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LITERATURE REVIEW: Analysis of Findings

on the range of approaches to address loss and damage associated with the adverse effects of climate change, including impacts related to extreme weather events and slow onset events

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Main messages

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- **Loss and damage continuum: climate variability and slow onset climatic processes**. Addressing loss and damage requires an understanding of the kinds of events and processes that are associated with the adverse impacts of climate change..
- **Four groups of approaches fit along the loss & damage continuum**. Combinations of the four groups of approaches are needed throughout the continuum in different combinations.
- **Choosing the right mix of approaches** for a country or region depends on the sectors exposed to loss and damage, & social and economic characteristics of a country.
- **Gaps in knowledge and practice**
  - Most of our knowledge and practice today is about **responding** to extreme weather events. Quite a bit of awareness about the need for effective **prevention and risk reduction**.
  - But major gaps exist about **approaches to address slow onset** climatic processes, both today and in the future

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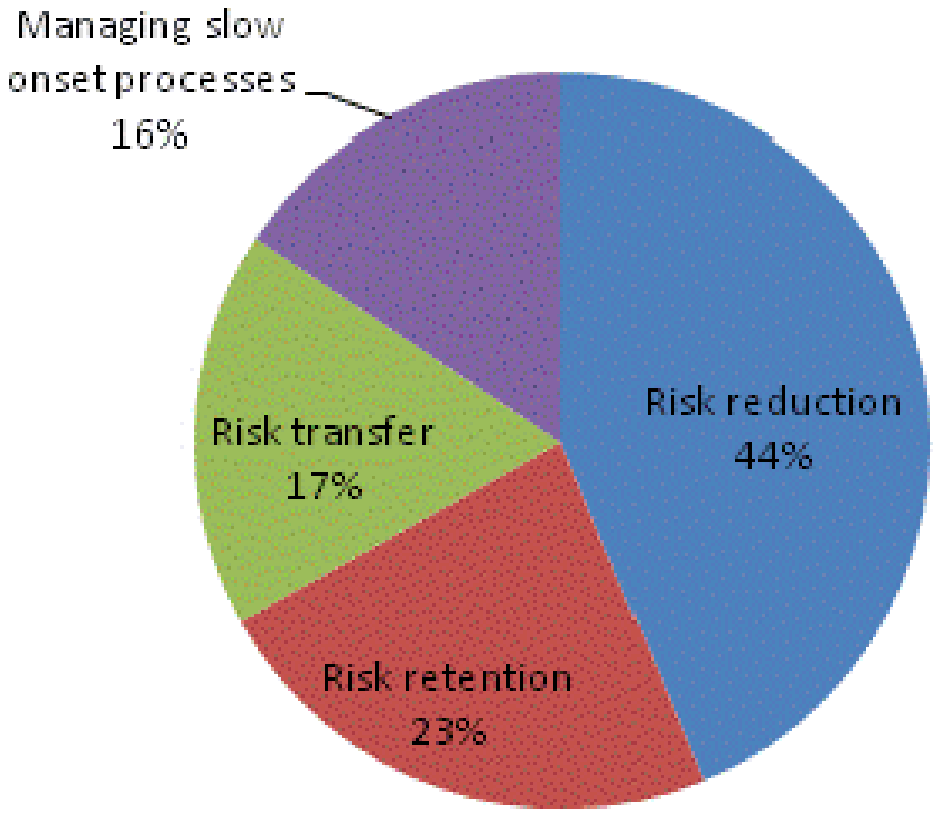
Summary of approaches to address loss and damage

Total approaches reviewed



Risk Reduction Approaches

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- Risk reduction measures are undertaken before an actual extreme event occurs.
- Risk reduction is often used effectively for those kinds of climate-related stressors which occur often and whose impacts are relatively low.
- Examples
  - Non-structural: Indigenous knowledge systems, early warning, adjustments in livelihood practices like agriculture, education, building codes
  - Structural: building protection structures like water retention dams, flood protection walls / sea walls, building retrofitting
  - Combinations of technology, education, engineering, early warning, etc. have all been used to help societies anticipate and reduce potential loss and damage from weather extremes (usually those which are frequently observed and for which relatively more information is available).
- Risk reduction is appropriate across all sectors of an economy and in all ecosystem types, although the design specifications differ.

