The ADVANCE Partnership

Lessons learned in creating more useful climate science

USAID Adaptation Community Meeting

March 16, 2017

Ryan Bartlett | Lead, Climate Risk Management, WWF-US

Center for Climate Systems Research
Earth Institute | Columbia University

ADVANCE

- **WWF-US**, **Center for Climate Systems Research** (CCSR), Columbia University's Earth Institute
- Started in 2015, work in 11 countries:
  - Bolivia, Colombia, Paraguay, Bhutan, Myanmar, Nepal, India, Pakistan, Kyrgyzstan, Tajikistan, Mongolia

WWF

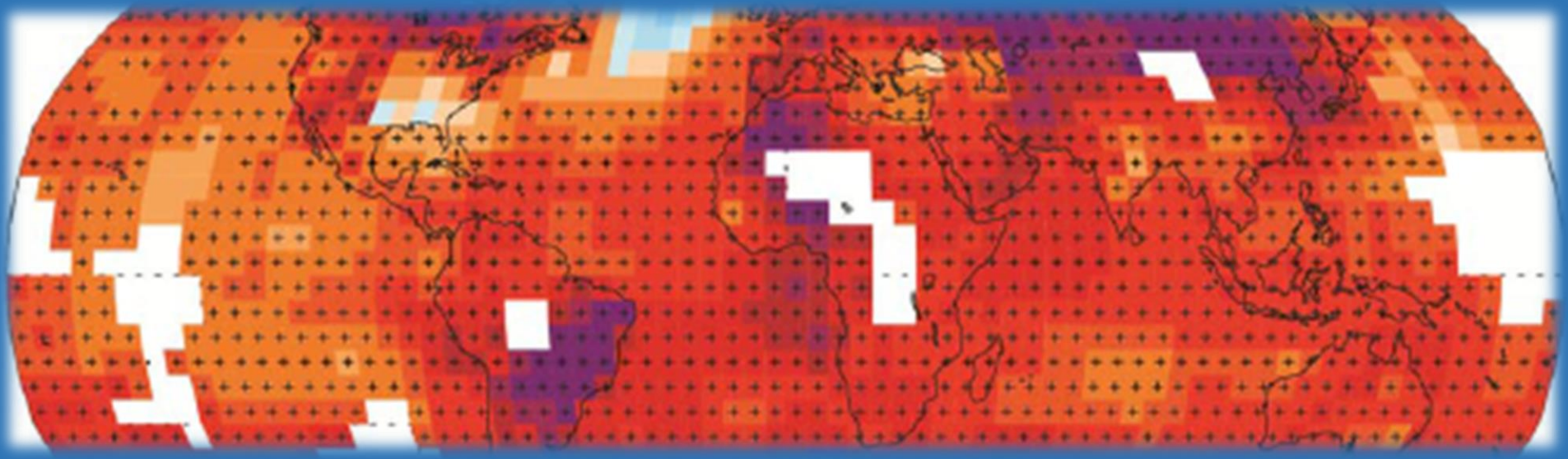
Center for Climate Systems Research
Earth Institute | Columbia University

Why ADVANCE?


Turn flood of climate information into useable stream, experts say
Source: Thomson Reuters Foundation - Thu, 17 Sep 2015 15:15 GMT
Author: Laurie Goering
PLOS | ONE
TENTH ANNIVERSARY
Publish
About
Browse
OPEN ACCESS
PEER-REVIEWED
RESEARCH ARTICLE
Narrative Style Influences Citation Frequency in Climate Change Science
Ann Hillier, Ryan P. Kelly, Terrie Klinger
Published: December 15, 2016 • http://dx.doi.org/10.1371/journal.pone.0167983
A1B
rcp8.5
rcp4.5
Relative Probability
Global Average Surface Temperature Change (°C)
(°C)

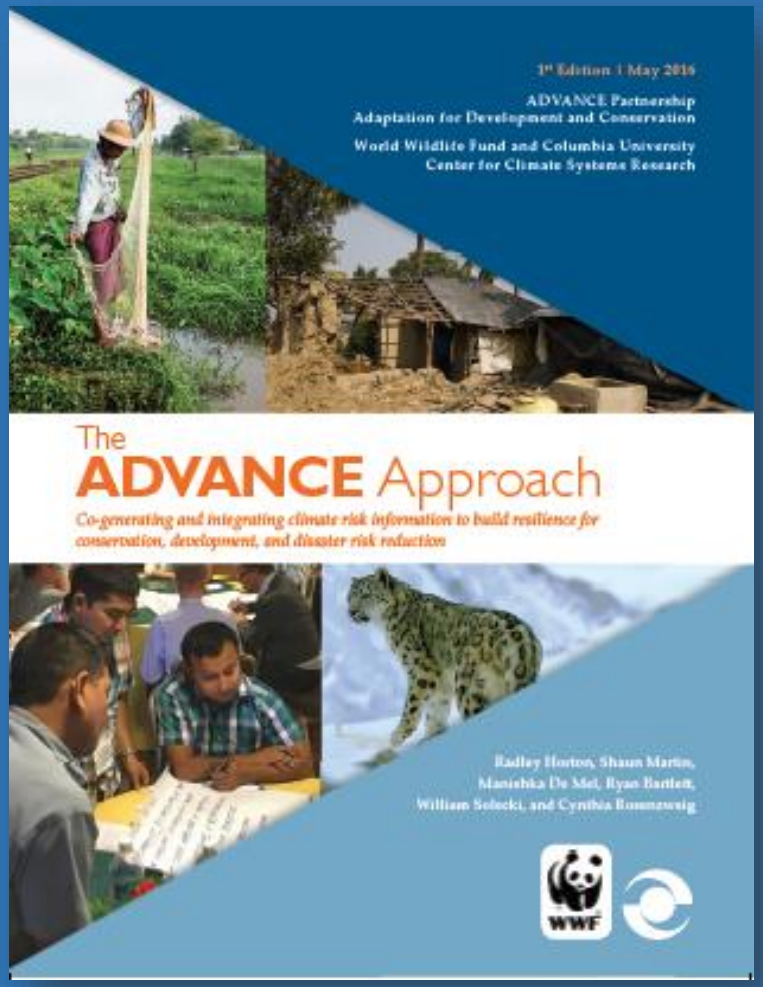
Limitations of climate science

- Lack of observed historical data
- Not tailored to conservation landscapes
- The 2100 problem
- Too much uncertainty to be useful



ADVANCE Approach

Building climate-resilience through **“co-generation”** of **tailored climate-risk information**, incorporation into conservation and development planning, policies and practice.



