



Second National Forum on Climate Change Cambodia

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Biodiversity and Climate Change

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Key Messages

- Cambodia's biodiversity: national treasure & globally important, but under extreme pressure
- Potential severe impacts of climate change (CC) on biodiversity; critical to address indirect impacts
- Integrated approaches to addressing climate change offer win-win-win solutions
- Framework for stronger regional collaboration to proactively address CC is needed
- Cambodia can use the GMS Summit and Rio+20 Summit processes to advance integrated approaches and regional collaboration both of which would build CC resilience and create enabling conditions for a Green Economy



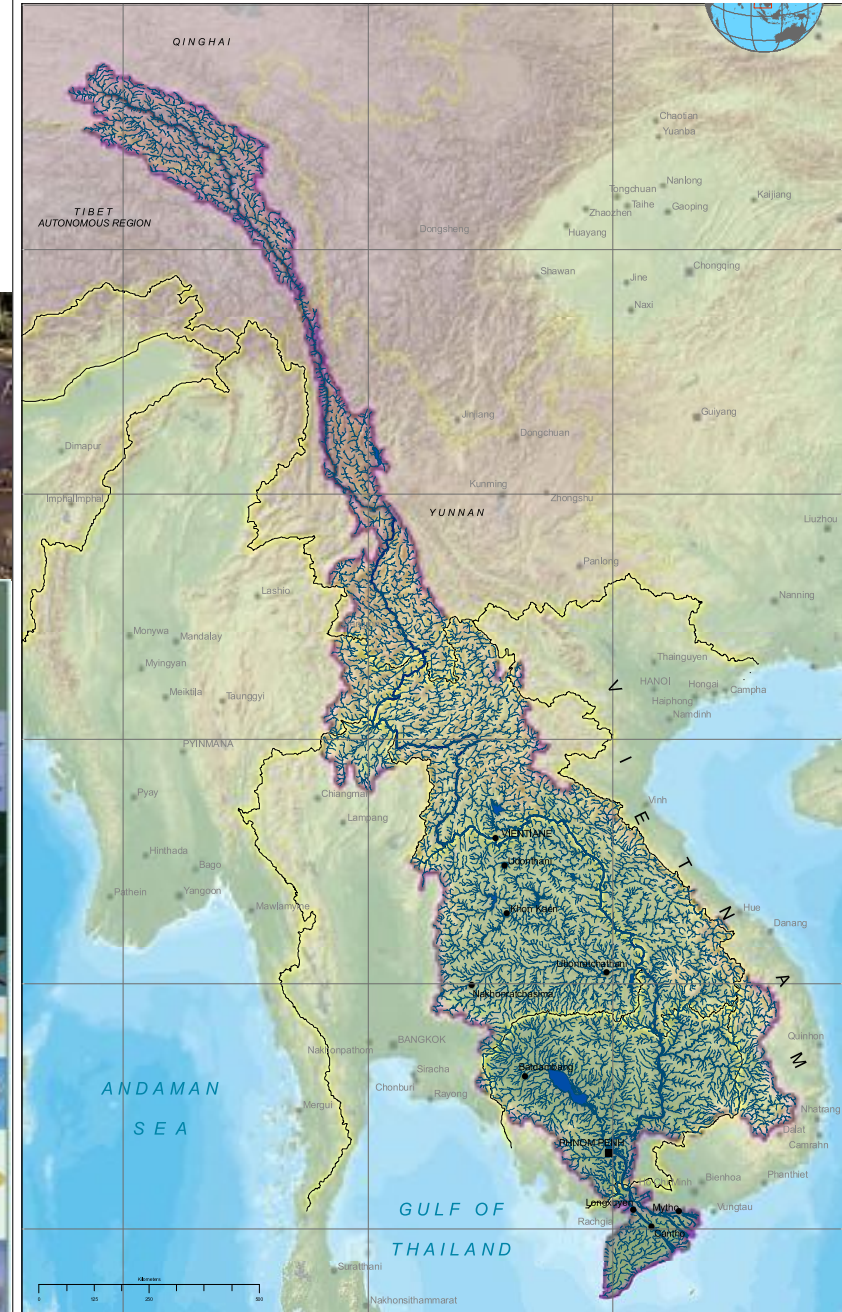
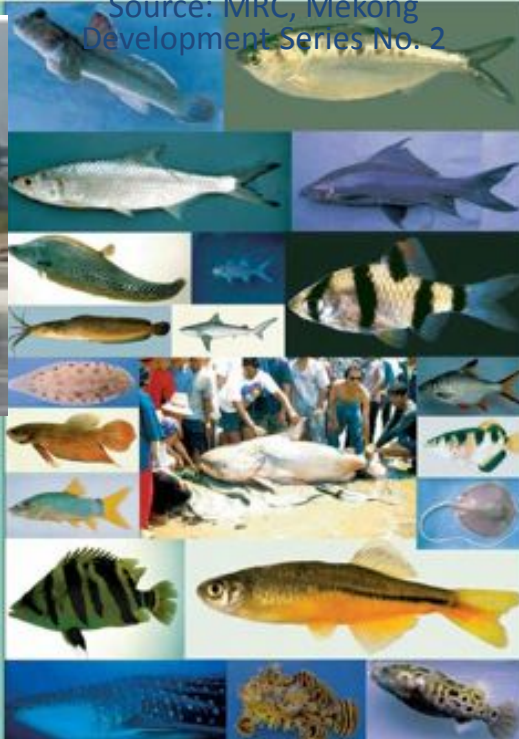
1. Biodiversity is...

