Global Adaptation Atlas

Linking Science, Policy, and Practice to Build Resilience to Climate Change

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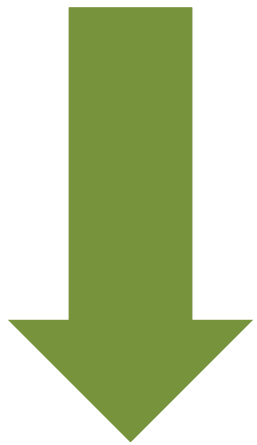
The New Climate Problem: Adaptation

- Global focus on climate change
- IPCC: Irrespective of the scale of mitigation, adaptation is necessary, especially in the developing world
  - Complementary, not competing objectives
  - Growing push to set priorities for adaptation funding (e.g., UNFCCC Adaptation Fund)

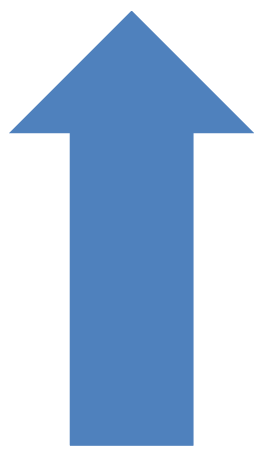


Mitigation

Reducing GHG emissions to avoid the worst potential impacts of climate change

Adaptation

Planning for and adjusting to environmental changes already underway



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What Makes Adaptation Different from Other Climate Policy Issues?

- Location, location, location!
  - Emissions reductions anywhere “count” everywhere
  - Adaptation is highly site-specific
  - Populations in greatest need are often least able to adapt
- Divide between climate science and policy
  - Limited data at small scales, local levels
  - Lack of integrated research, aggregate impacts
  - Diffuse policies and on-the-ground activities

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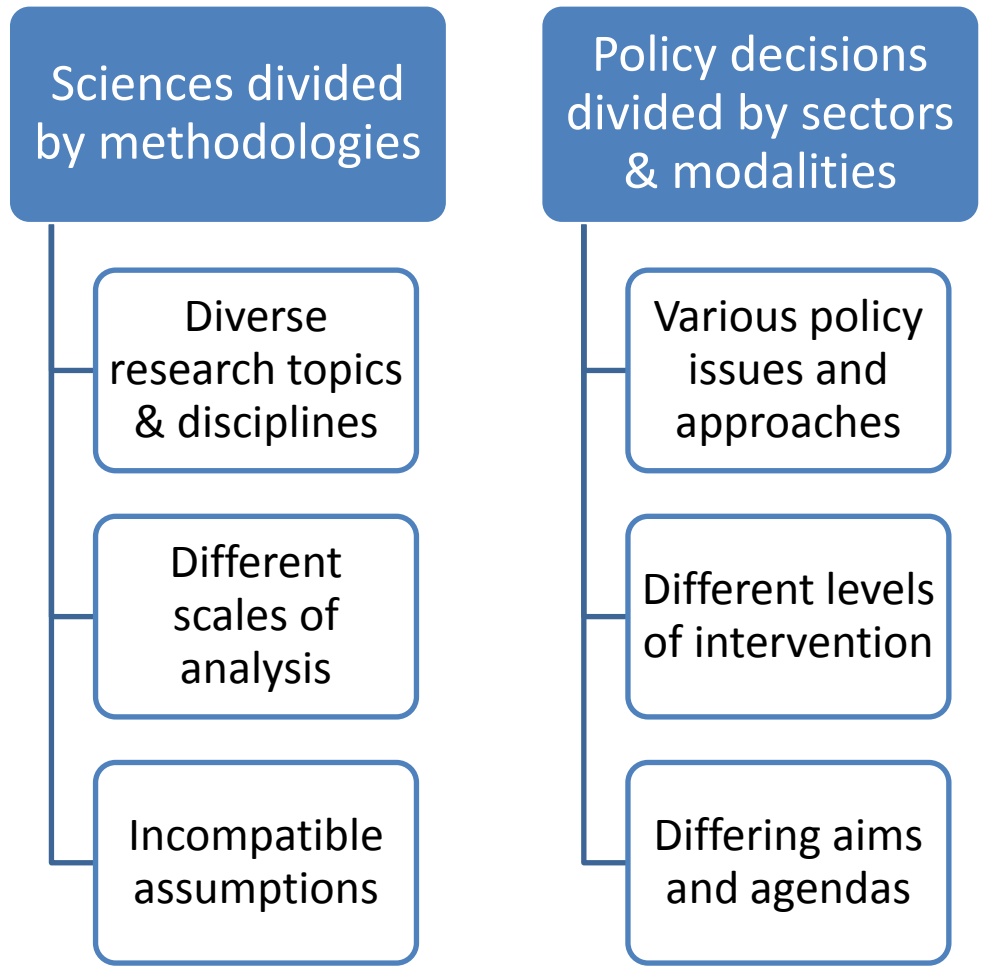
Why We Need the Global Adaptation Atlas

- Cannot effectively target adaptation investments without a new framework for coordinating science and policy
- Without coordination, adaptation efforts could undercut one another