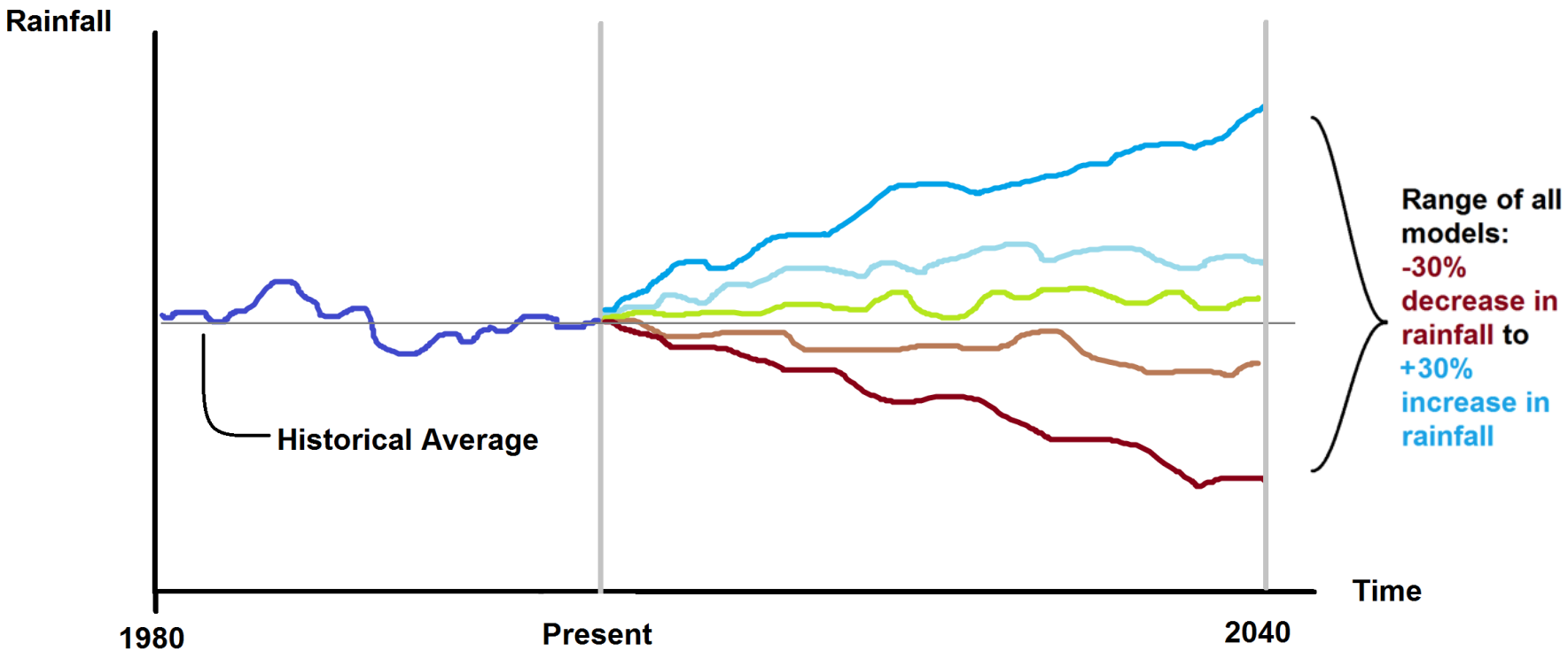
Tailored “co-generation”

- Direct stakeholder consultation
- In-country workshops, interviews, meetings
  - Local staff, communities, government departments

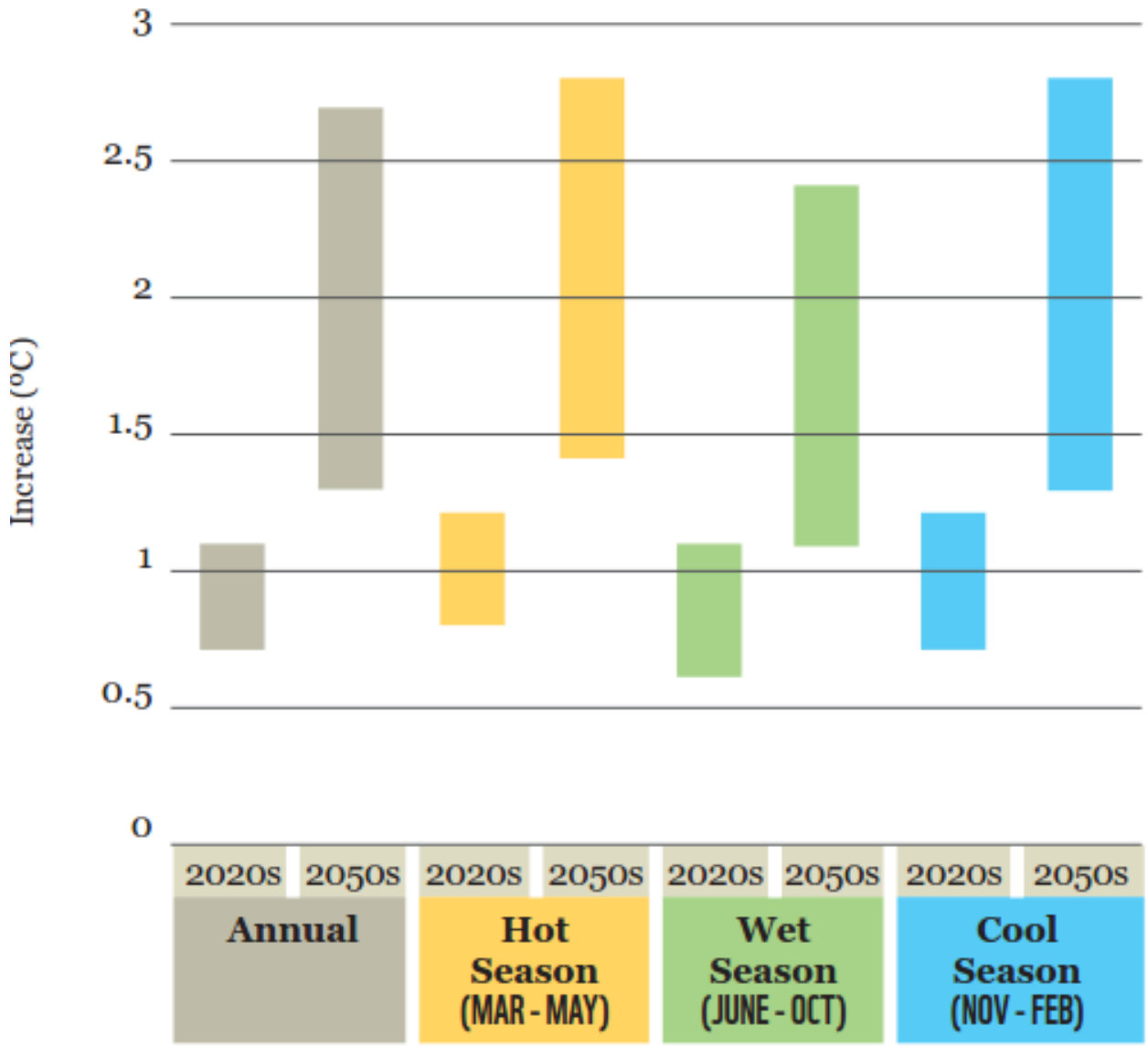
Early improvements

- Downscaled to project areas
- Nearer term timeframes (2011-2040)
- locally appropriate seasons determined by stakeholders
- Uncertainty explicit