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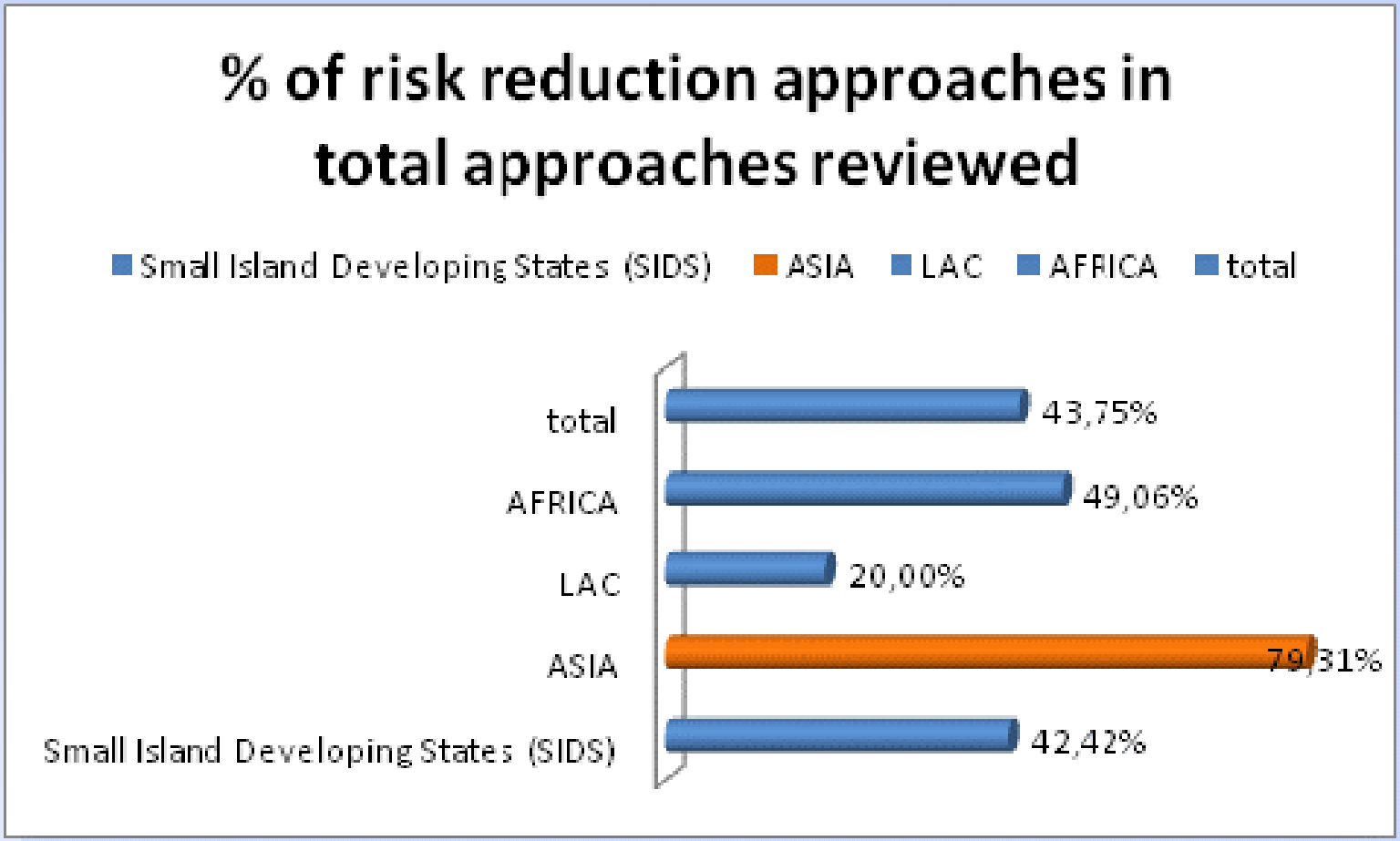
% of risk reduction approaches in total approaches reviewed
Small Island Developing States (SIDS)
ASIA
LAC
AFRICA
total
total
AFRICA
LAC
ASIA
Small Island Developing States (SIDS)
43,75%
49,06%
20,00%
79,31%
42,42%

Analysis of Risk Reduction Approaches

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Foundational Resource Requirements – Risk Reduction Measures

	Non-Structural	Structural
Budget $	**$ - $$** Non-Structural approaches can be relatively inexpensive but must be done on an ongoing basis (e.g. yearly for a decade or two)	**$$ - $$$$** Structural measures can be costly (infrastructure) to build and maintain over infrastructure lifespans of 20 – 50 years A country must be in the position to finance a large infrastructure investment
Infrastructure or equipment needed	 Early warning systems need effective radio or other location-appropriate communications systems Public outreach / education system Monitoring systems	 Sea level walls Flood retention walls Water retention systems (dams) Building retrofitting
Information & data	 Hazard information Risk mapping Weather information Forecasting systems and modeling	 Hazard information Risk mapping Engineering
Technical capacity (experts, etc.)	 Risk communication	 Engineering