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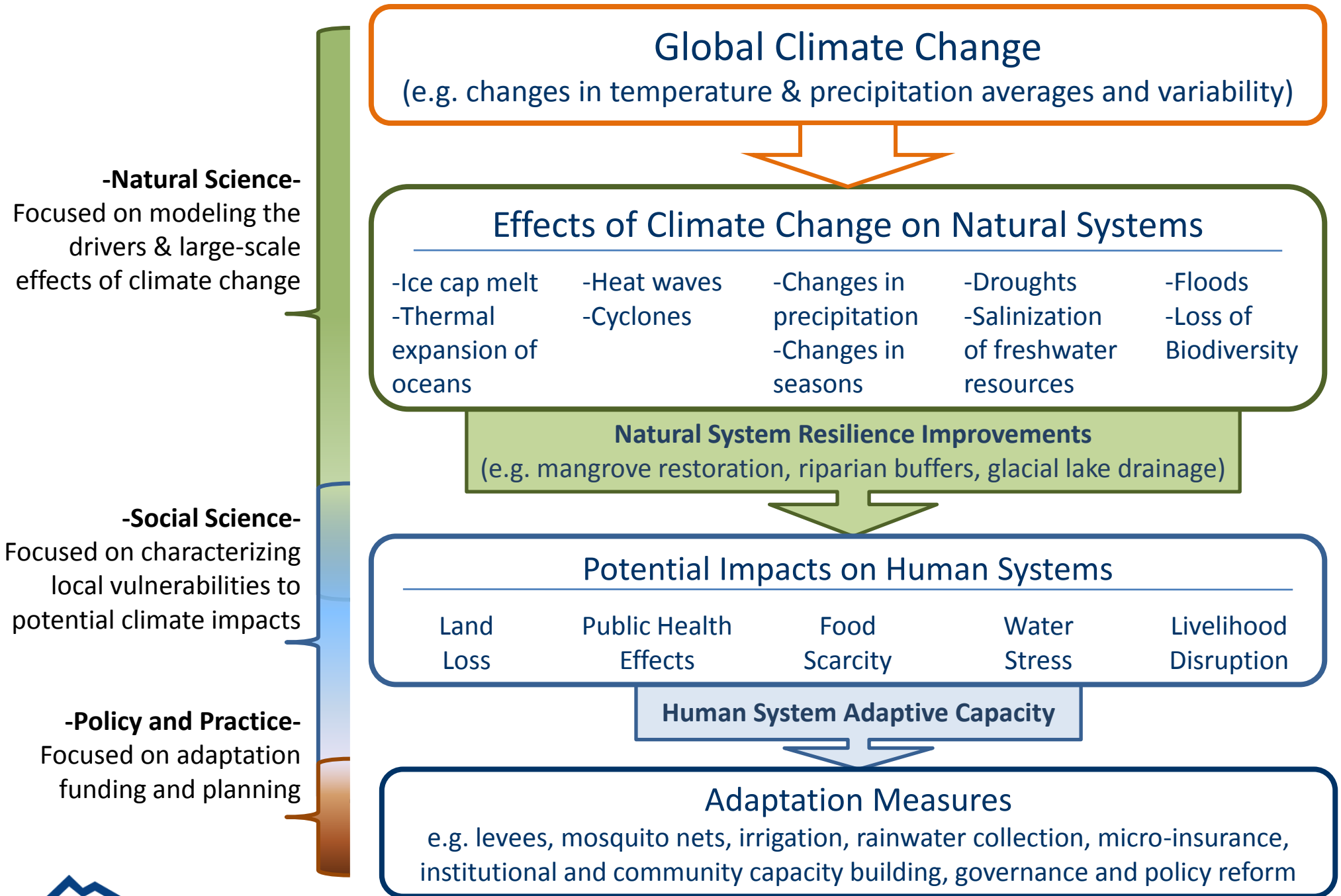

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The Role of the Atlas

Consolidate scientific information on climate impacts

- Across fields of research (agriculture, water, health, etc.)
- Across scales, from the global and regional to local

Compile data on "on-the-ground" adaptation activities

- Small-scale projects (rainwater systems, microinsurance, etc.)
- Large-scale development plans and investments

Highlight gaps in impacts (science) and adaptations (policy)

- Decisionmaking, priority-setting for adaptation projects and funds
- Monitoring and evaluating impacts/ responses over time

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Mapping as the Missing Link

- Geography and spatial information are common threads connecting impact science and policy
  - Climate impacts are site- and population-specific
  - Responses must be locally relevant *but* also coordinated more broadly
- Web-based mapping provides a shared medium for:
  - Integrated analysis across scientific disciplines
  - Comprehensive display and continuous updating
  - Dynamic user-profile tailored outreach to support decisionmaking
- Broad analytic role: Highlight if and to what extent adaptation activities correspond with projected climate impacts over time