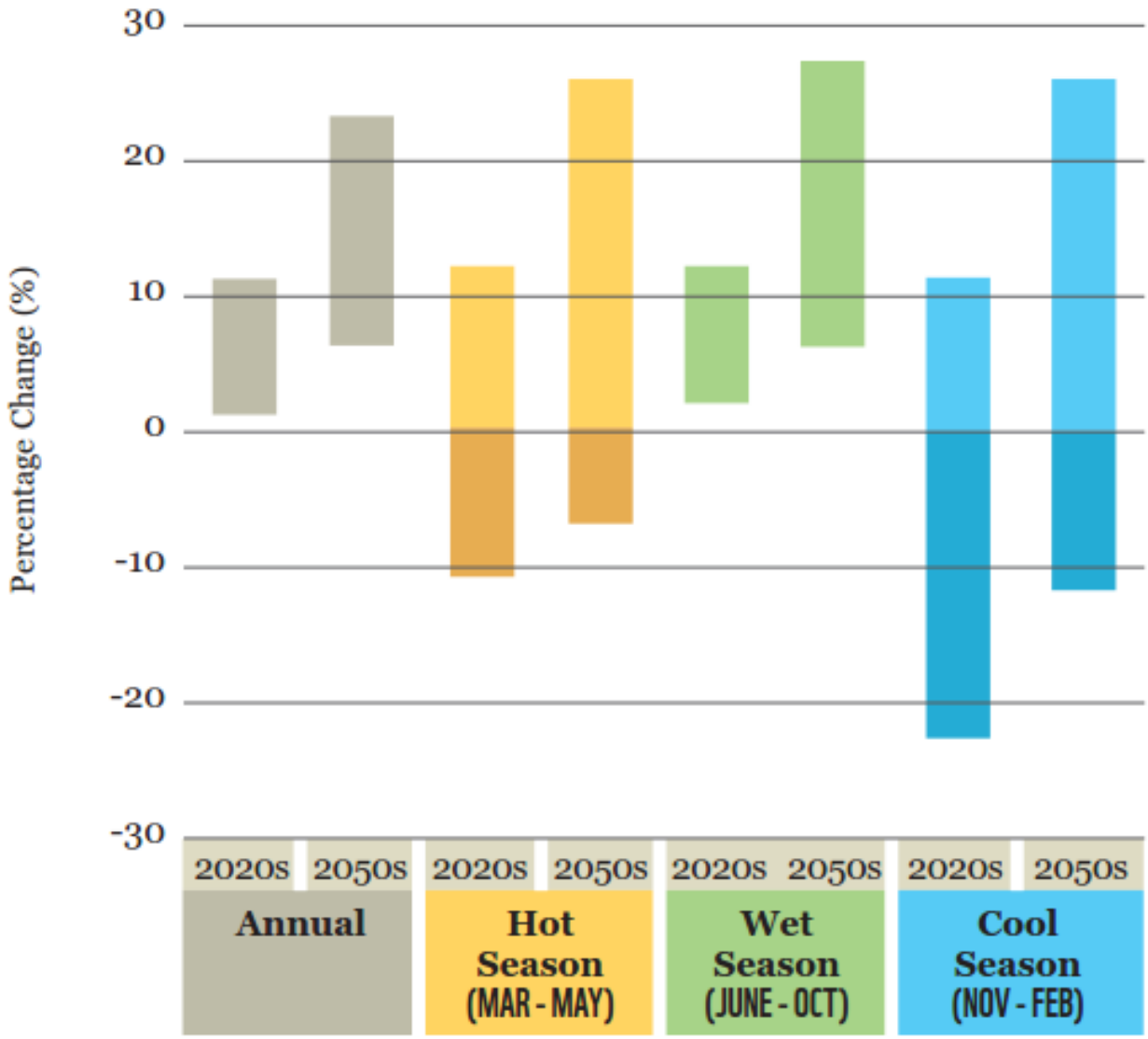
Range > Average



Projected National Temperature Change for the 2020s and 2050s

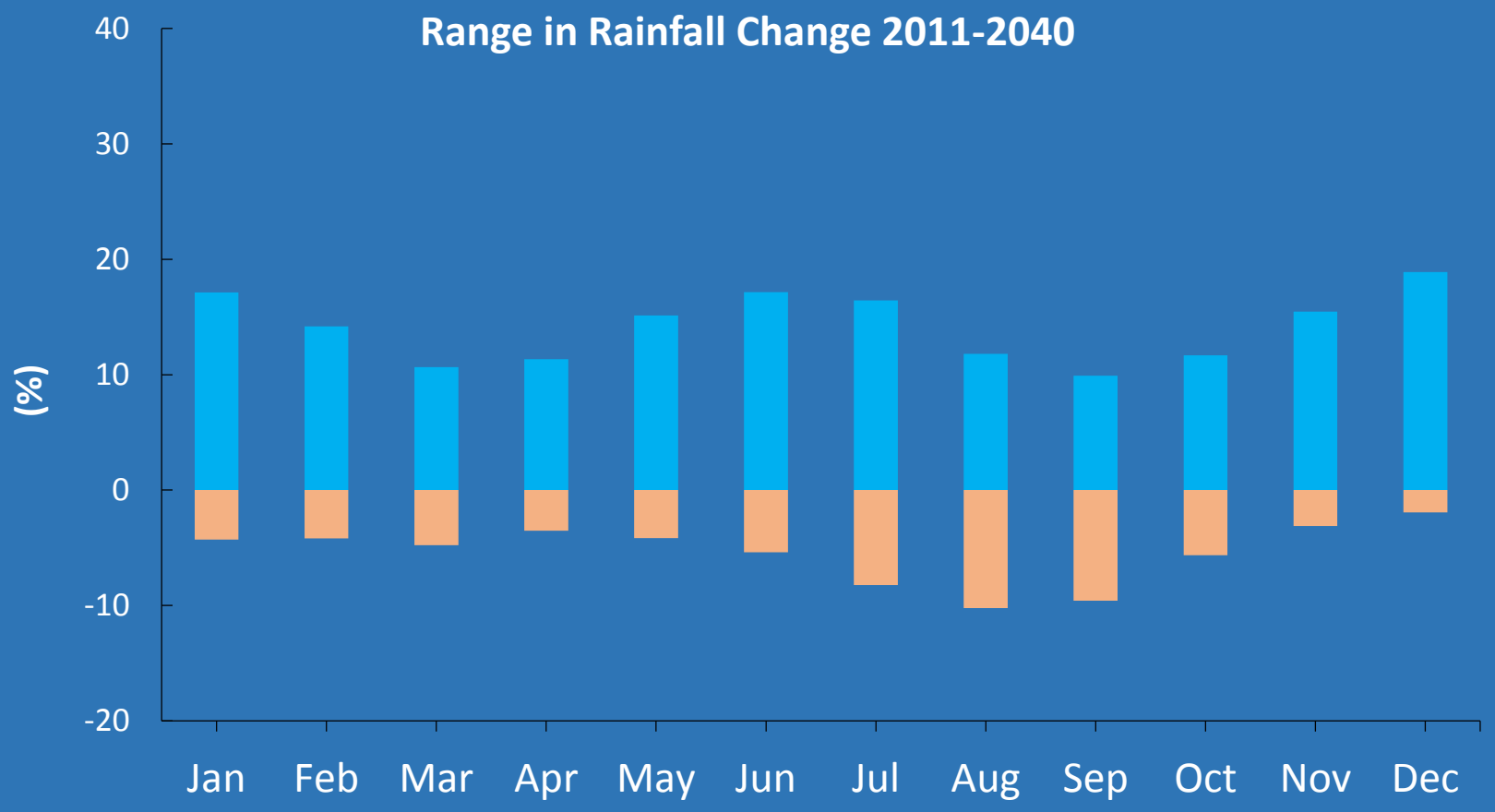


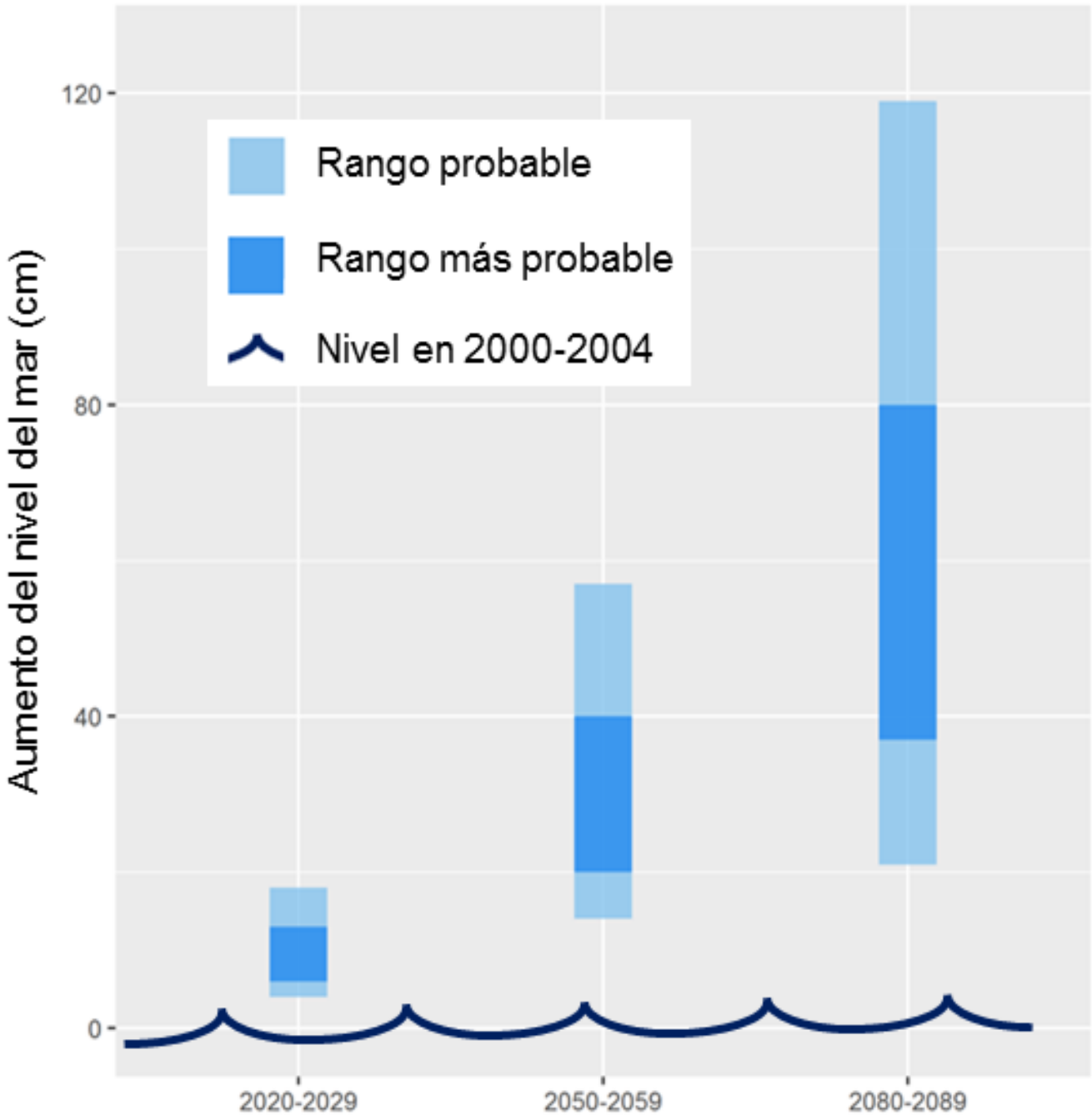
Projected Changes in National Rainfall in the 2020s and 2050s