Risk Retention Approaches

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- Group of approaches which allows a country to “self-insure” itself against climatic stressors
- Examples
  - Building social, physical, and economic resilient: Social funds, social safety nets
  - Financial risk retention: “passive” reallocation of budgets in the case of an emergency, “proactive” financial planning and use of tools like reserve funds for offsetting unexpected financial burdens associated with climatic stressors.
- Risk retention is used in every public sector, as well as in the private sector.
- The purposeful and planned use of risk retention can be part of a balanced set of complimentary approaches to manage loss and damage;
- However, **unplanned and unforeseen expenses can place significant burden on the public sector**, one of the greatest disadvantages of (financial) risk retention.

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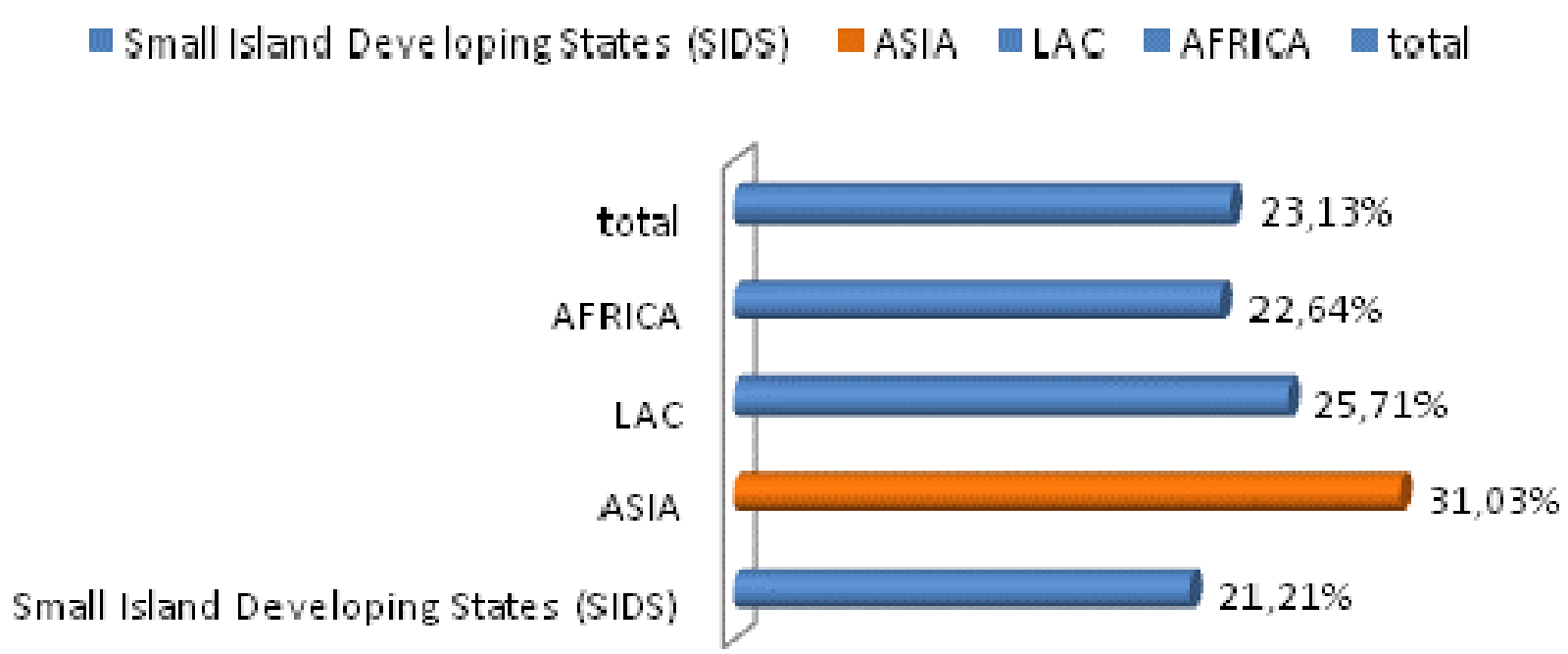
% of risk retention approaches in total approaches reviewed



Analysis of Risk Retention Approaches

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Foundational Resource Requirements – Risk Retention Measures