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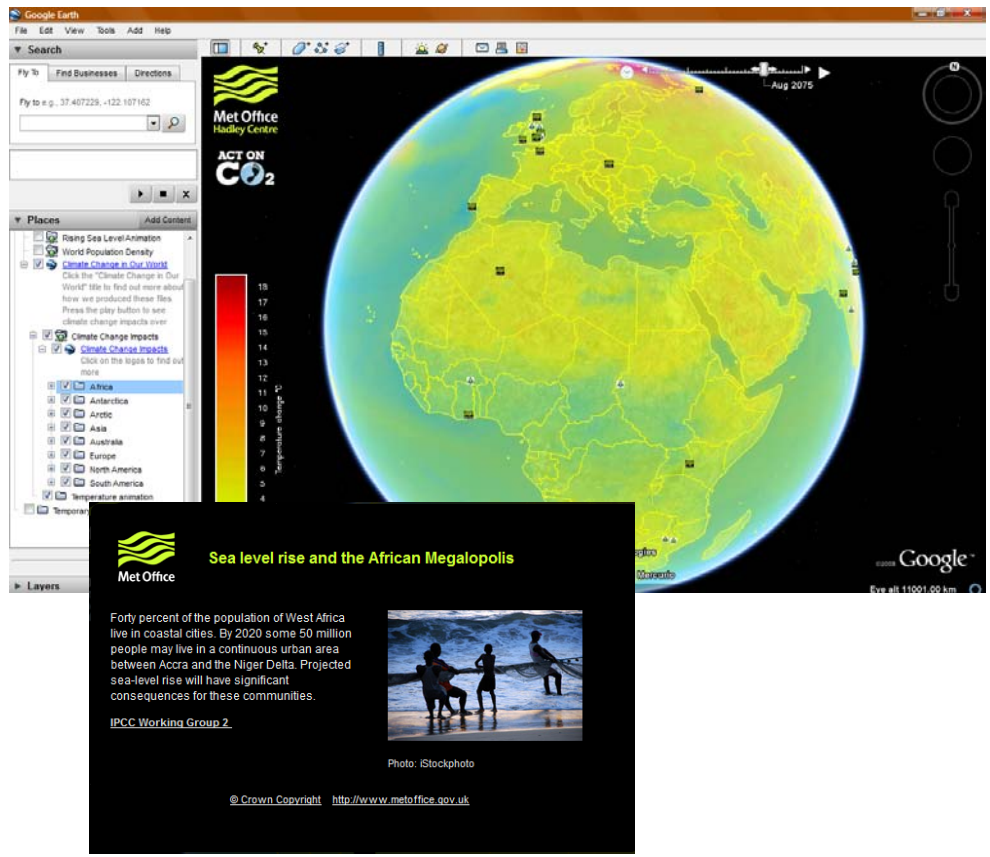
What Will the Atlas Look Like?

- Web-based mapping interface using ArcGIS and Google Earth
- Automated data upload features
  - Database of selectable impact layers from climate studies
  - Repository of adaptation projects
  - User compatibility/filtering guide for overlay by scenario, theme, sector, assumptions, citations, etc.
- Detail impact and project page and tailored summary pop-ups



Screen Capture of Google Earth Interface
Illustration of Met Office Hadley Center layers showing projected global temperature increase with pop-up windows highlighting emerging local climate impacts.

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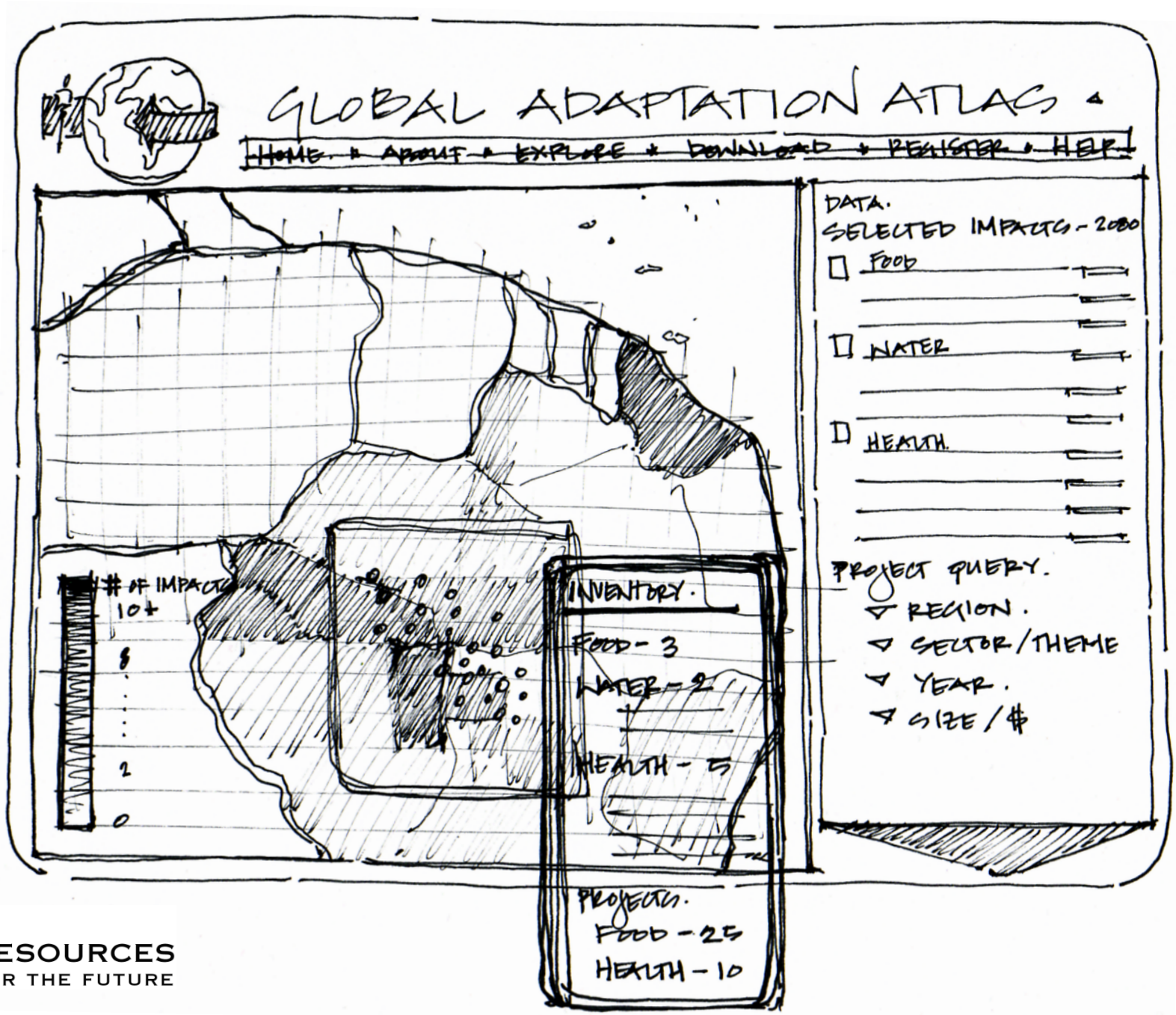
Atlas Interface Mockup/Sketch