Mangrove Conservation in Colombia


DIOS ES PARA TODOS
Amigo no es cualquier


Range in Rainfall Change 2011-2040
(%)
40
30
20
10
0
-10
-20
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec


Rango probable
Rango más probable
Nivel en 2000-2004
Aumento del nivel del mar (cm)
120
80
40
0
2020-2029
2050-2059
2080-2089

Lesson Learned

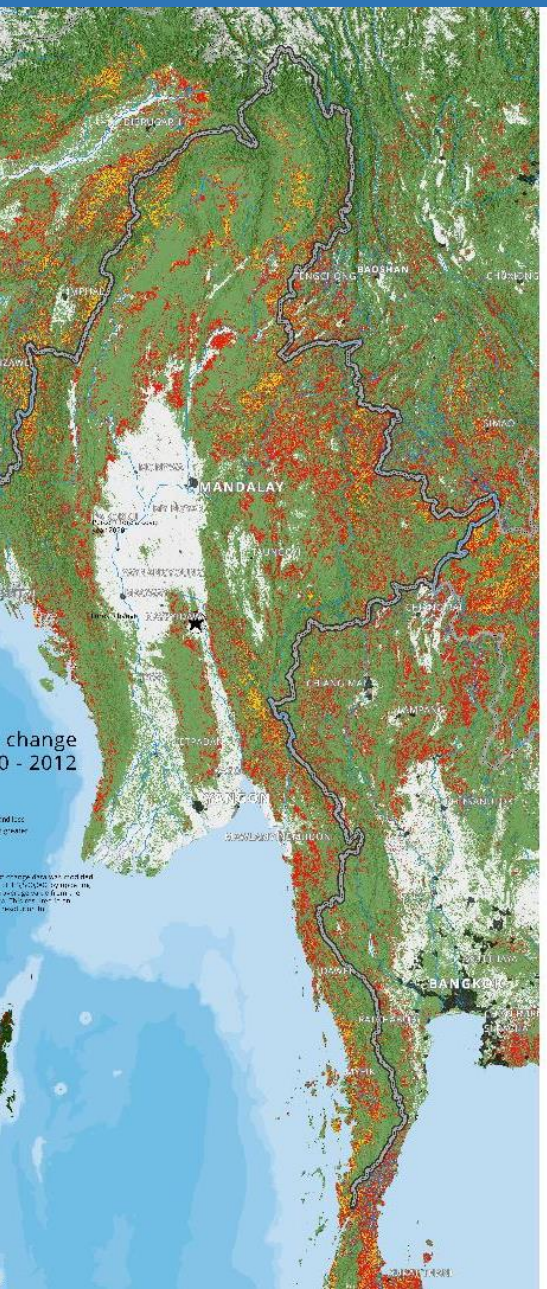
We don’t understand nearly enough about how species and ecosystems respond to climate change to make use of climate science for planning.

Lesson Learned

Identifying and devoting research time to **“known unknowns”** and monitoring ecological change and weather should be built into all conservation strategies.

Myanmar

Natural Capital Assessment



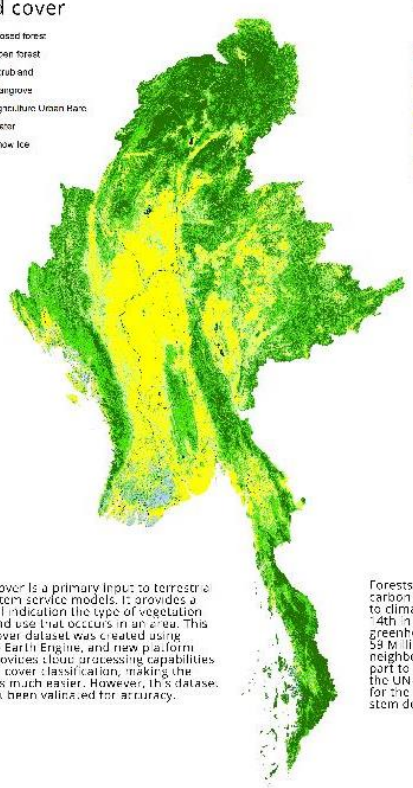
Natural capital in Myanmar

for the benefit of people and wildlife

Myanmar's forests are expansive and contain a rich array of wildlife including elephants, tigers and other endangered species. These forests are also an important source of **natural capital**, providing vital **benefits to the people** of Myanmar and beyond.

Land cover

- Closed forest
- Open forest
- Scrubland
- Mangrove
- Agriculture Urban Bare
- Water
- Snow Ice



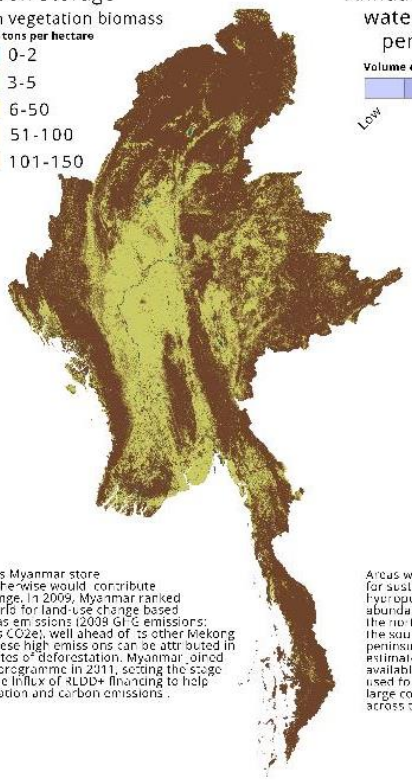
Land cover is a primary input to terrestrial ecosystem service models. It provides a general indication the type of vegetation and land use that occurs in an area. This land cover dataset was created using Google Earth Engine, and new platform that provides cloud processing capabilities to land cover classification, making the process much easier. However, this dataset has not been validated for accuracy.