- Life on earth
- Extraordinarily diverse in Cambodia & the region





Mekong River: 2nd Most Diverse, Largest inland Fisheries, Vital for 60 Million People in Basin





Cambodia Has:

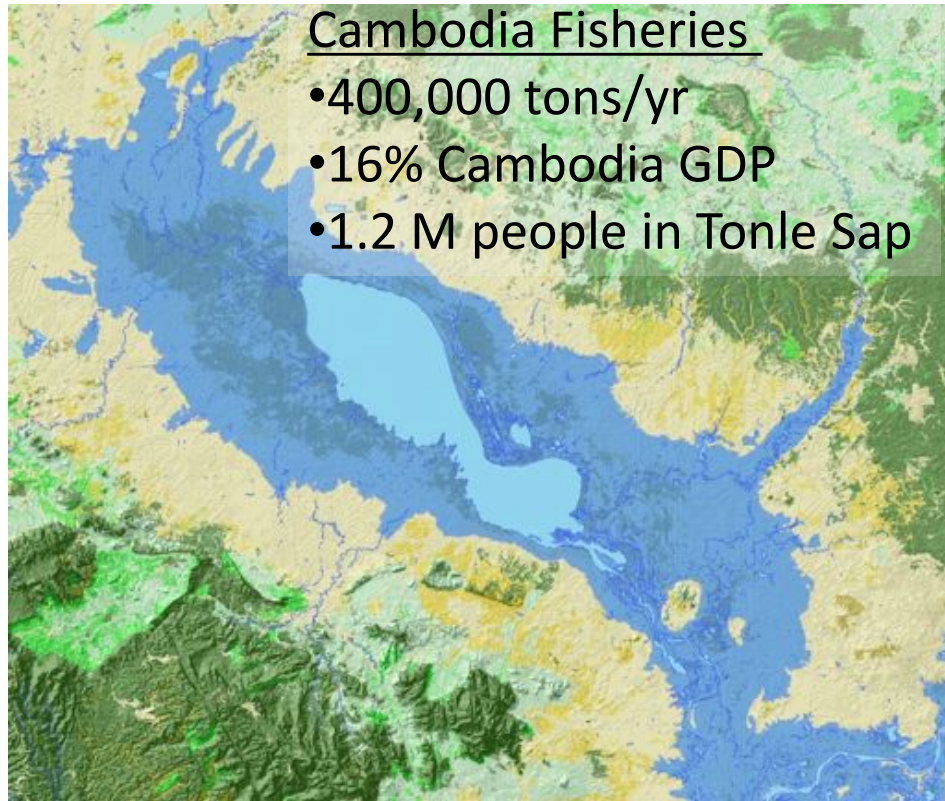
**Largest intact dry forest blocks in SE Asia;
highest vertebrate richness in Indochina,
and largest banteng population in world**





1. Biodiversity Is ...

- Crucial for livelihoods and food and water security in Cambodia
- Critical for Cambodia's economy
- Extremely threatened
 - Cambodia has most endangered mammals, birds, and fish species per unit area in Mekong region
 - Climate change exacerbates other pressures





2. Observed Impacts on Cambodia's biodiversity

- No observed impacts definitively attributed to CC
- No literature due to lack of long-term studies, monitoring, and targeted research
- Challenge: identifying climate change indicators in 'open systems'