	Resilience – building	**Financial risk retention (paying for the impacts)**
Budget $	**$$$** Resilience building approaches require sustained and targeted financing over a period of years	**$$$$$** Self-financing potential loss and damage can be costly and impose itself on public budgets exactly when liquidity is in greatest demand
Infrastructure or equipment needed	 Targeting programs to reach the right groups Public outreach / education system Monitoring systems	 Sound financial planning & financial forecasting Clear legislation to administer funds
Information & data	 Hazard information Risk mapping Weather information Forecasting systems and modeling	 Hazard information Risk mapping Weather information Forecasting systems and modeling
Technical capacity (experts, etc.)	 Social protection & targeting experts	 Financial risk management, esp. in public sector

Risk Transfer Approaches

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- Risk transfer approaches help shift the – mostly financial – risks of loss and damage from one entity to another.
- Risk transfer usually is associated with a fee for the service provided (e.g. of one entity assuming responsibility for the part of the risk that is transferred).
- Risk transfer is undertaken when the country or entity assesses that the potential loss and damage it could experience could be greater than its ability to manage that loss and damage.
- Examples:
  - Insurance (micro- , meso-, macro), catastrophe bonds, conditional risk transfer, combined insurance-credit programs, etc.
- **Risk transfer is used to reduce the uncertainty and volatility associated with potential loss and damage**.
- **Risk transfer does not directly prevent or reduce the risk of damage or loss**; however, the financial liquidity provided by this set of approaches can reduce some of the indirect effects of damage

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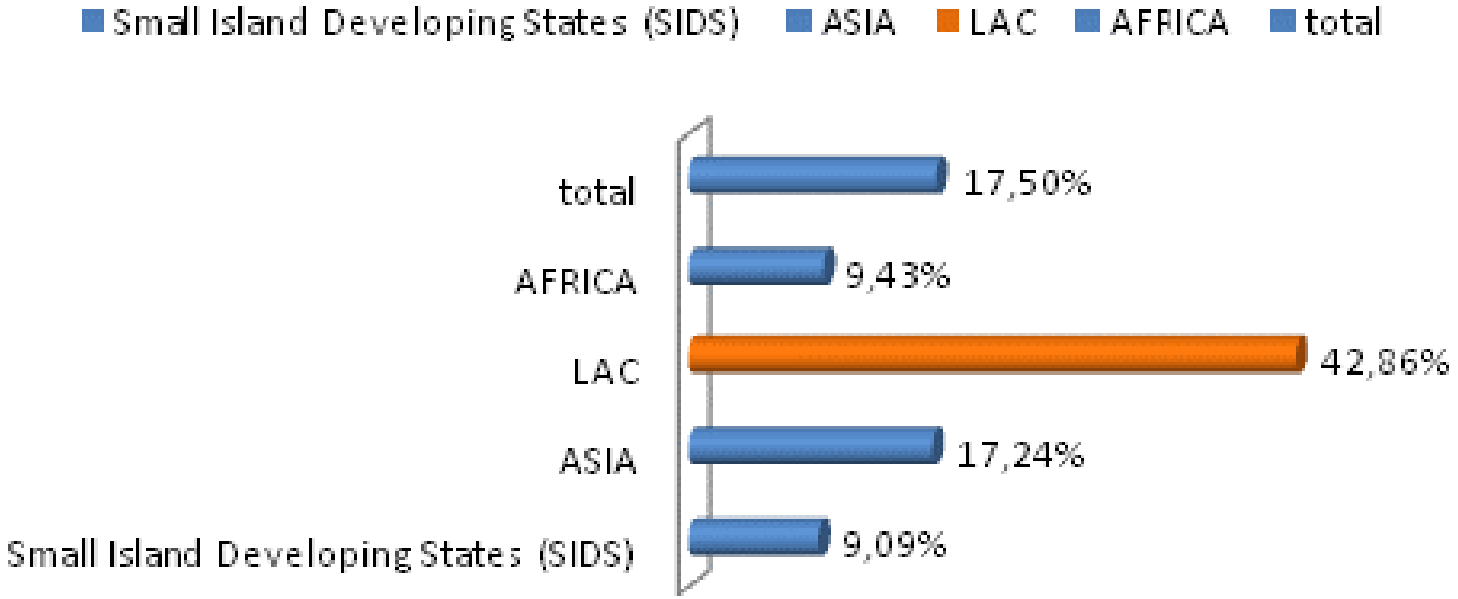
% of risk transfer approaches in total approaches reviewed



