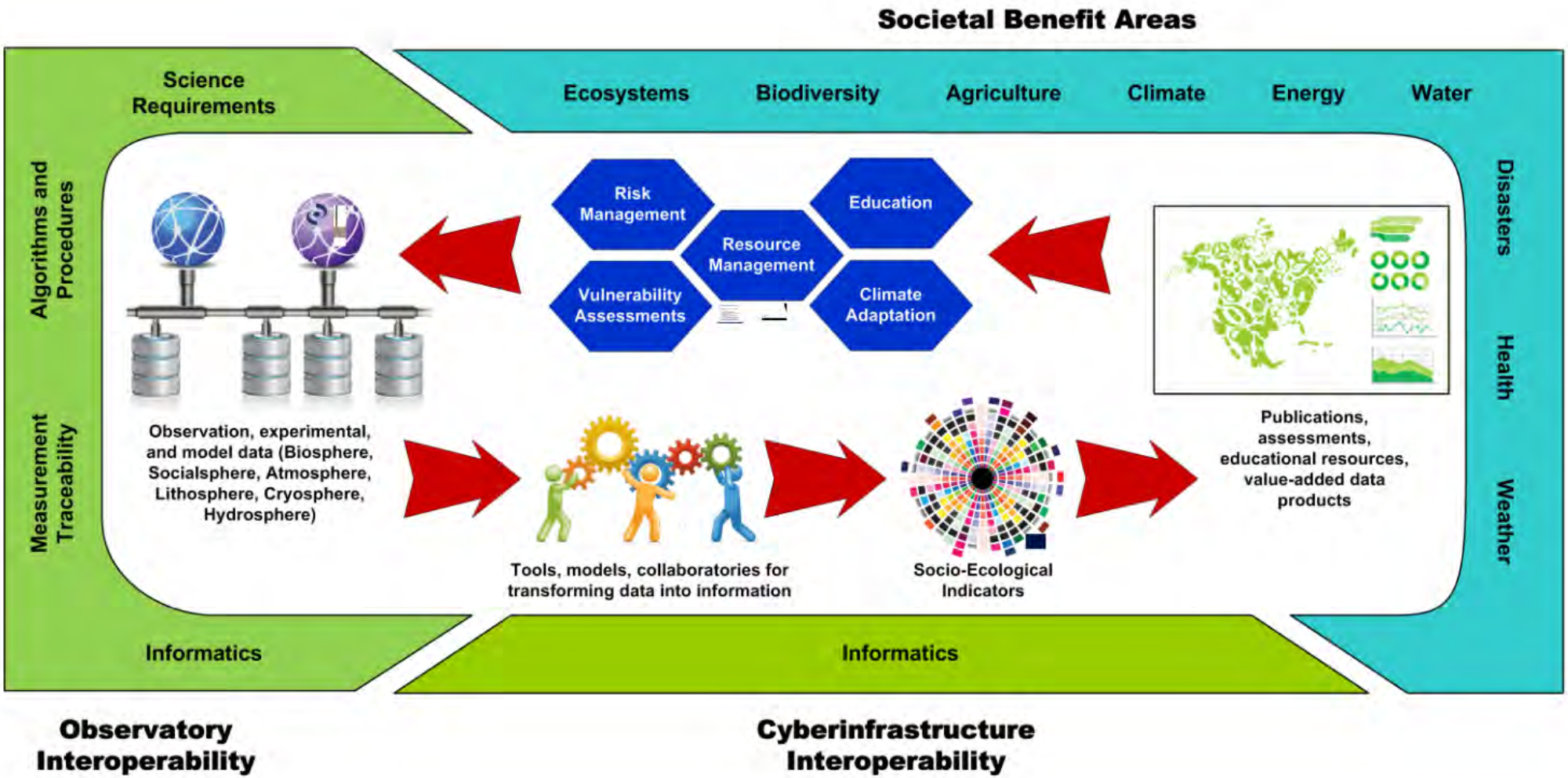
Phenology


USGCRP
National
Indicators
Indicators: proposed USGCRP indicators
EBV
Essential
Biodiversity
Variables