2. Potential impacts on biodiversity

- Shifts in species distributions leading to new ecosystems(Williams *et al.* 2007)
- In the Greater Mekong Region, 133 to 2,835 plant species and 10 to 213 vertebrates could become extinct (Malcolm *et al.* 2006)





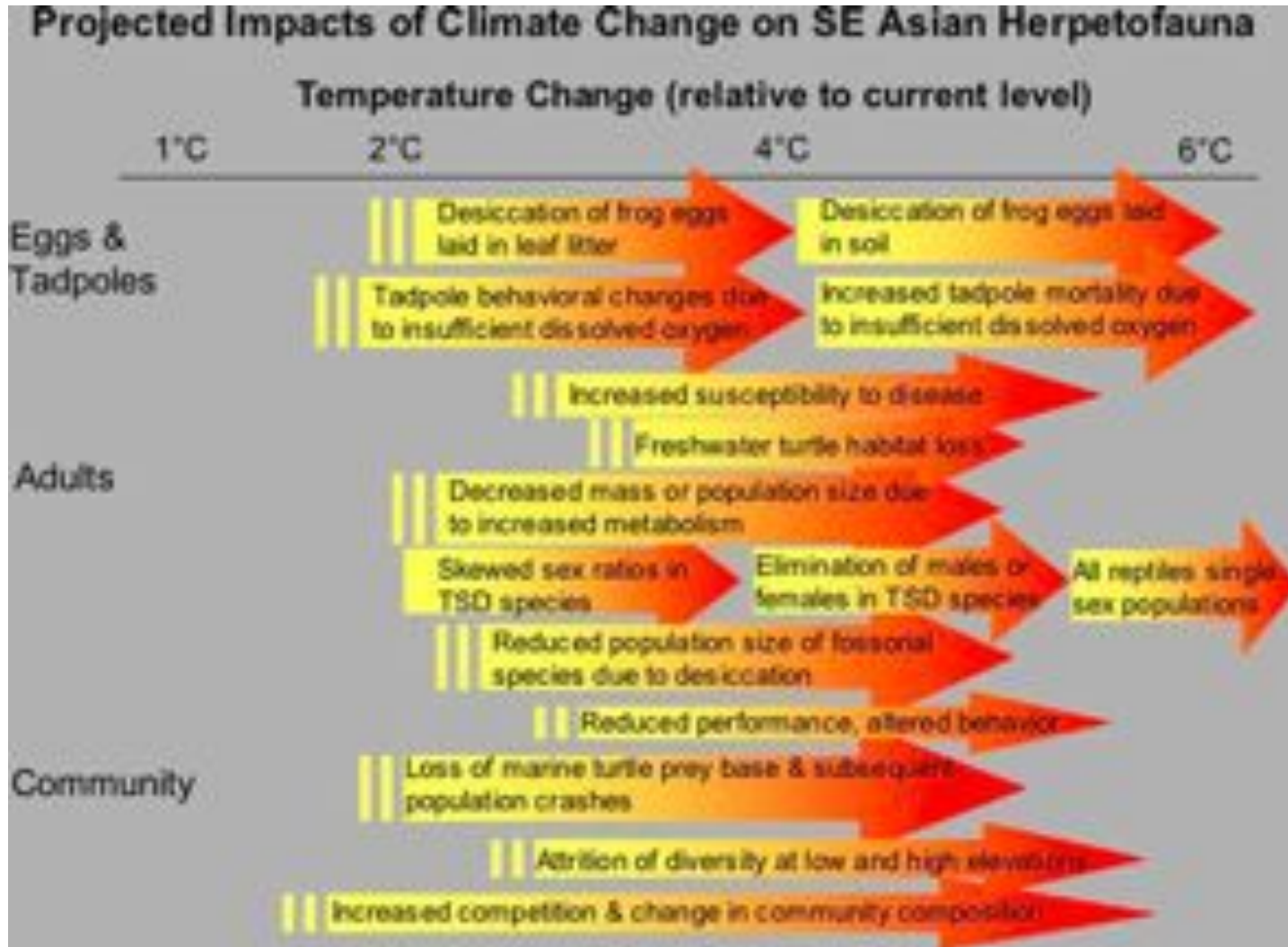
Species at Greatest Risk from Climate Change

- Rare, threatened, endangered
- Restricted ranges
- Poor dispersers
- Mountain-top and low-lying island endemics
- Extreme niche specialists
- Narrow physiological tolerances





Reptiles & Amphibians Likely to Be Severely Impacted in SE Asia, including Cambodia



Source: Bickford et al. 2010



Shift Toward Deciduous Forest Ecosystems



Reduction of forested areas and displacement of evergreen by deciduous forest types

- Subtropical moist forests projected decline from 48% of total forest area to 12% (2100)
- Semi-deciduous broad leaf forest is projected to decrease by 41% in 2020, and by 69% in 2100
- Effects of invasive species & pests?