Analysis of Risk Transfer Approaches

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Foundational Resource Requirements – Risk Transfer Measures

	Generalized requirements for risk transfer
Budget $	**$$$** Cost of risk transfer is an equation of the "pure cost of risk", plus the cost of administering the risk transfer
Infrastructure or equipment needed	 Weather information and monitoring systems Forecasting systems and modeling Insurance regulation frameworks Financial system
Information & data	 Hazard information Risk mapping met service & satellite) Risk analysis, risk mapping, hazard- asset- and vulnerability exposures
Technical capacity (experts, etc.)	 Risk assessment and modeling experts Financial risk, insurance experts

Approaches to manage slow onset climate processes

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- Slow onset climatic processes are underway today, yet this is the area under approaches to address loss and damage **where the most needs to be learned, new approaches tested, and experiences shared**.
- Examples in this literature review include:
  - Regional natural resource management and coordination, like regional river commissions
  - National level coordination approaches across sectors, sometimes represented in national climate change focal points, national climate change legislation and policy
- Combinations of approaches to address the losses from long-term foreseeable risks (residual loss and damage) such as sea level rise, widespread desertification and the loss of geological water sources such as glaciers will be needed in the future.
- Some residual damages and losses will require the accumulation of resources and are likely best dealt with using a combination of institutional and governance approaches, management, and financial tools.

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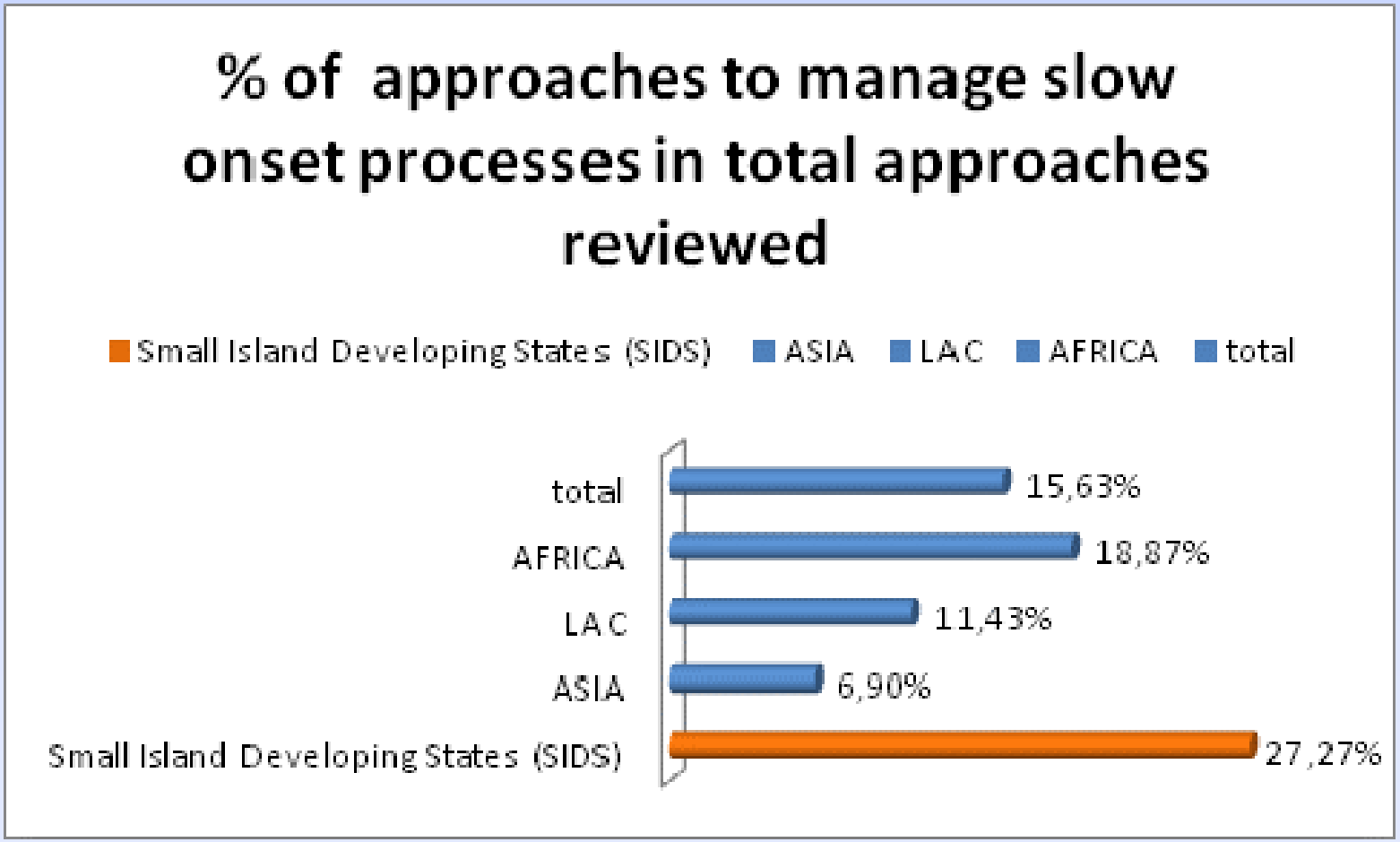
% of approaches to manage slow onset processes in total approaches reviewed
Small Island Developing States (SIDS)
ASIA
LAC
AFRICA
total
total
AFRICA
LAC
ASIA
Small Island Developing States (SIDS)
15,63%
18,87%
11,43%
6,90%
27,27%