Scalable Observations to Inform Global Concerns



- Phenology: robust ecological indicator & integrator
- Observations that are easily replicated inexpensively and extensively
- Connects citizens, scientists, policy makers



CCAFS structure:
Yield forecast work flow

Esri-NEON Tribal Lands Collaboratory

- "*…using ArcGIS Online as the platform for geospatial content management, science communication, and citizen science.*" – Dawn Wright (Esri Chief Scientist)
- Techno-socio collaborative platform built on:
  - Interdisciplinary, systems-approach for understanding and managing coupled human-natural systems.
  - Transforming data on coupled human-natural systems into information for decision-support.
  - Utilizing technology to link data, science, and information so that resource-management actions are ultimately traceable to data.
  - Addressing environmental challenges at the relevant temporal, spatial, and social scales.

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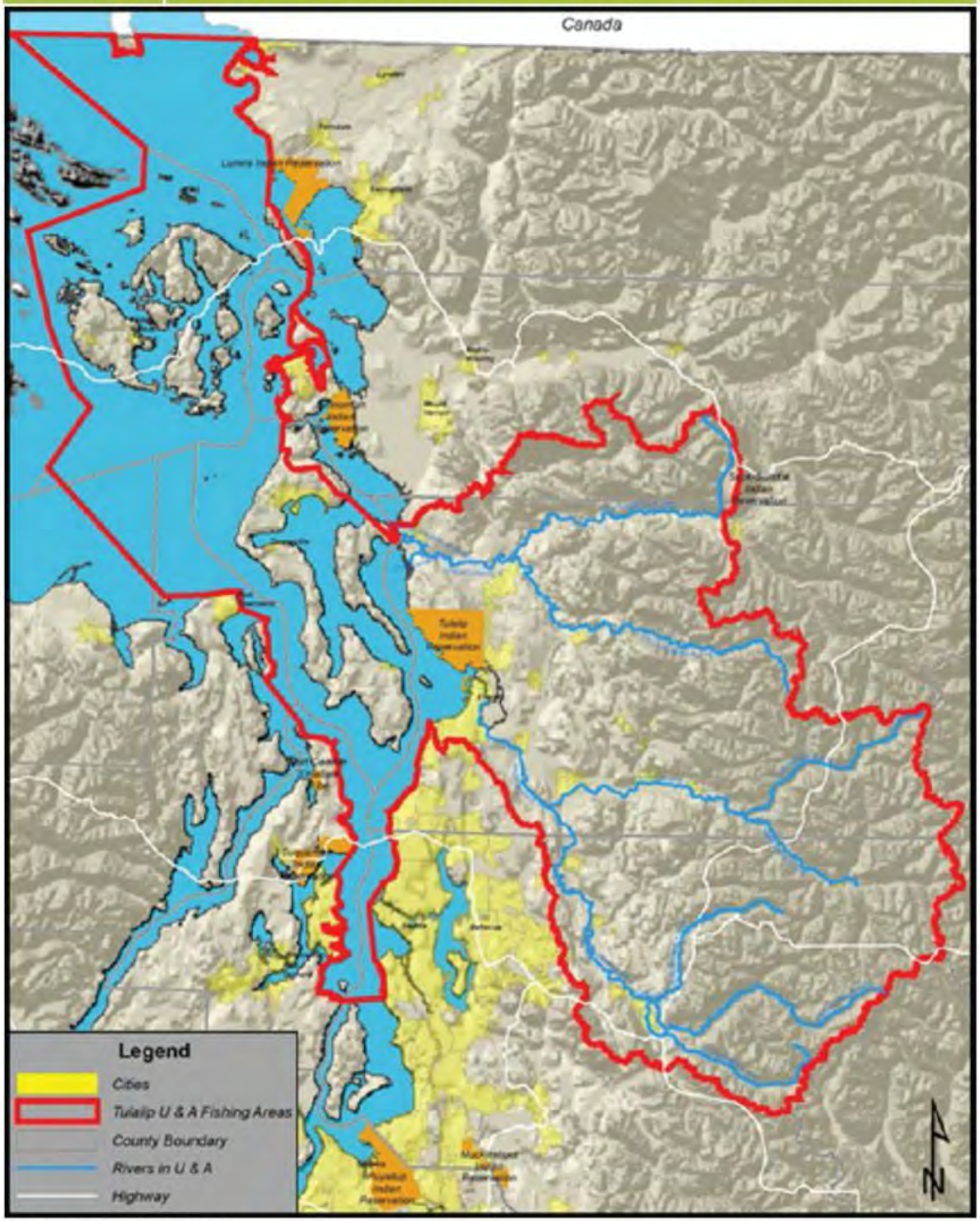
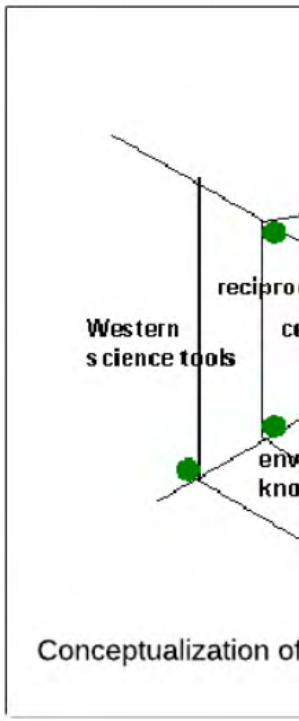
FIGURE 2 | MAP OF THE TULALIP INDIAN RESERVATION AND FISHING AREAS