Carbon Storage

in vegetation biomass

Carbon tons per hectare

- 0-2
- 3-5
- 6-50
- 51-100
- 101-150

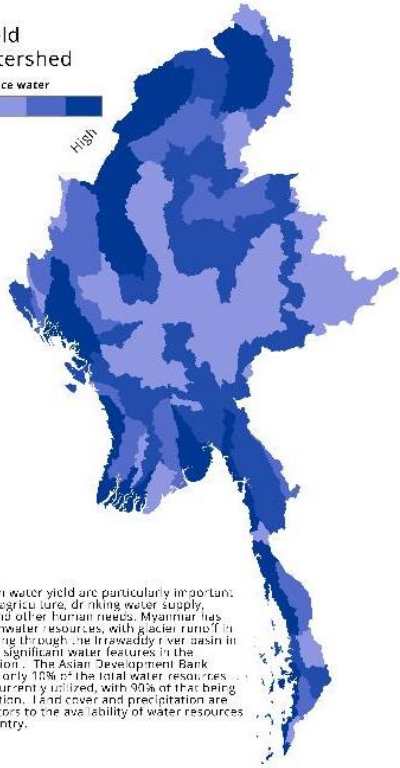


Forests across Myanmar store carbon that otherwise would contribute to climate change. In 2009, Myanmar ranked 14th in the world for land-use change based greenhouse gas emissions (2009 GHG emissions: 59 Million tons CO2e), well ahead of its other Mekong neighbors. These high emissions can be attributed in part to high rates of deforestation. Myanmar joined the UN REDD programme in 2011, setting the stage for the possible influx of REDD+ financing to help stem deforestation and carbon emissions.

Annual water yield per watershed

Volume of surface water

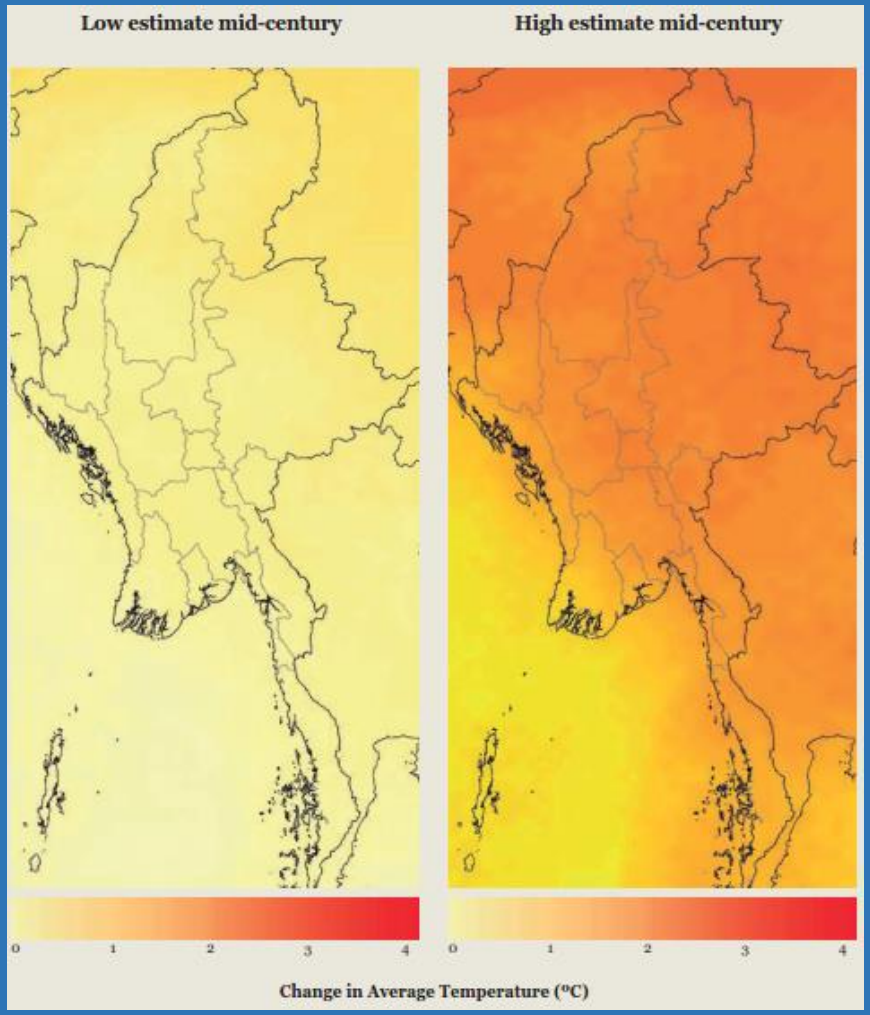
Low — High

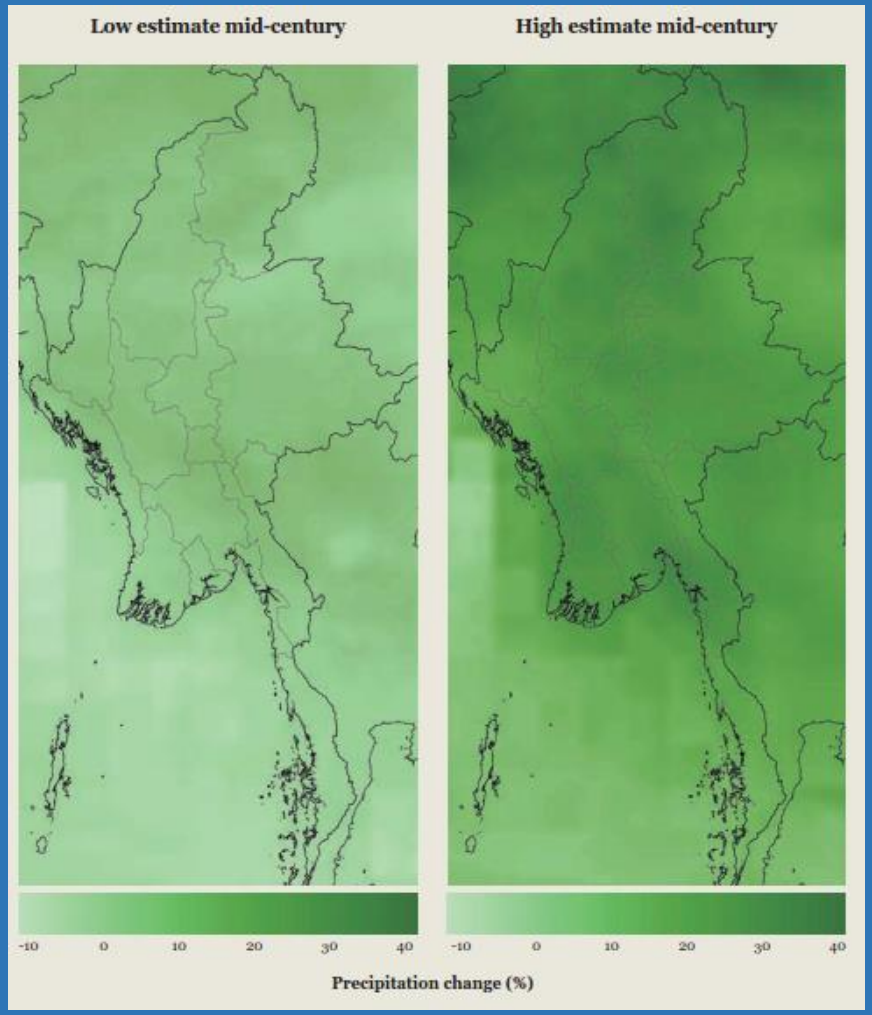


Areas with high water yield are particularly important for sustaining agriculture, drinking water supply, hydropower and other human needs. Myanmar has abundant freshwater resources, with glacier runoff in the north flowing through the Irrawaddy river basin in the south, and significant water features in the peninsular region. The Asian Development Bank estimates that only 10% of the total water resources available are currently utilized, with 90% of that being used for irrigation. Land cover and precipitation are large contributors to the availability of water resources across the country.