Analysis of Approaches to manage slow onset climatic processes

Foundational Resource Requirements – Measures to address slow onset climatic processes

	Current approaches	Future approaches
Budget $	**$ - $$$** Policy frameworks Political and social dialogue Investments in research and innovation	**$$$$$** Future approaches may range from "extreme" physical infrastructure investments, new forms of social organization and population distribution, etc. Costs will not all be finance-able, so
Infrastructure or equipment needed	 Communication Community & citizen engagement National dialogue and policy making Regional dialogue	 All of the dialogue and planning currently used, plus more intensive regional and national monitoring and coordination approaches Infrastructural measures at new scales Relocation of at-risk populations Transboundary livelihood arrangements in some areas Provisions for fresh water at large scale Large-scale livelihood programs
Information & data	 Hazard information Risk mapping Weather information Forecasting systems and modeling Social & physical thresholds	 Hazard information Risk mapping Weather information Forecasting systems and modeling Social & physical thresholds
Technical capacity (experts, etc.)	 Policy and planning	 Policy and planning Infrastructure Weather & climate modeling Thresholds monitoring Economic & financial tools Economic / livelihood alternatives Regional diplomatic relations

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Analysis of African approaches to address loss and damage

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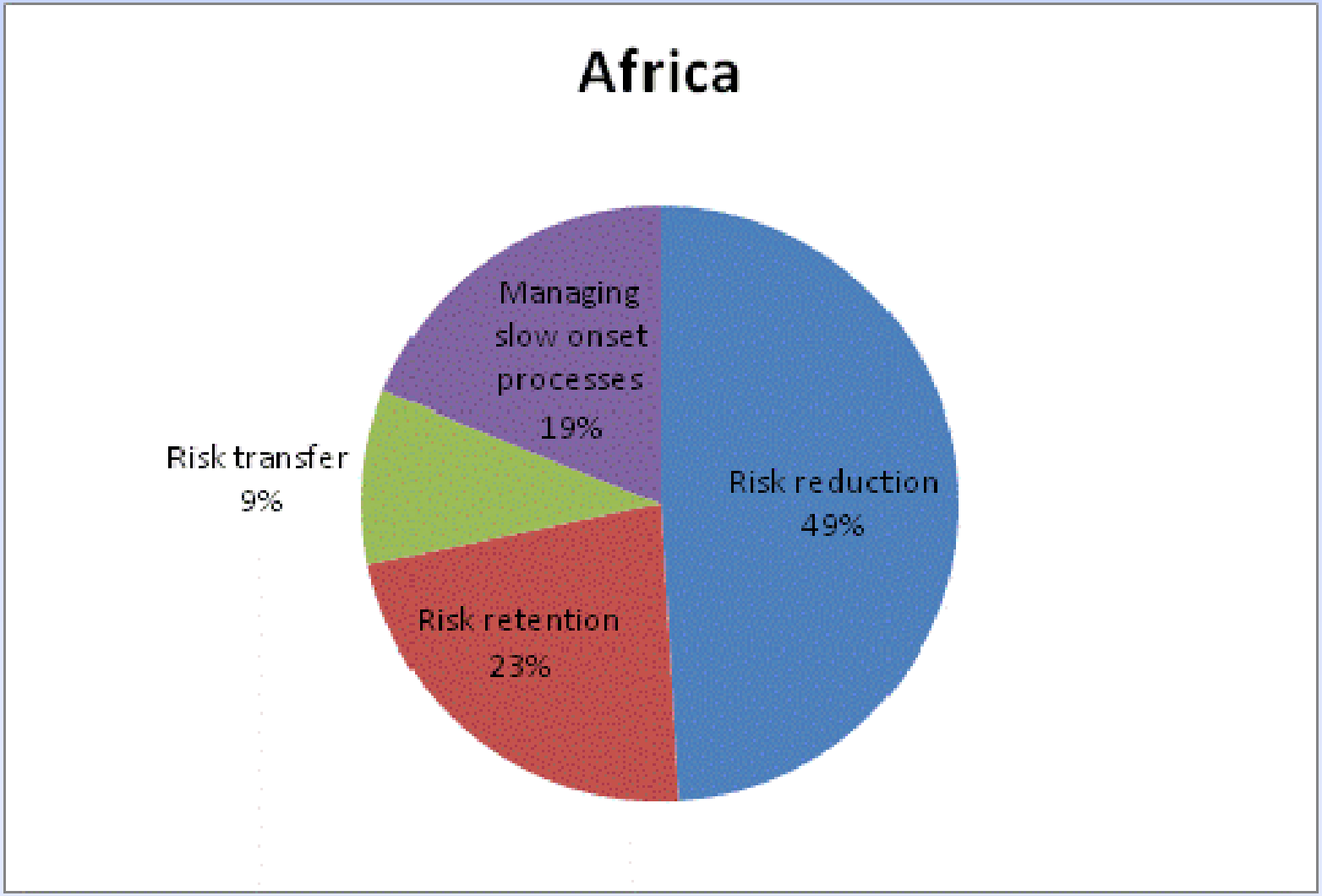
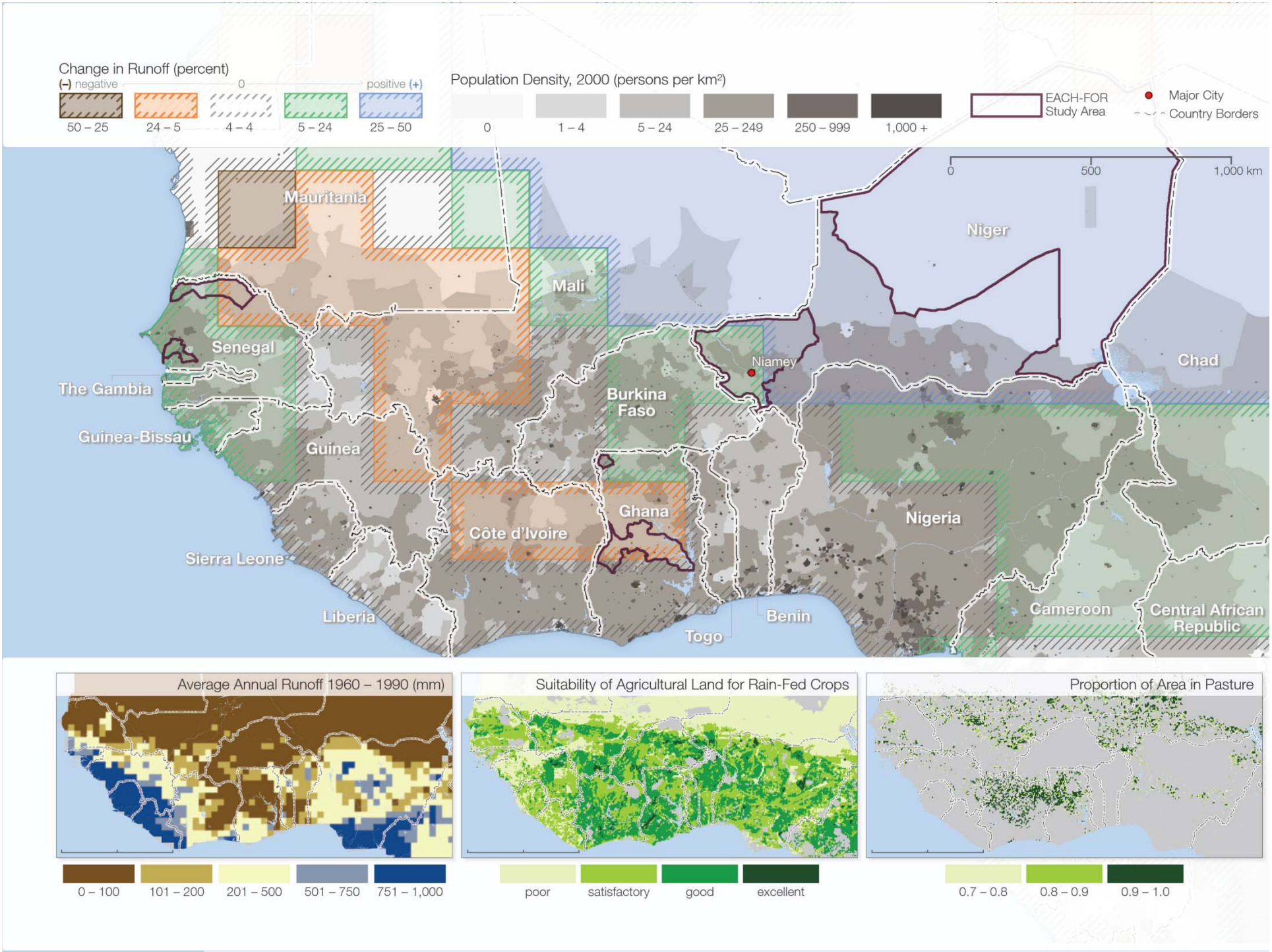