Map provided by Tulalip Tribes



Questions w

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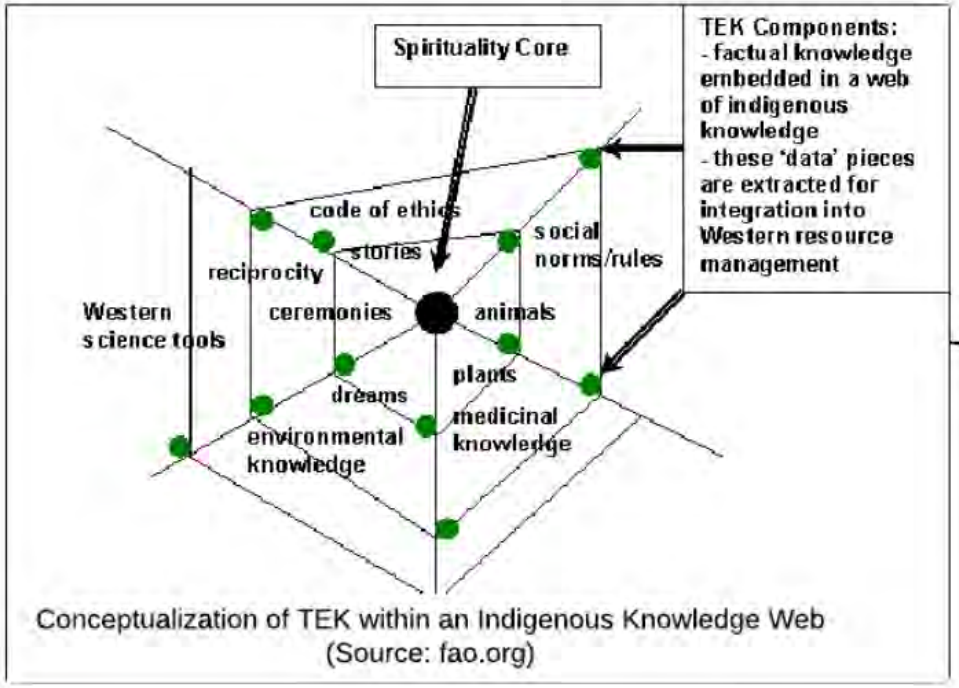

Conceptualization of TEK within an Indigenous Knowledge Web
(Source: fao.org)

US Climate Resilience Toolkit (Part of President Obama's Climate Action Plan)