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Atlas Interface Features

- Explore
  - Map Viewer
  - Data Index
- Download
- Upload
- Resources
- Register
- About

- Impact/activity map layers
- Overlay criteria (scenario, etc.)

Explore

- Data filtered by region, theme, citation, etc.
- Multiple formats (shapefile, KML)

Download

- Automatic data pull/push from key partners
- Layer/project upload ‘wiki’

Upload

- Data/feature updates
- Advisory board commentary

Resources

- User profiles
  - Scientists
  - Policymakers
  - Citizens
- Outreach

Register

- Mission / Vision
- Core Team
- Partners
- Contact

About

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Example Atlas Impact & Activity Data

	Climate Impacts	Adaptation Activities
 Food	Change in agricultural productivity	Drip irrigation, modified planting, new crops/seeds
 Land	Land loss from sea-level rise (submergence) and erosion	Levees, sea walls, riparian buffers, resettlement
 Livelihood	Loss of income (fishing, hunting, tourism)	Micro-finance, insurance, and retraining programs
 Health	Changing disease vectors (dengue), malnutrition	Mosquito nets, vaccine programs, disaster relief
 Water	Drought, contamination, salinization of freshwater	Rainwater collection, filtration systems, desalinization

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What New Efforts Will the Atlas Support?

1 Consolidating science on impacts	• Identify gaps in science across disciplines, regions, scales • Highlight areas for new integrated analysis
2 Mapping on-the-ground adaptations	• Automate continuous data collection on adaptation projects • Create a comprehensive, searchable project database
3 Creating a tailored outreach vehicle	• Create key user profiles, track with Google Analytics • Collect and exchange local lessons and global best practices
4 Sustaining long-term evaluation	• Develop a spatial data archive on impacts and activities • Track changes in projected impacts & adaptations over time

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Building Block 1: Synthesizing Climate Science

- Collecting data on climate impacts

- Harmonizing results of climate model projections and studies
  - Congruent scenarios (~3-degree C temperature increase by 2080)
  - Matching scales (global 1-km gridded datasets v. regional studies)
  - Compatible assumptions (avoid double-counting of impacts)
  - Coding for level of peer-review/citation using Google Scholar
- Overlay datasets to identify intersections of multiple impacts

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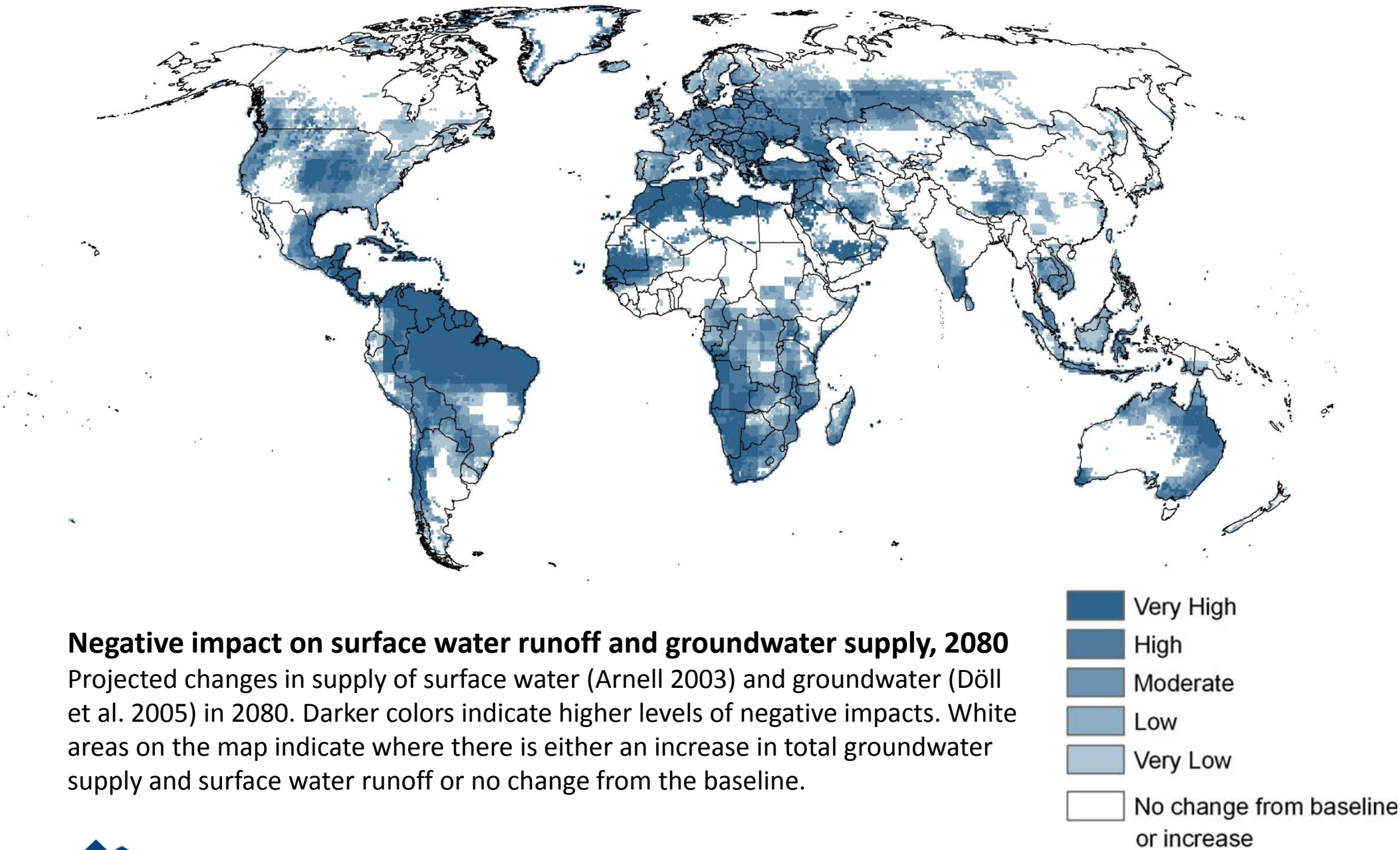