Source: ADB April 2009

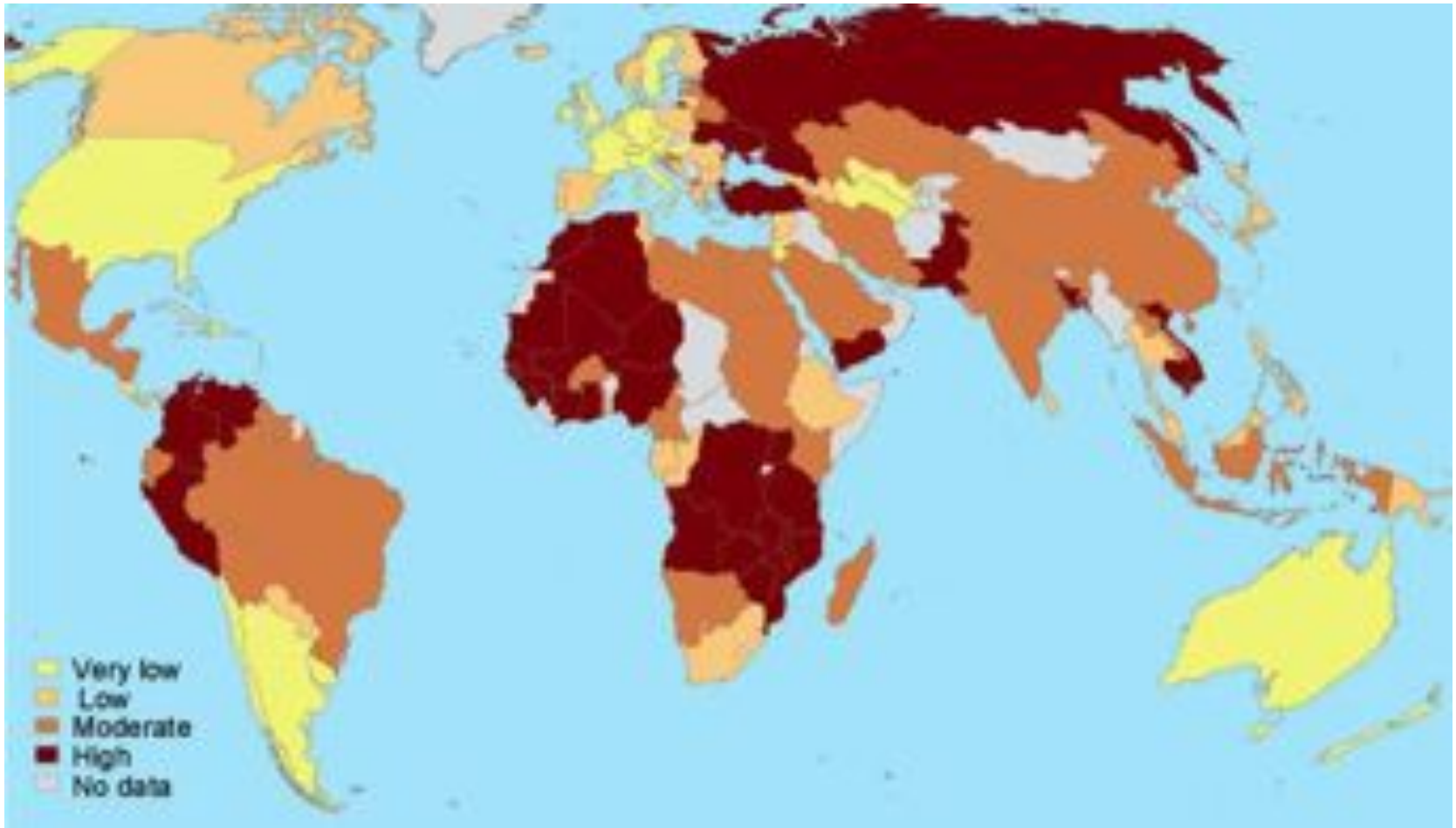


Seasonal Wetlands Especially Vulnerable





Cambodia's Economy Extremely Vulnerable in Part Due to Potential Impacts on Fisheries