U. of Notre Dame's Climate Adaptation Collaboratory

Focus on the 'outer' edges of the knowledge web

Inspired the conceptualization of the Toolkit

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Resilience Workflow

Data
Tools and Models
Indicators
Publications
Points of Contact

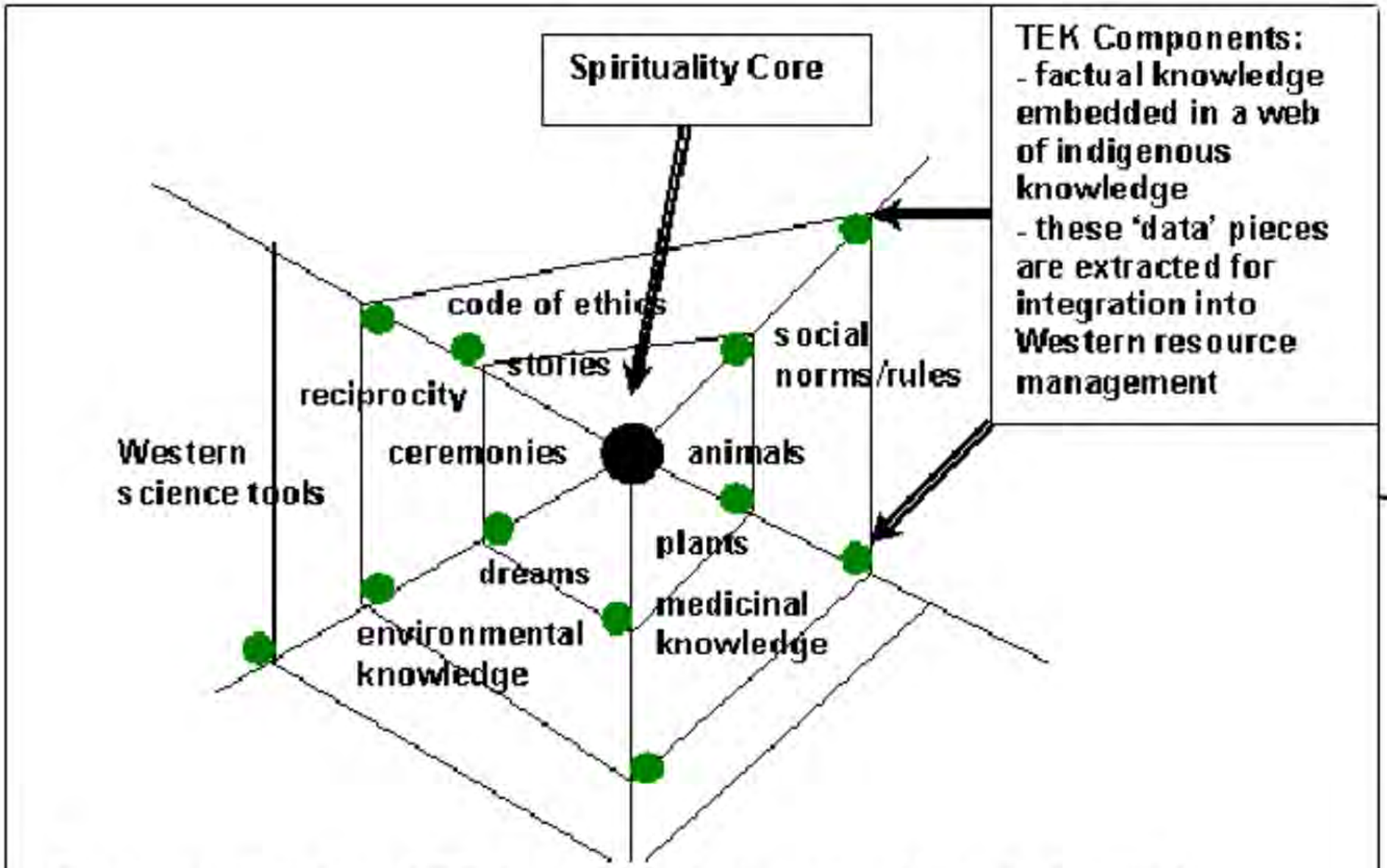
Tribal Science and Technology Resilience Toolkit