Negative impact on surface water runoff and groundwater supply, 2080

Projected changes in supply of surface water (Arnell 2003) and groundwater (Döll et al. 2005) in 2080. Darker colors indicate higher levels of negative impacts. White areas on the map indicate where there is either an increase in total groundwater supply and surface water runoff or no change from the baseline.

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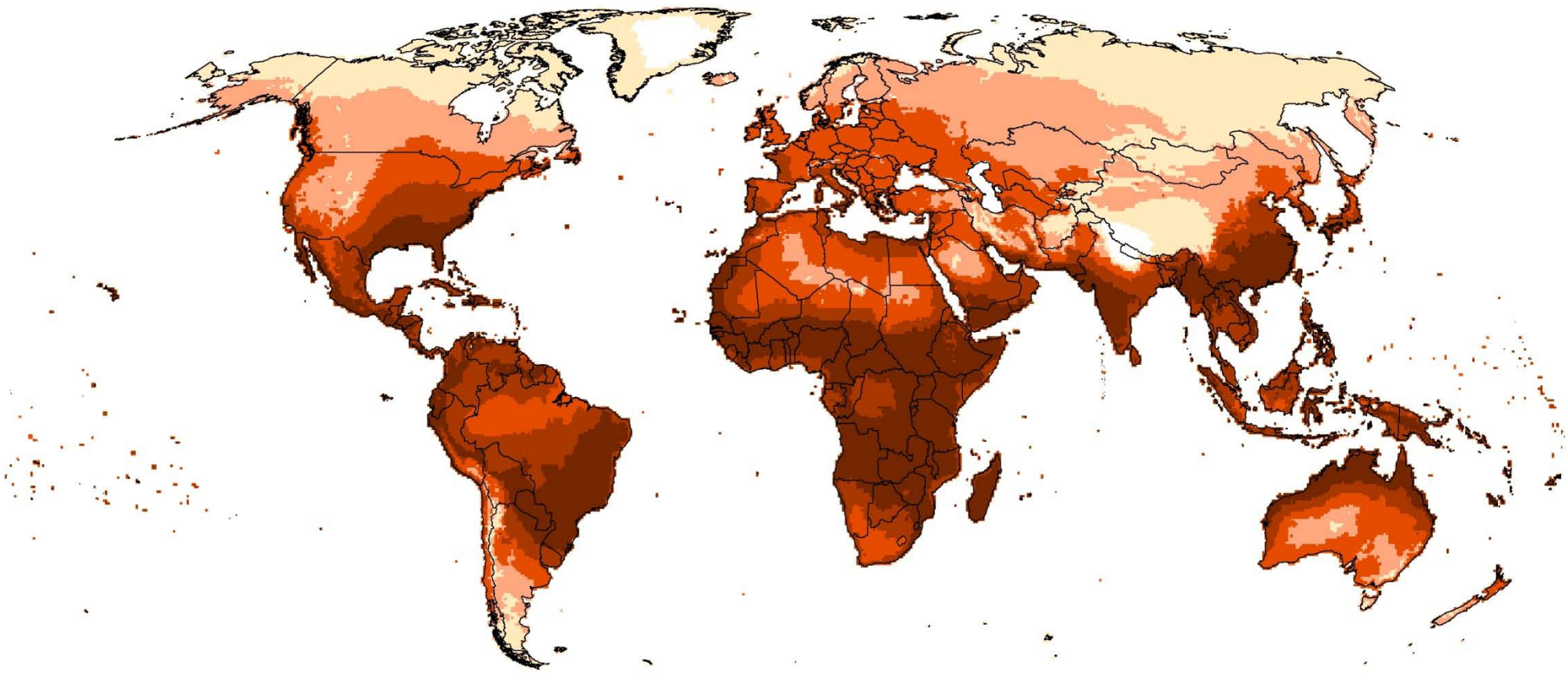

Increase in probability of dengue fever epidemic, 2080

Projected increase in probability of a dengue fever epidemic (Hales et al. 2002) in 2080. Darker colors indicate a greater increase in the probability of an epidemic from current levels. White areas on the map show where there is either a decrease in the probability of an epidemic or no change from the baseline.