Africa
Managing slow onset processes 19%
Risk transfer 9%
Risk reduction 49%
Risk retention 23%


Change in Runoff (percent)
(–) negative
0
positive (+)
50 – 25
24 – 5
4 – 4
5 – 24
25 – 50
Population Density, 2000 (persons per km²)
0
1 – 4
5 – 24
25 – 249
250 – 999
1,000 +
EACH-FOR Study Area
Major City
Country Borders
0
500
1,000 km
Mauritania
Mali
Niger
Senegal
Niamey
Chad
The Gambia
Burkina Faso
Guinea-Bissau
Guinea
Ghana
Nigeria
Côte d'Ivoire
Sierra Leone
Liberia
Benin
Togo
Cameroon
Central African Republic
Average Annual Runoff 1960 – 1990 (mm)
0 – 100
101 – 200
201 – 500
501 – 750
751 – 1,000
Suitability of Agricultural Land for Rain-Fed Crops
poor
satisfactory
good
excellent
Proportion of Area in Pasture
0.7 – 0.8
0.8 – 0.9
0.9 – 1.0

Risk Reduction in Africa: Selected experiences

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- Early warning systems
  - Mozambique and flooding
  - West Africa drought and food security
- Indigenous knowledge (and livelihood practices and strategies)
  - Planting schedules and practices
  - Different crop varieties
  - Reducing soil erosion
- Infrastructural measures, especially around water management

Risk Reduction in Africa: Selected experiences

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- Financial risk retention
  - Planned measures include reserve funds ()
  - Unplanned risk retention can contribute to economic distress
- Social safety nets
  - Ethiopia, Productive Safety Net Program
  - Malawi, cash transfer program
  - Migration & social networks (W. Africa)
- Innovative regional and national programs like the Africa Risk Capacity

Risk Transfer in Africa: Selected experiences

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- For low-income groups
  - Livelihoods
  - Specific crops
  - Use of indexes (rather than “indemnity approaches)
- Meso-level (such as for sectors)
  - Agricultural sector
  - For particular crops or targets
  - For housing or public infrastructure
- Innovative regional and national programs like the Africa Risk Capacity

Slow onset approaches in Africa: Selected experiences

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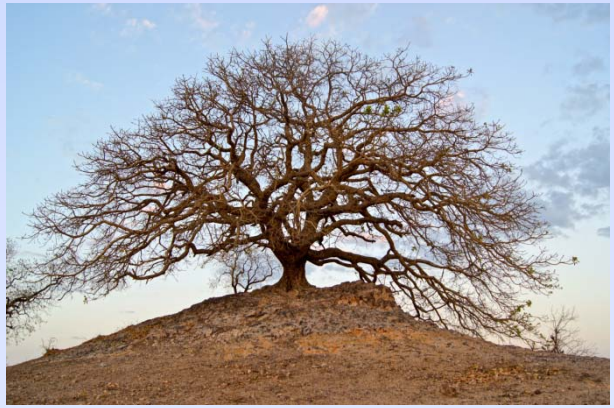

- Institutional
  - Strategy for Flood Management for the Kafue River Basin, developed in a collaborative and participatory process between WMO, a Zambian expert team and key stakeholders including Government Ministries, local organizations, researchers, NGO's, and local farmers' and fishing associations.
- Planning
  - Association for strengthening Agricultural Research in Eastern and Central Africa (ASARECA) have incorporated climate change adaptation strategies into their national development plans

Main messages

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Thank you.

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