Each tribal entity in the partnership contributes to the knowledge commons that is the Toolkit

Tribal Entity #1

Tribal Entity #2

Tribal Entity #3



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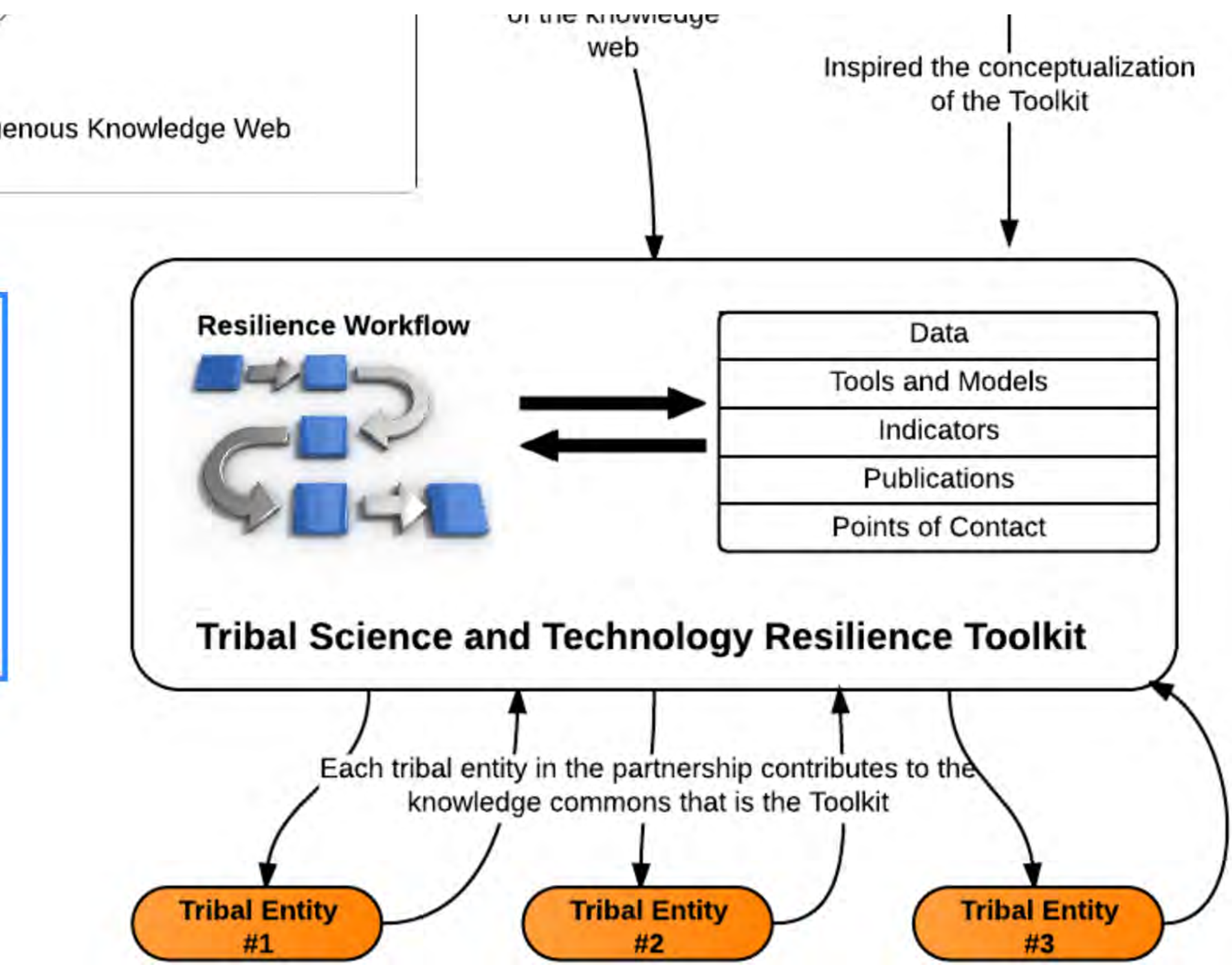
Resilience Workflow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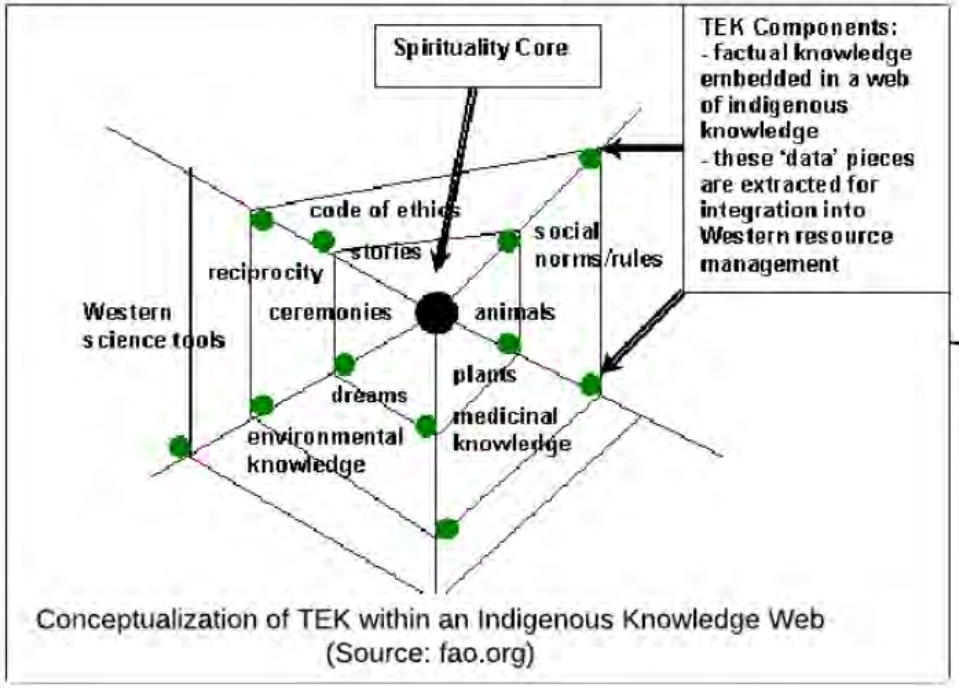