THE EDITH AND HARRY S HELMSLEY CHARITABLE TRUST

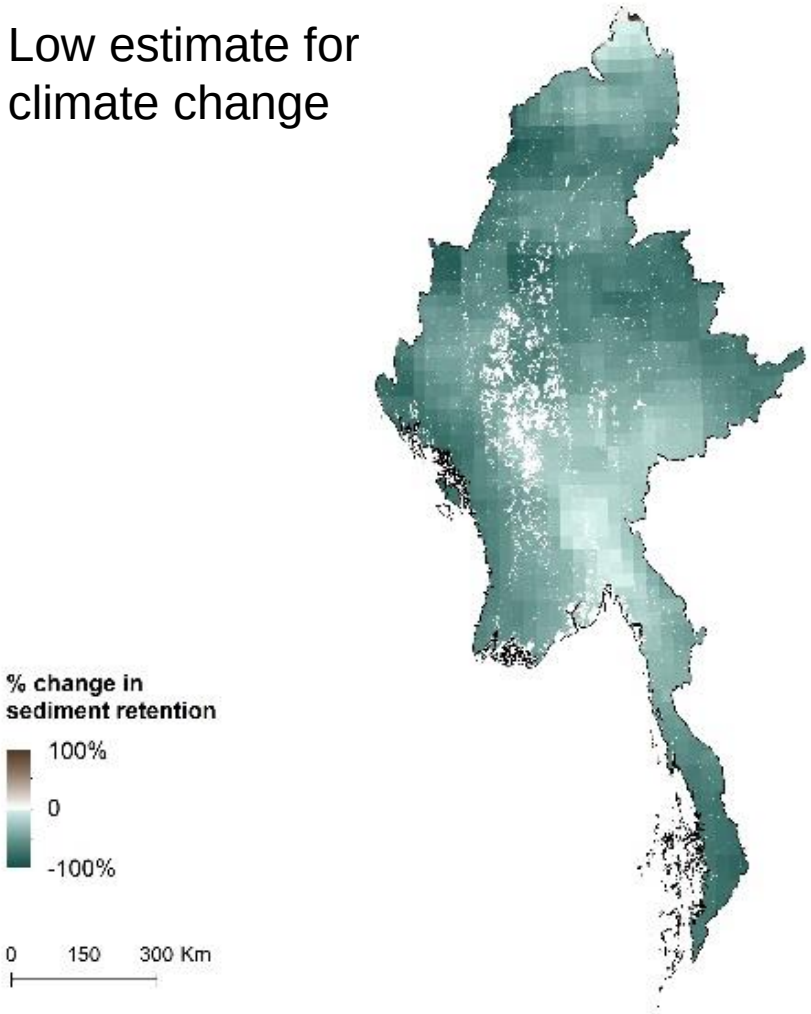
WWF


Low estimate mid-century
High estimate mid-century
0
1
2
3
4
0
1
2
3
4
Change in Average Temperature (°C)

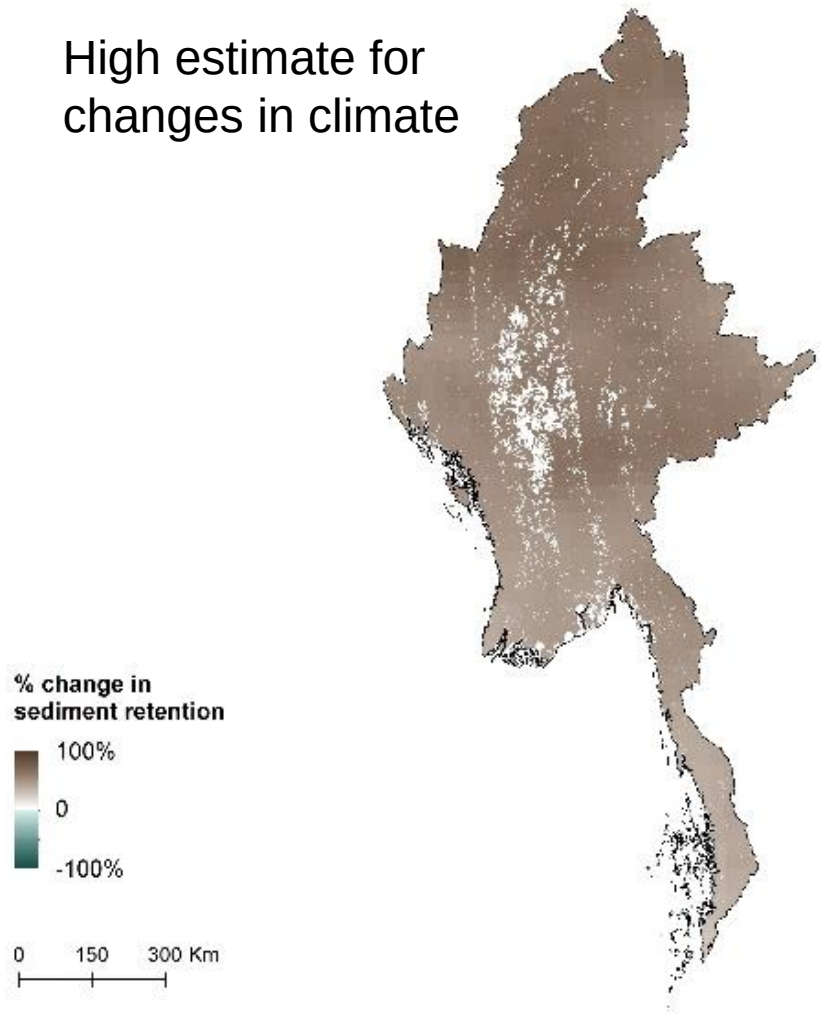

Low estimate mid-century
High estimate mid-century
-10
0
10
20
30
40
-10
0
10
20
30
40
Precipitation change (%)

