

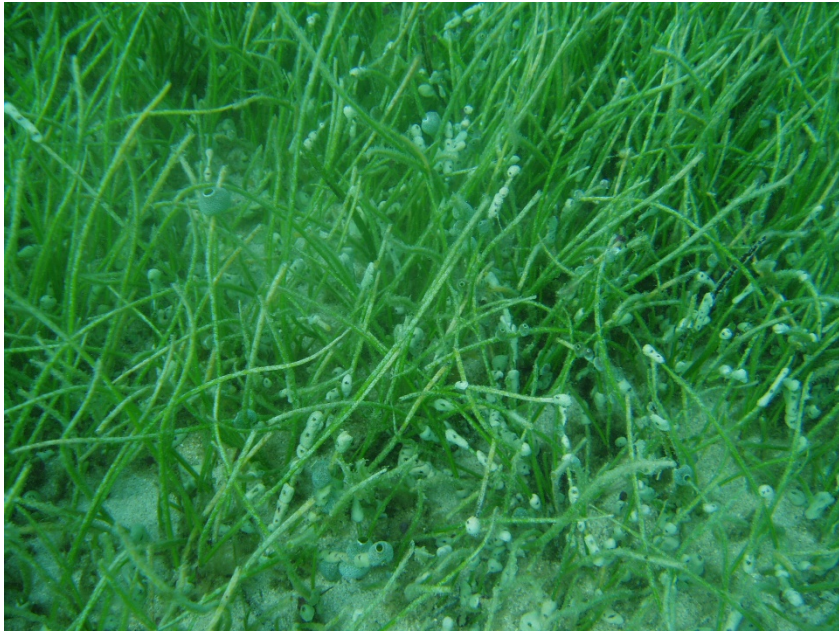
Keeping Balance: the Status and Importance of Seagrass Ecosystems in the Pacific Oceanscape

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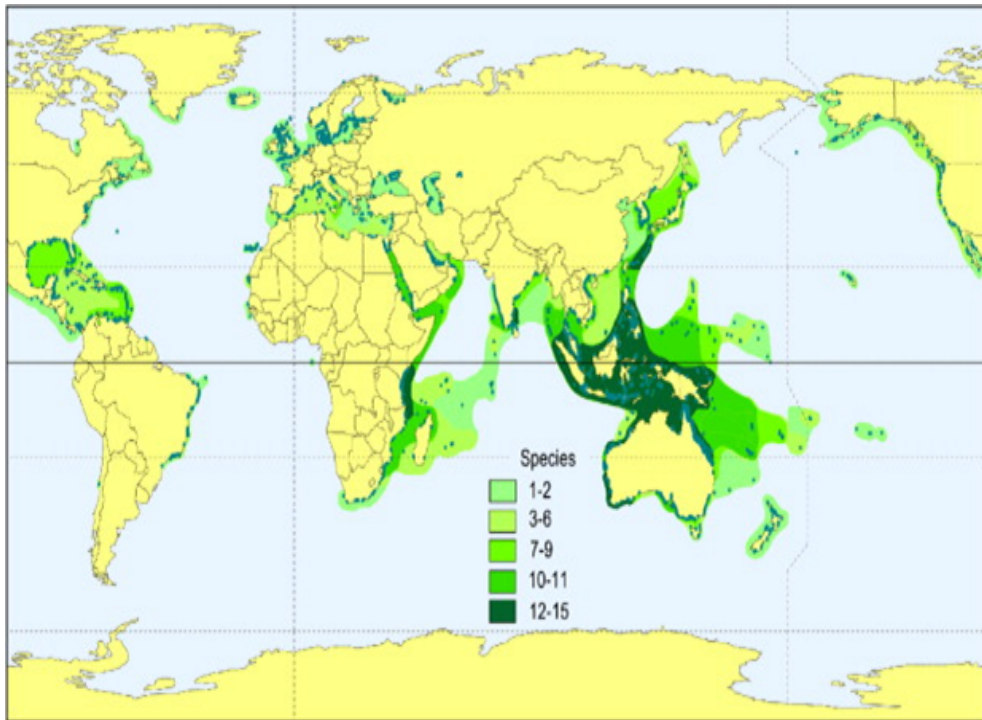


Seagrass Meadows



- Seagrasses are marine flowering plants, that reproduce both sexually & asexually to **form extensive meadows**.
- Closely related to members of the lily and taro families. And must have sunlight to allow photosynthesis.
- Seagrasses possess roots, stems, leaves, flowers, fruits & seeds like terrestrial plants. Thus much of there **biomass is hidden underground**.