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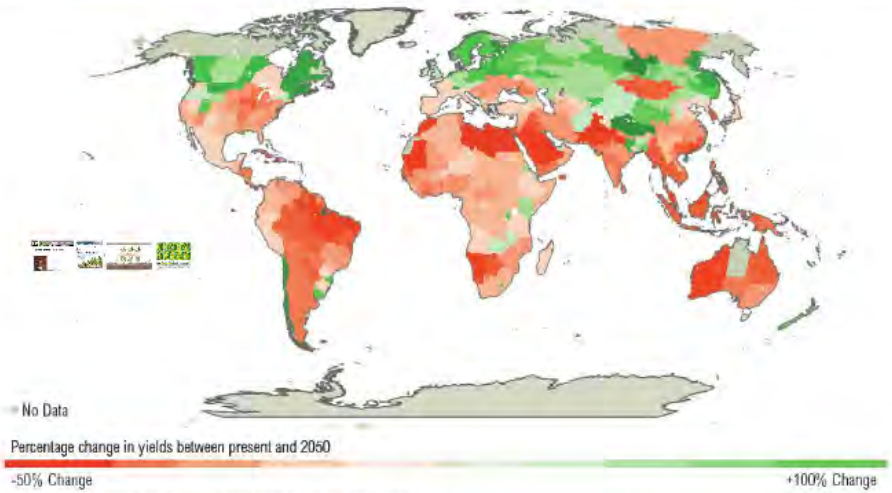
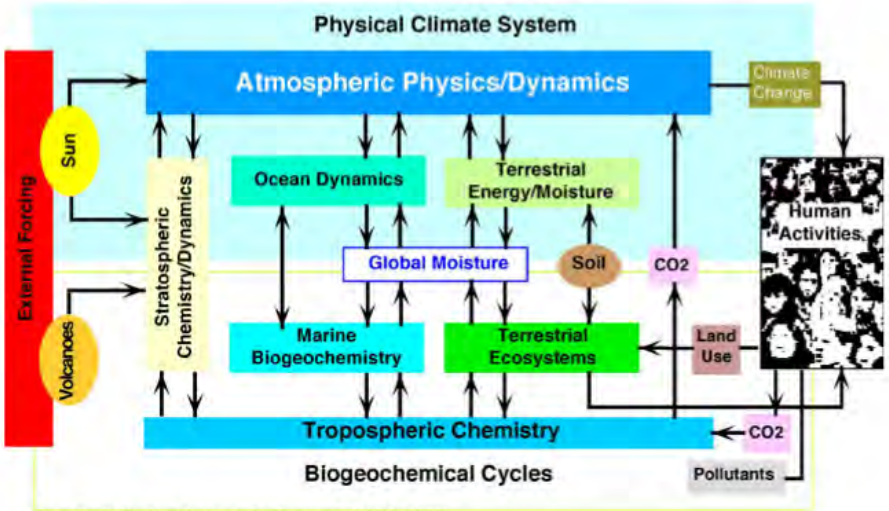
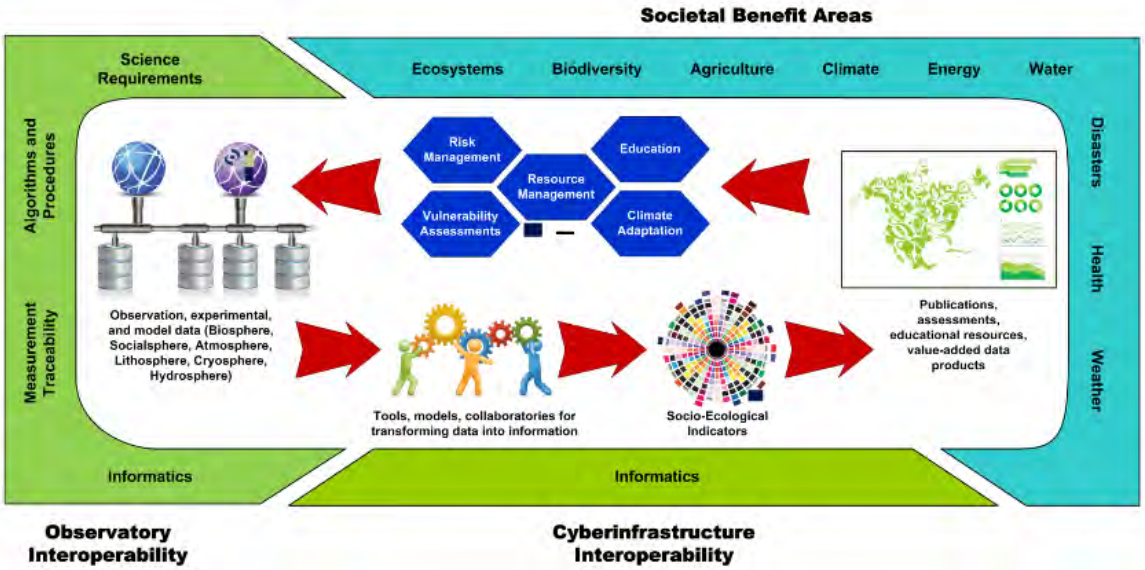
Figure 2 | Climate Change is Projected to Impact Crop Yields (3° C World)



Source: World Bank. 2010. *World Development Report 2010*. Washington, DC: World Bank.



(from Earth System Science: An Overview, NASA, 1988)



CCAFS structure:
Yield forecast work flow

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RESEARCH PROGRAM ON Climate Change, Agriculture and Food Security

Potential role for GEOSS:

Enabling citizen science contribution towards food security / nutrition security issues to enable:

(1) engagement in dialog about large-scale environmental change

(2) demonstration of data-driven science policy

Opportunity: Community Agriculture