Source: Allison et al. 2009



2. Potential impacts on biodiversity

- Changes in ecosystems e.g., riparian to flooded forests, evergreen to dry forest, desertification
- Potential impacts to fisheries sustainability (loss of spawning areas) and forest resources (loss of NTFPs)
- Increase in invasive and/or tolerant species e.g. rats & other 'pest' species, reduction in biodiversity
- Food insecurity for people dependent on agriculture, fisheries and NTFPs





3. Adaptation & Mitigation Measures

- Reduce fragmentation and ensure connectivity of habitats to allow species dispersal under different scenarios
- Landscape planning to ensure connectivity of core biodiversity habitats
- Utilise ‘soft’ infrastructure that is adaptable to climate change
- Integrate ecosystems and communities in adaptation and development planning



Key Mitigation Strategy: Maintain Cambodia's and Region's Forests

REDD can help subsidize this strategy

Some key benefits of the region's forests

6 billion tons of Carbon = US\$30–120 billion

Subsistence level forest products = US\$1.5–8.5 billion



“Soft” & “Ecosystem-Based” Adaptation Measures

HAZARD	IMPACT	OPTION
Sea level rise & storm surges	Damage to settlements	Set-backs (prevent development immediately on coastal fronts)
Coastal flooding	Damage to settlements	Mangrove restoration
Flooding	Reduced agriculture productivity	Adaptive crops (new varieties that can grow in flooded conditions)
Drought	Reduced agriculture productivity	Rainwater harvesting (water conservation methods)
Drought & aridity	Decreased food security	Drought insurance (community based insurance scheme)



4. Potential impacts of human responses to climate change

- The impacts of human responses to CC on biodiversity can dwarf the direct impacts (Turner et al. 2010)
- Maladaptation

[Climate change responses are] maladaptive when they do not enable a person, system, or society to cope with some aspect of change, but also when they worsen a problem or reduce the capacity to respond to future unforeseen events and circumstances. P. 414, Fazey et al. 2010

- Importance of avoiding mal-adaptation



4. Potential impacts of human responses to climate change

- Connected, biologically diverse systems provide resilience to climate change...

“natural processes of flood and recession – the flood pulse – drive the natural productivity of agriculture and fisheries.” p. 50, Cambodia HDR 2011

“Because of the linkages between fish populations, the flooded forests, and the well being of the local people in ... northeastern Cambodia, the survival of these forests is critical” p. 137, Baird et al. 2007

- ... but infrastructure, habitat loss, fragmentation reduce resilience

“Already, it appears that changes in the hydrology in the mainstream Mekong River caused by upriver dams in China may be the cause of the deaths of large numbers of flooded forest trees in the Mekong River in Stung Treng Province, northeastern Cambodia.” p. 139, Baird et al. 2007



5. Priority areas for research

- Impact on ecosystem integrity and services at **national** and **regional scale** from planned developments, and demonstrating alternatives to hard infrastructure
- **Adaptability** of institutional frameworks
- Areas for policy revisions to **enable** and **mainstream** climate change adaptation and mitigation
- Develop integrated approaches to addressing climate change
- Identification of capacity needs to develop **integrated approaches** to land use planning



Enabling environment

Making policies & institutions 'climate smart'
Improving governance

Affects outcomes of adaptation

Non-adaptive policies can slow or prevent adaptation

Institutions need to be flexible

Plan for change over time

Mainstreaming

Not just an 'environmental' issue
Partnerships across sectors for learning & action