Climate change effects on sediment retention

Low estimate for climate change

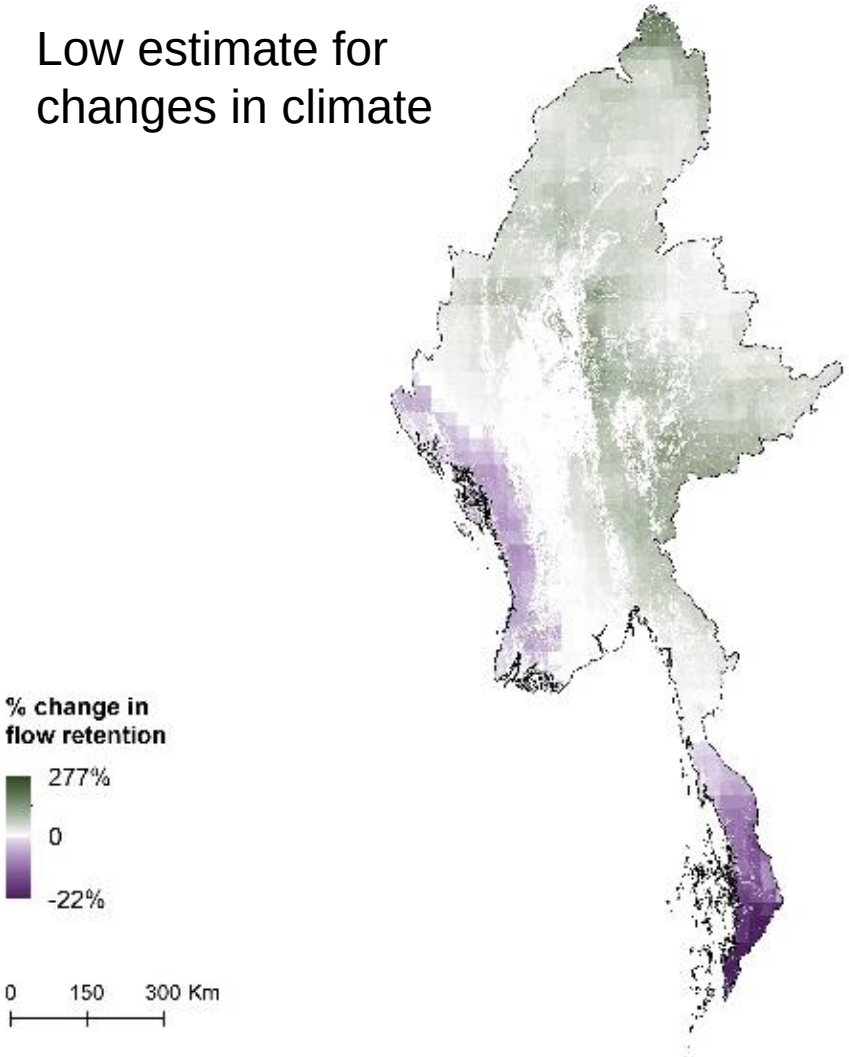


High estimate for changes in climate

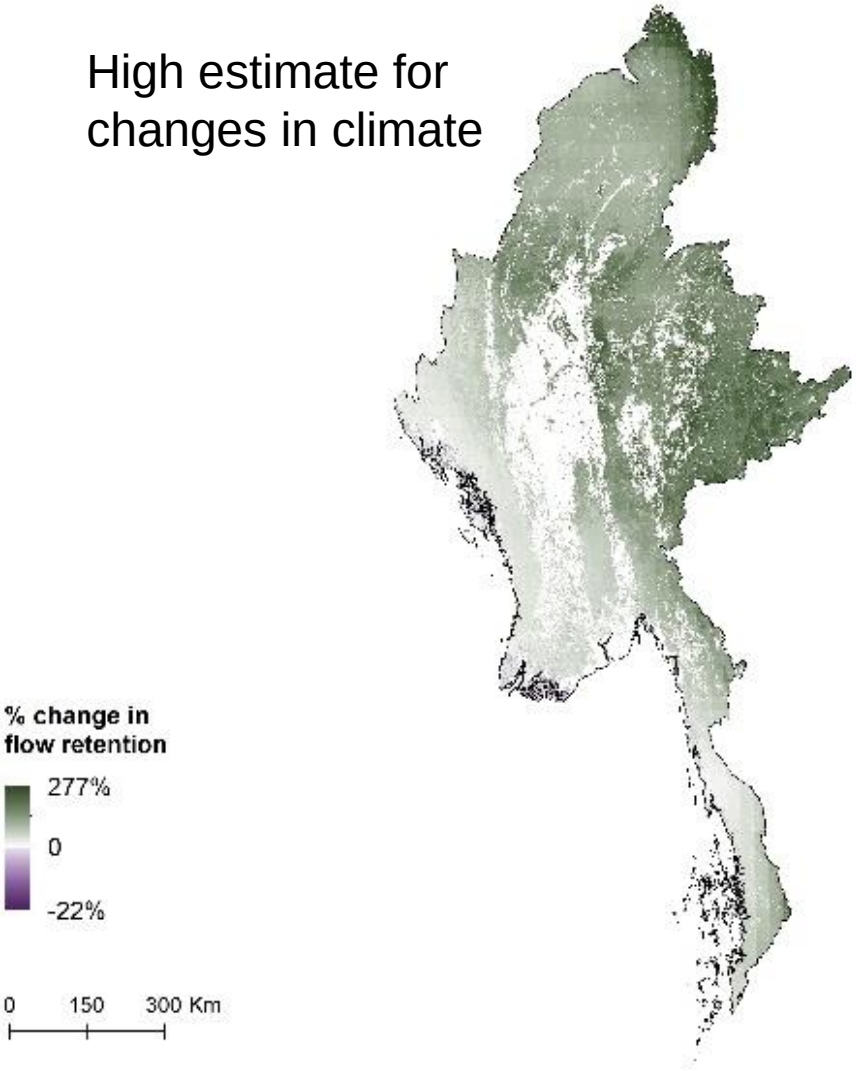


Climate change effects on flood risk reduction

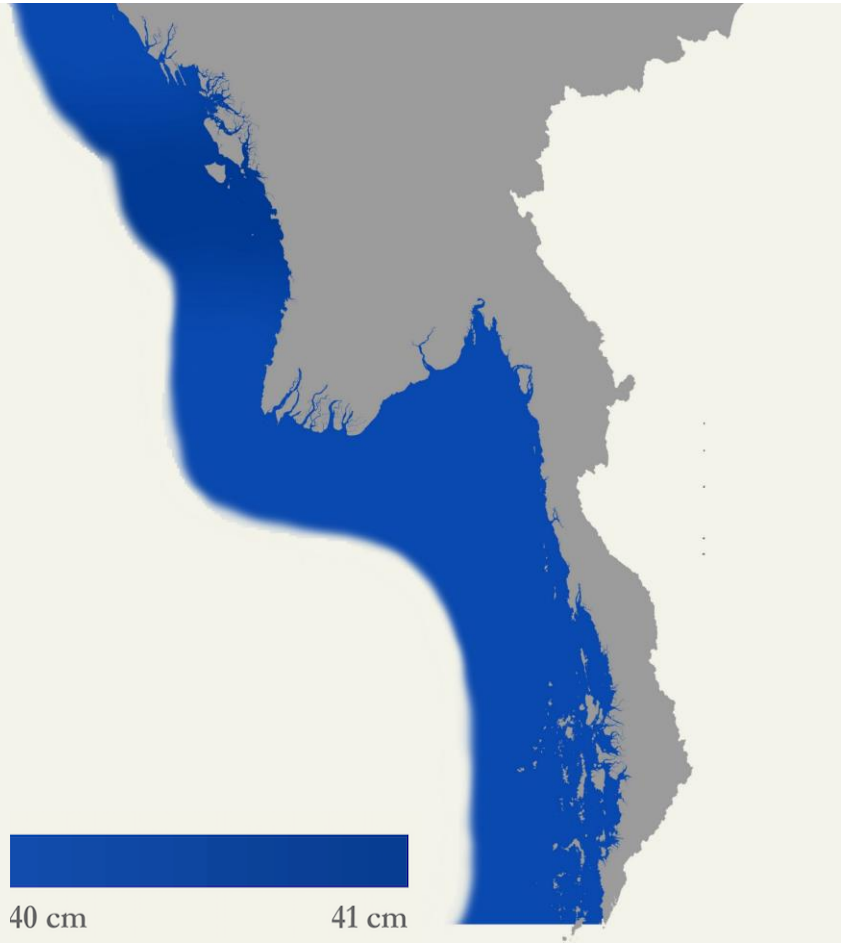
Low estimate for changes in climate



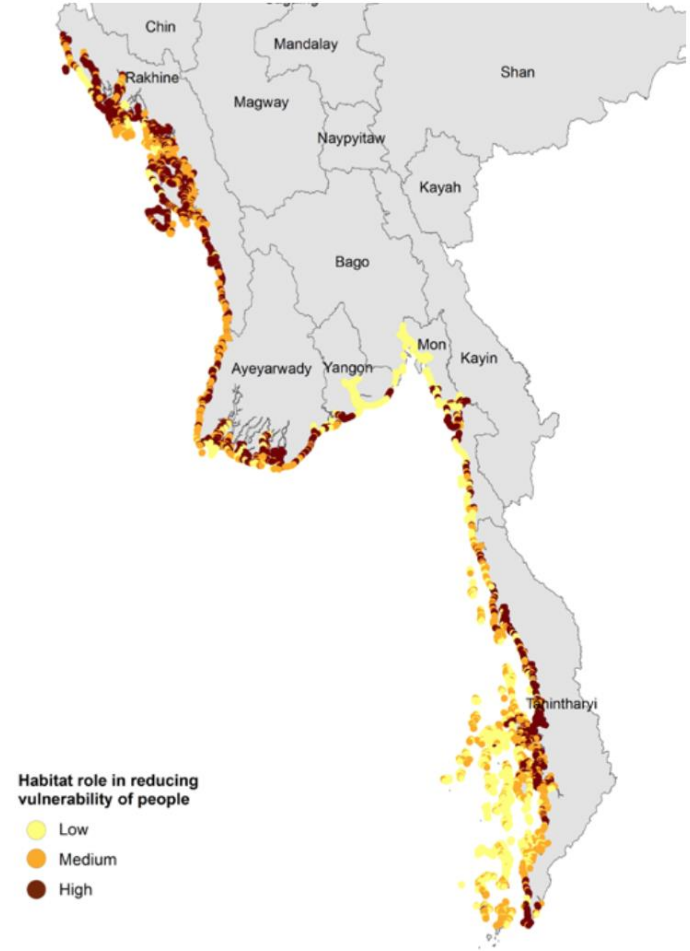
High estimate for changes in climate



Not so dynamic…



Sea level rise projections for mid century



InVest Coastal Vulnerability Model

Lessons learned: Technical

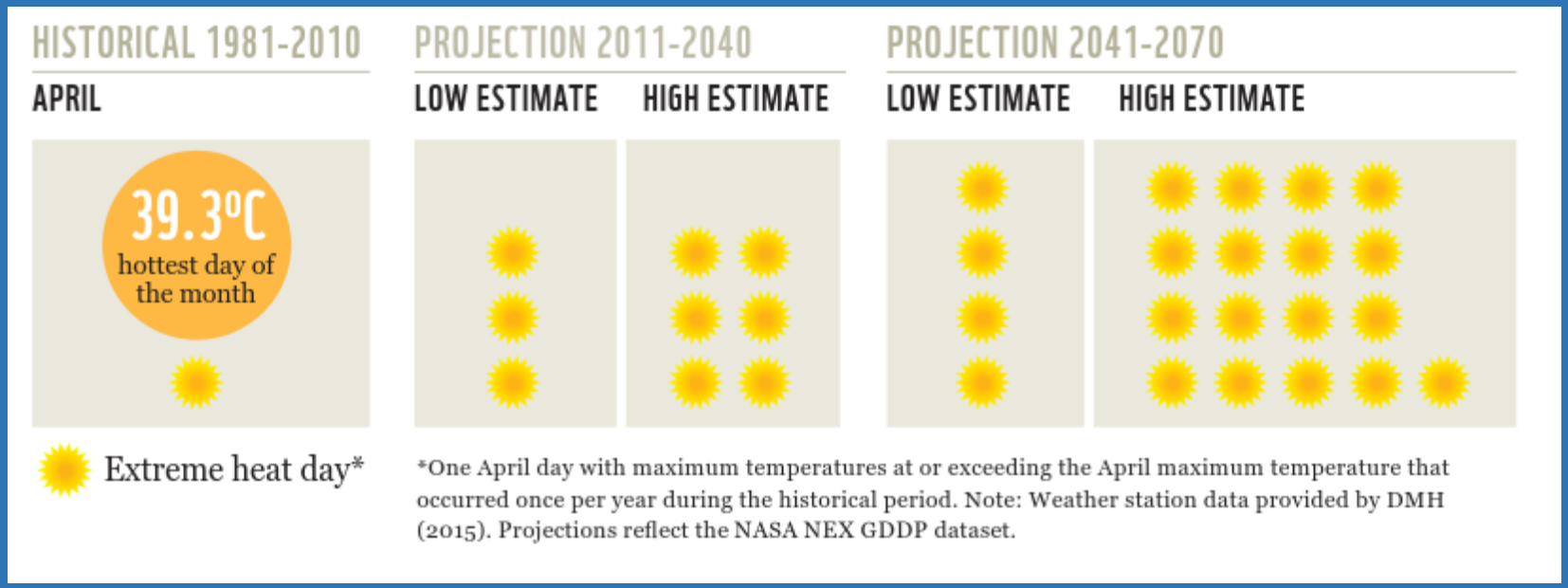
- Ecosystem service models not built for climate complexity
- Core climate expertise from the start
- Ecosystem service modelers /= climate risk experts

Collaboration with DMH, MoNREC


Sun.
60 days of rain
ID/DRD
1 water avaliab
DoA
DAR
LBD
FD/GAD
Pump House
Town
Pipe line
deep tub
Landslide (Intensity)
Consecutive Raing Days - Intensity
Consecutive hot day
Heavy Rain
Drought
consecutive hot day
Intensity
Increase Heavy Rain (Frequency)
Rural Market
Flood Erosion (Intensity)
2 or 3 days of heavy rain
- Increase Flood (Frequency)
Paddy
rainy
Bean + Pulse
Summer
Chilly Peanut Bean Sesam
Winter
- consecutive hot day
Drought Flood
- More Flood
- Extended dry period
- More drought
- Daytime high consecutive hot days
Housing
Livelihood
- Fishing
- Agriculture
- live stock
- Consecutive hot days
- Dry season
Hospital
School
electricity