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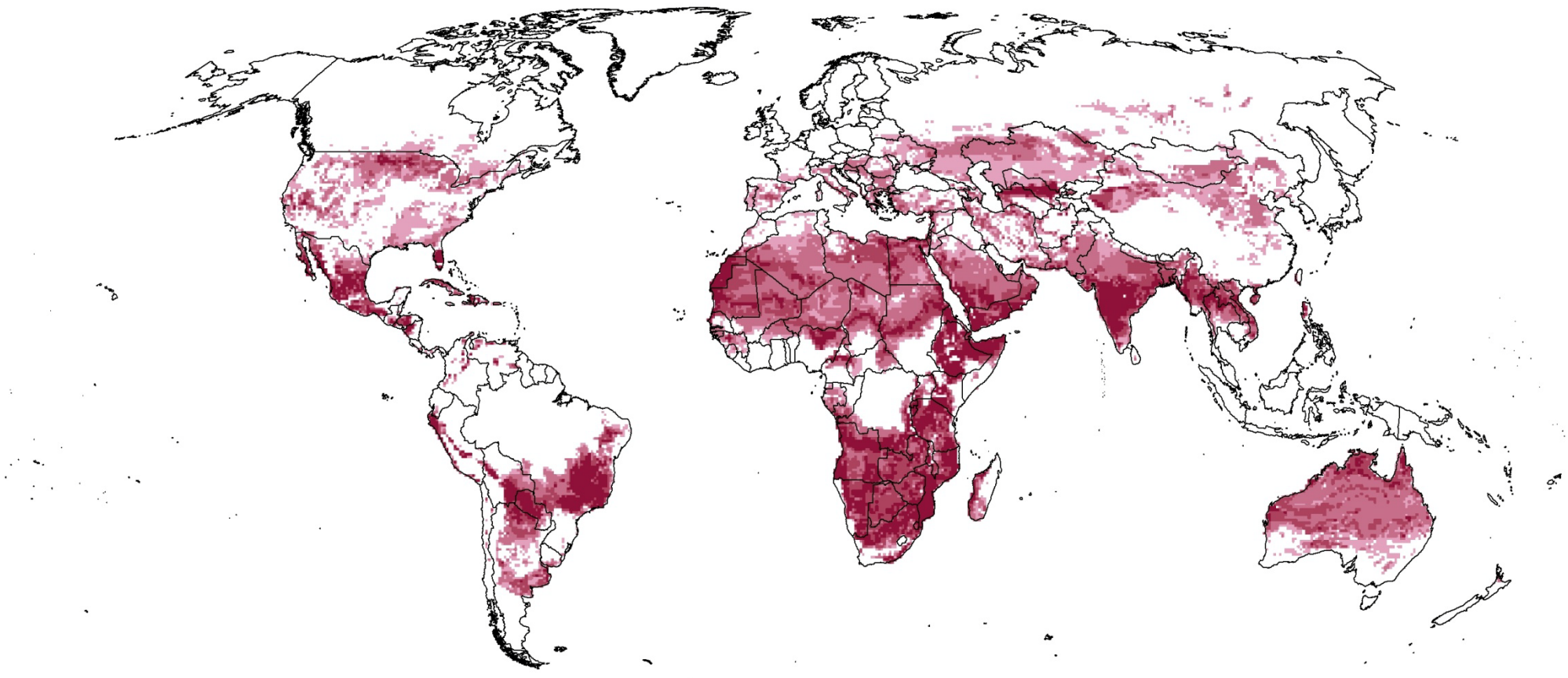

Decrease in total number of "good" days per month for tourism, 2080

Projected estimate of climate-induced loss of total days suited for tourism in 2080 (Amelung et al. 2007). Darker colors indicate greater decrease in the length of the tourism season. White areas on the map indicate where there is either an increase in the total number of "good" days or no change from the baseline.