Current policies may not be sustainable

Hard approaches often prioritized; ecosystem approaches offer benefits

Sustainability; avoidance of mal-adaptation

Co-benefits; climate mitigation, livelihoods

Promote local solutions



ECOSYSTEMS & LIVELIHOODS ADAPTATION

Developing an integrated approach to Adaptation
Planning and Action

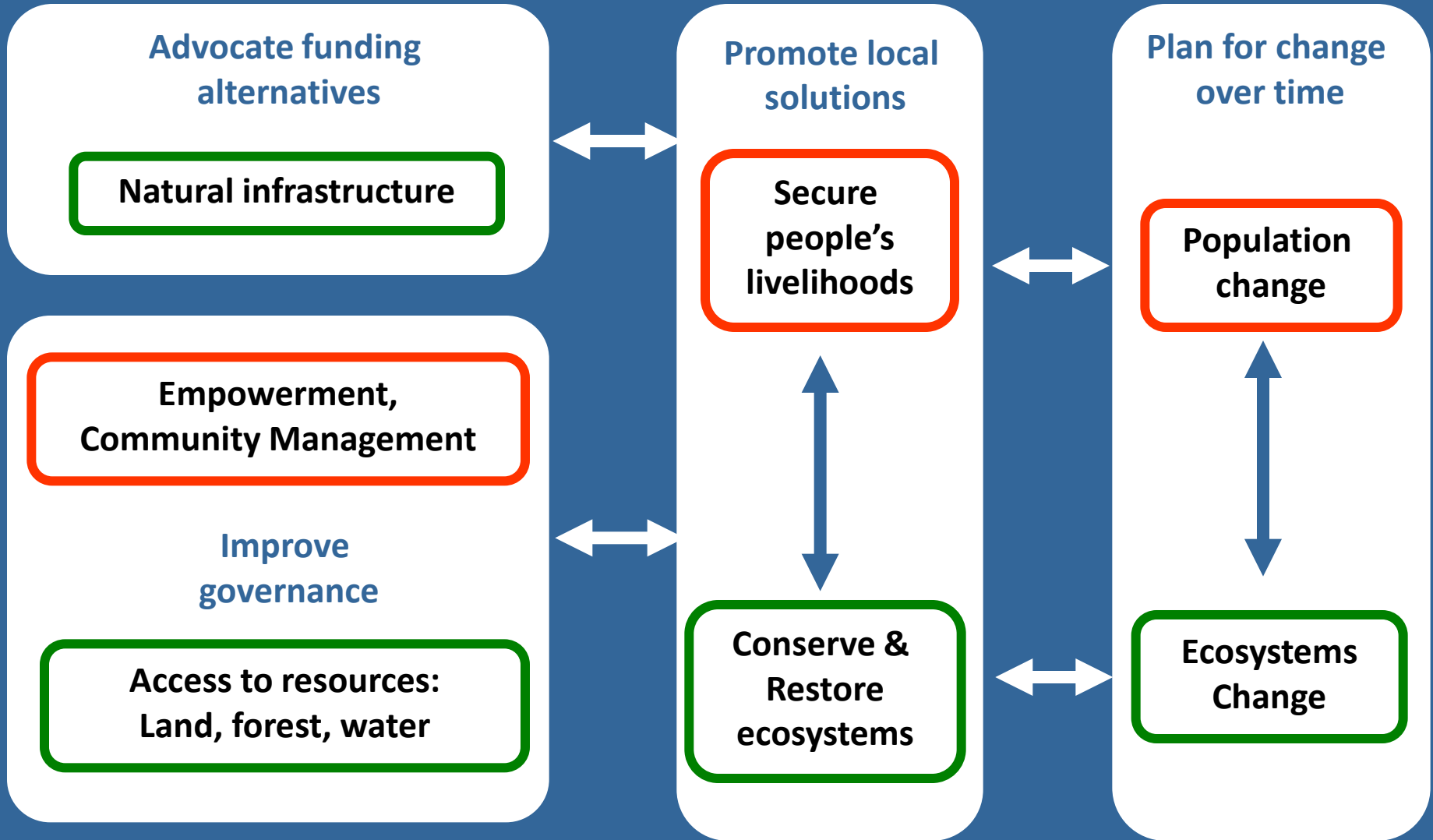


Why this integrated approach?

- Vulnerable communities and ecosystems are at risk
- Large 'hard' infrastructures are dominant, but risky investments
- Local solutions enhance resilience of people and of ecosystems
- Promote 'natural' infrastructure



Framework: Integrated Approach to Adaptation Planning and Action



Partnerships across sectors for learning and action



Towards an integrated approach

- Promote locally relevant and long-term adaptation solutions
- Advocate for funding alternatives to high costs infrastructure
- Embrace natural infrastructure
- Consider in planning that ecosystems change
- Conserve and restore ecosystems and at the same time address the needs of the people
- Tackle fundamental justice issues and related governance changes
- Develop partnerships across sectors for rapid learning and action



6. Key policy recommendations

- Support **soft alternatives** to hard infrastructure; **invest in natural infrastructure**
- Policies, plans, and infrastructure need to be **flexible**, adapt and evolve as the climate changes (i.e., plan for change)
- Planning and coordination required **across sectors**; new partnerships are needed across sectors for learning & action
- Develop a supportive **enabling environment** (including improved governance) for successful adaptation and mitigation measures
- Commit to **regional collaboration** to address climate change and aggravating impacts from development



THANK YOU !

For more information:

www.panda.org

www.elanadapt.net

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