- effect on food security
- low Income
(Roof damaged)
More damage
→ Heavy Rain and Strong Wind (power cut)

Lessons learned

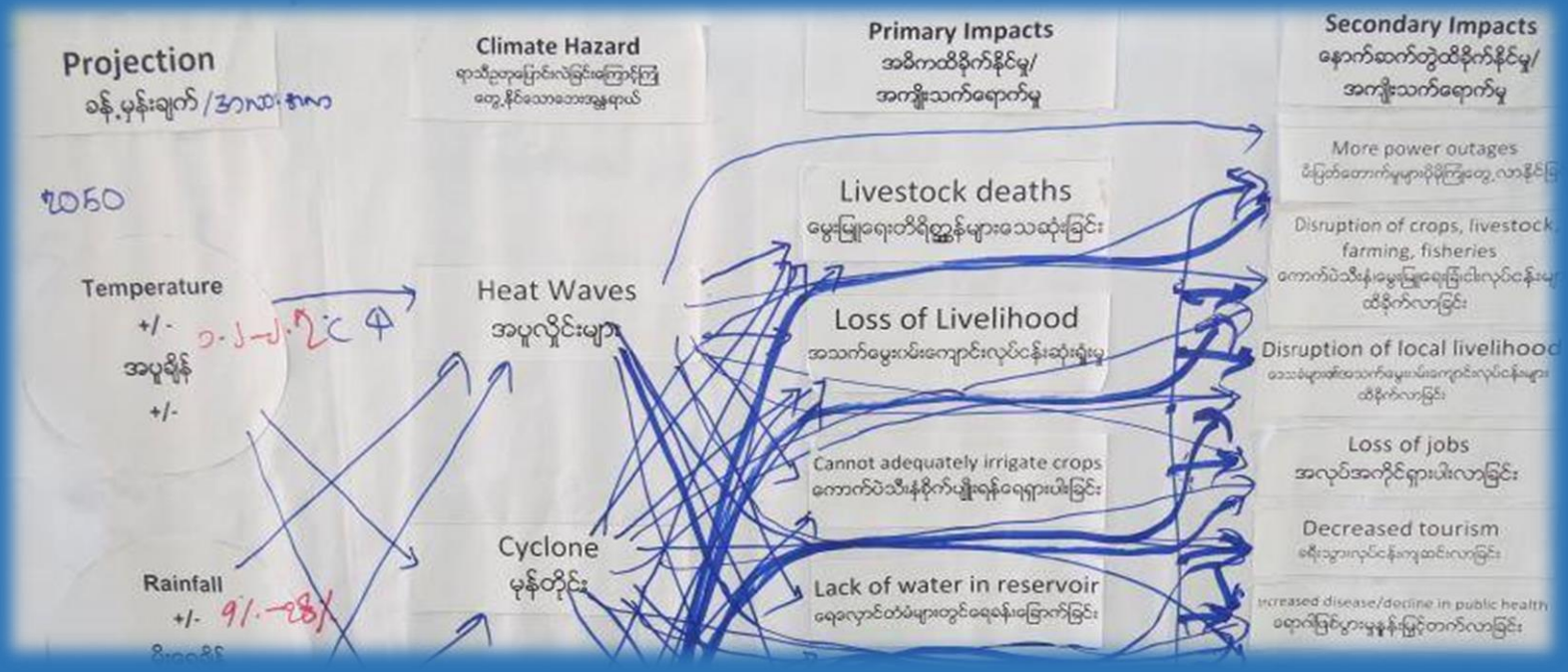
- Most useful information in the extremes
- Limited capacity for *climate risk assessment*
- Rigid government silos
- Seasons are a slippery concept




Gov
Win
USD
Ward 14

Lessons learned: Engagement

- Lack of data, information on critical ecosystem thresholds → plan for general trends
- Best options still to reverse existing degradation trends
- Major uncertainties about intervention resilience



ADVANCE lessons learned

- Capacity development to improve understanding of climate risk, system dynamics
- Projections helpful for general trends, but most useful information requires observed data
- Communicating uncertainty more honest, but also a lot more work, ambiguous outcomes
- Constant engagement critical for success
- Climate-smarting existing projects is often too late
- Need to be advisors, not just science providers

Thank you

WWF

Center for Climate Systems Research
Earth Institute | Columbia University

www.worldwildlife.org/ADVANCE
www.myanmarnaturalcapital.org

For discussion

- How can we make downscaled projections more useful?
- Does communicating uncertainty actually help our cause?
- Effective models for communicating and planning for risk?
- What tools and approaches can we use to better forecast critical ecosystem thresholds?