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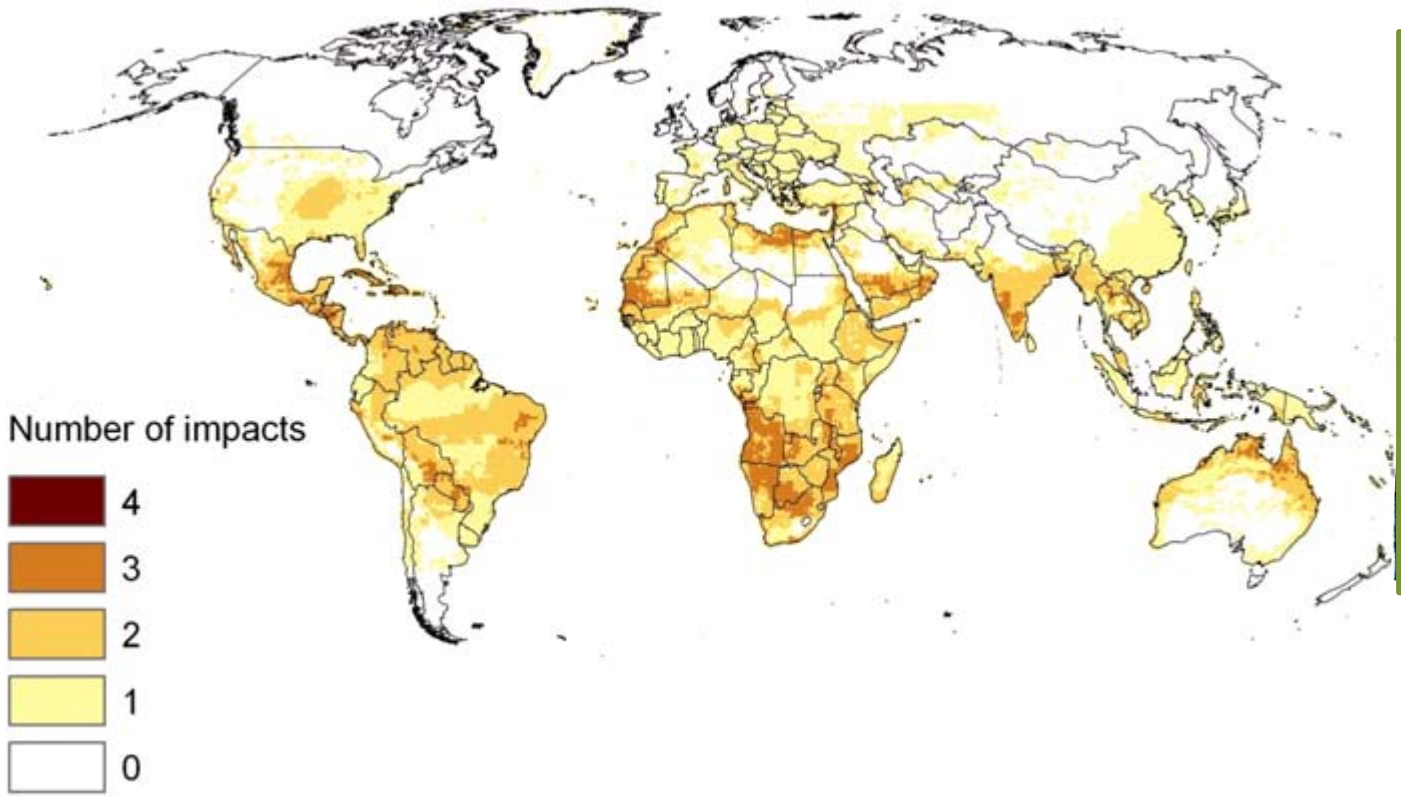

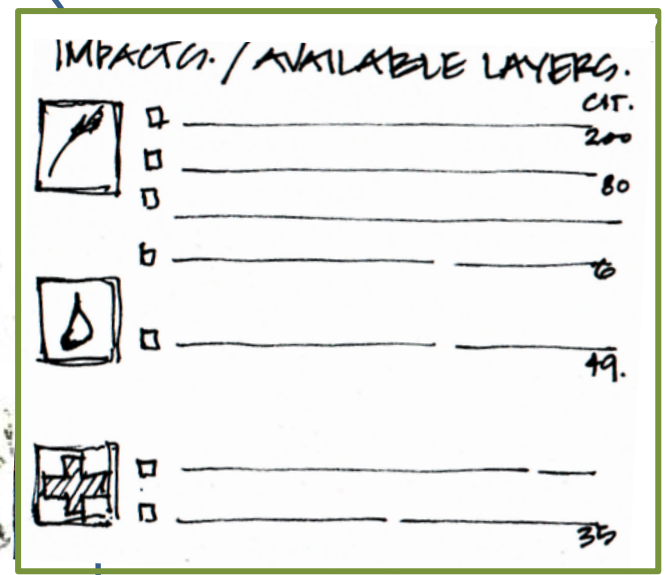

Sample overlay map of selected negative climate impact "hotpots," 2080
Number of impacts in the "high" and "very high" categories in each 1-km grid cell for four major climate impacts: 1) Water: decrease in surface water runoff and groundwater supply, 2) Land: loss due to a 1-meter sea level rise (CRESIS Database), 3) Health: increased probability of dengue fever epidemic, and 4) Livelihood: decrease in number of days suitable for tourism (Vajjhala and Nackoney, in prep).

- Selectable impact layers (food, land, water, health, livelihood)
- Weighting options
- Compatibility criteria, overlay guidance for users

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Building Block 2: Mapping Adaptation Activities

- Automated application for upload of adaptation projects
  - Collaboration with partners (e.g. PLAID) to push/pull data into Atlas on ongoing and planned adaptation projects, programs, measures
  - Entries mapped as points and/or coverage areas
- Real-time updating of on-the-ground activities
  - Basis for outreach – filter archived data by project type, size, etc.
  - Basis for analysis – evaluate coverage, density, and types of adaptation activities relative to projected climate impacts
- Oversight, validation, and quality control mechanism

  Periodic "Google Alert" to project contacts, program managers, trusted Atlas reviewers/users to periodically validate/update project entries

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Building Block 3: Targeting Outreach Efforts

- Three tiers of tailored “lessons offered” for registered users
- A user who enters or searches for info on agriculture in Mali will receive a dynamic pop-up window with related materials

Local: Other similar projects in your area
Sorted list of other agriculture projects in Mali from archive of Atlas entries

Regional: Related projects in your region
List of related projects in other sectors (water, health, livelihood, etc.) in larger region (e.g. West Africa) sorted by keyword

Global: Examples of best practices around the world
Links to model projects of similar type and size around the world based on ratings of best practices by “trusted” users (i.e. Amazon.com, Netflix, etc.)

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Building Block 4: Supporting Evaluation

- Spatial data archive and research tool
- Monitoring climate impact science
  - Evaluate changes in modeling and projected impacts over time
  - Characterize gaps in research (geography, discipline, scenario, etc.)
  - Identify new research questions on multiple stressors and opportunities for multi-disciplinary collaboration
- Tracking and supporting evaluation of adaptation projects
  - Monitor rate/level at which projects are funded in different regions and across different sectors
  - Correlation between adaptation activities and projected impacts
  - Observe change in adaptation investments over time

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Who Will Use the Atlas and For What?

Policymakers & Leaders: Visualize impacts affecting their regions, view portfolios of projects underway, and identify gaps that need to be filled

- Policymakers
- Ministers and Agency Directors
- Philanthropic Foundations
- Multi-lateral donors
- United Nations
- International climate negotiators

Scientists: Enter impact data, develop finer-grained integrated models, further multidisciplinary collaboration

- Natural Scientists
- Social Scientists

Citizens: Act!

Allow civil society leaders, advocates, and others to identify impacts, adaptation options being implemented by others in the area & opportunities for coordination

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How Can We Define and Measure Success?

Goals

- Compile and organize science (impact data) and policy (on-the-ground adaptation projects and activities)
- Provide data in formats that are accessible and relevant to scientists, policymakers, and citizens around the world

Measures of Success

- Web traffic, number of Atlas entries, data downloads
- Citations using Atlas data in peer-reviewed research
- Surveys of Atlas users, advisory board members on impact on policy & decisions
- Google Analytics trends

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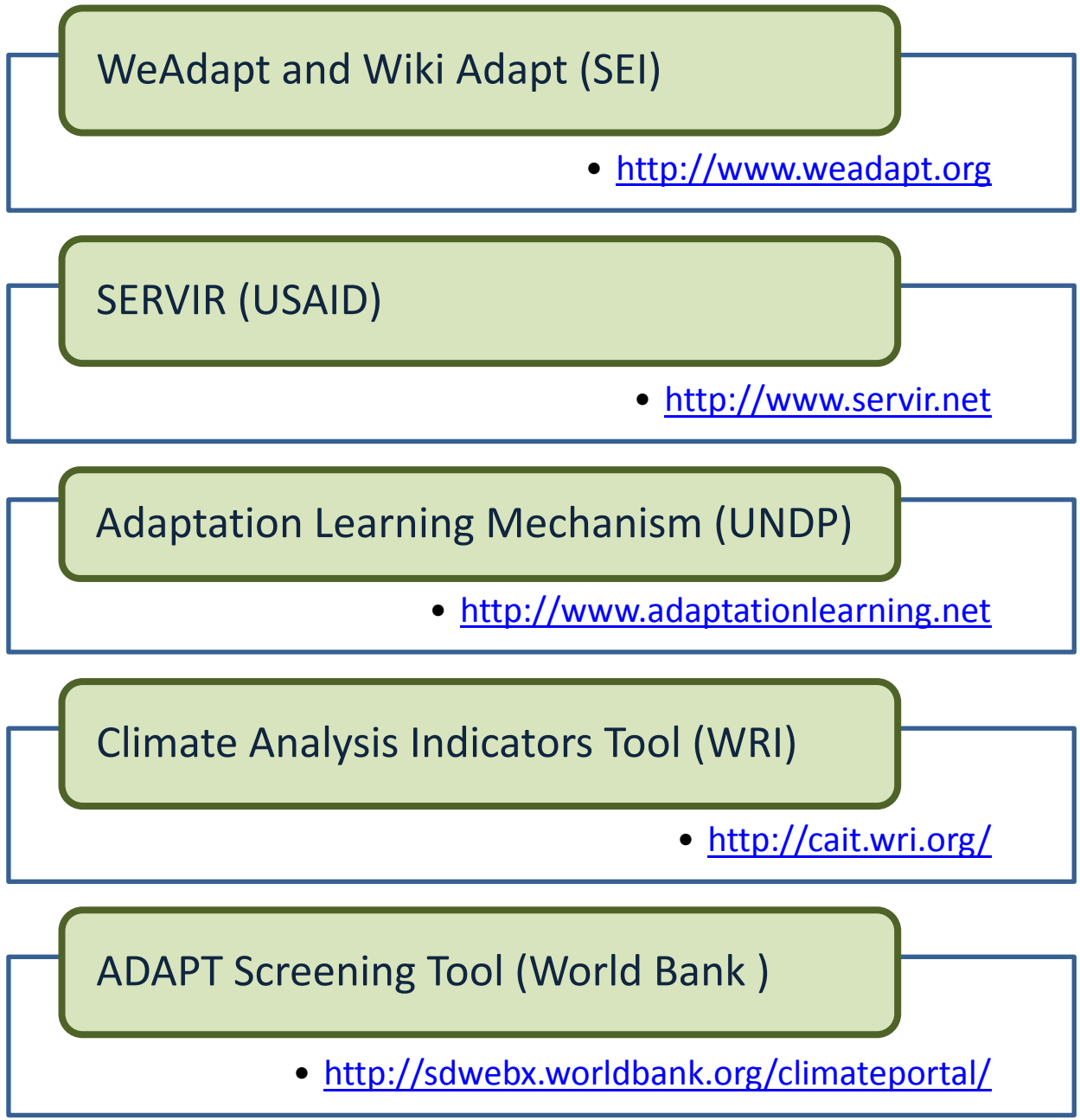
Value-Added

- Builds on multiple aspects of other web-based adaptation tools
- Links science, policy, and practice in a dynamic framework to help build global and local resilience to climate change



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