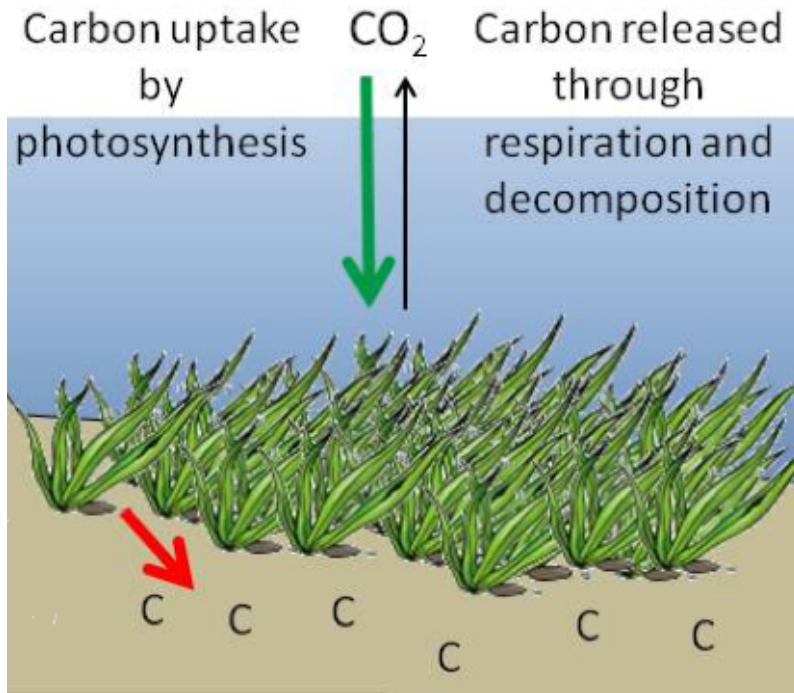
Seagrass Distribution



Source: Short *et al.* 2007

- Seagrass meadows grow along coastlines of every continent except Antarctica.
- Highest seagrass “diversity” with ~14 species found in Indo-Pacific region¹¹.
- Globally 14% of all seagrass species are considered at risk of extinction.

Seagrass Efficient at Fixing CO₂



Source: ⁹

- Ocean (“blue-carbon”) crucial in regulating global carbon capture = 55%.
- Seagrass is responsible for up to 11% of this “blue-carbon” storage by oceans each year².
- Seagrass stores carbon @ a rate 35 times faster than tropical rainforests.
- 90% carbon in sediment & continues to build on this for centuries.

Vulnerability to Climate Change

4 main areas well documented by Waycott *et al.*, 2011



Sea Level Rise

- Depth of habitat will increase, reducing light to plants
- Coastal land erosion will destroy seagrass substrate

CO₂ Rise

- Increased CO₂ reduces pH & affects availability & rate of carbon uptake
 - Increased productivity, biomass & reproductive output
-

Increased Storms & Rainfall

- Impact plant habitat & physiological processes
- Resilience and recovery from physical disturbance takes time – research now occurring overseas

Sea Temperature Increase

- Decrease efficiency of photosynthesis
- Expected significant effects on reproduction - limited information

Threats to Seagrasses Meadows

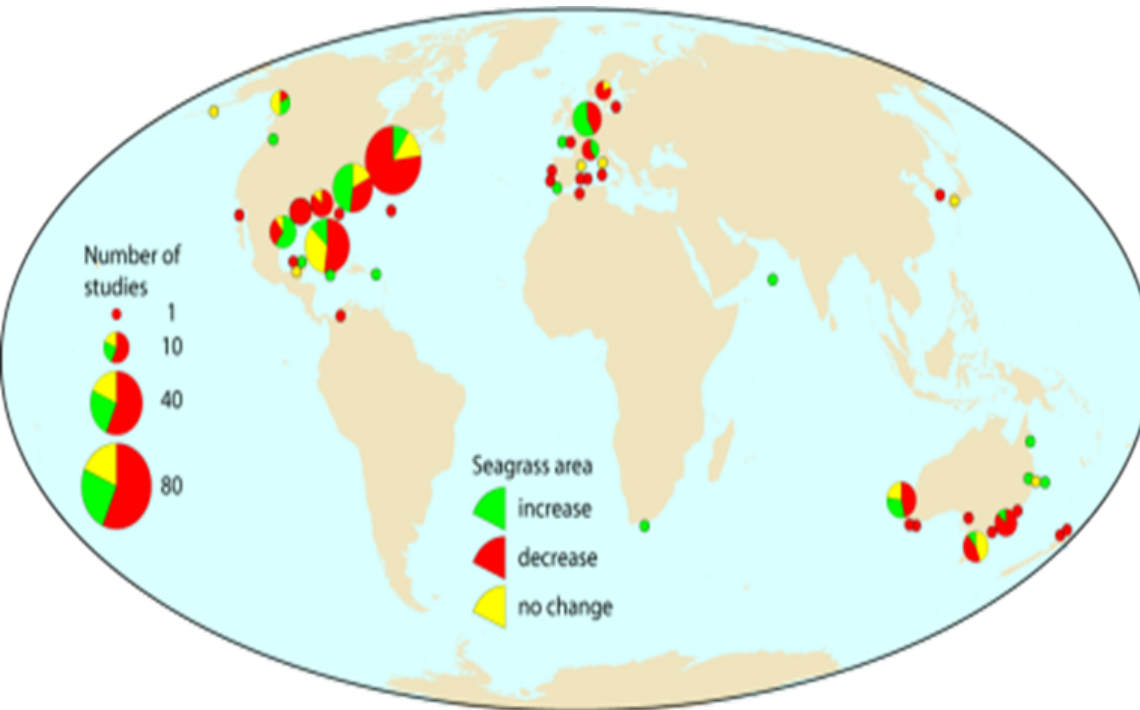


Photo Source: Lamb, *et al.* 2017.

- Poor recognition of seagrass habitat as a highly valuable natural resource.
- Climate change impacts driven by huge global human population increases.
- Unsustainable natural resource use including pollution & coastal development.
- Land clearing & associated poor catchment management practices.
- Lack of regional research on which to base sound management decisions.

Seagrass Losses & Gains

- Seagrass coverage is being lost globally at an annual rate of $1.5\% \text{ y}^{-1}$ that is equal to about 2 football fields being lost each hour².



- Scientists attribute this to poor water quality caused by “pollutants” especially sediments and nutrients⁴ from land run-off causing cloudy water that prevents sunlight penetration to seagrass plants.
- There appears to be no current information from Oceania except for Australia & New Zealand.

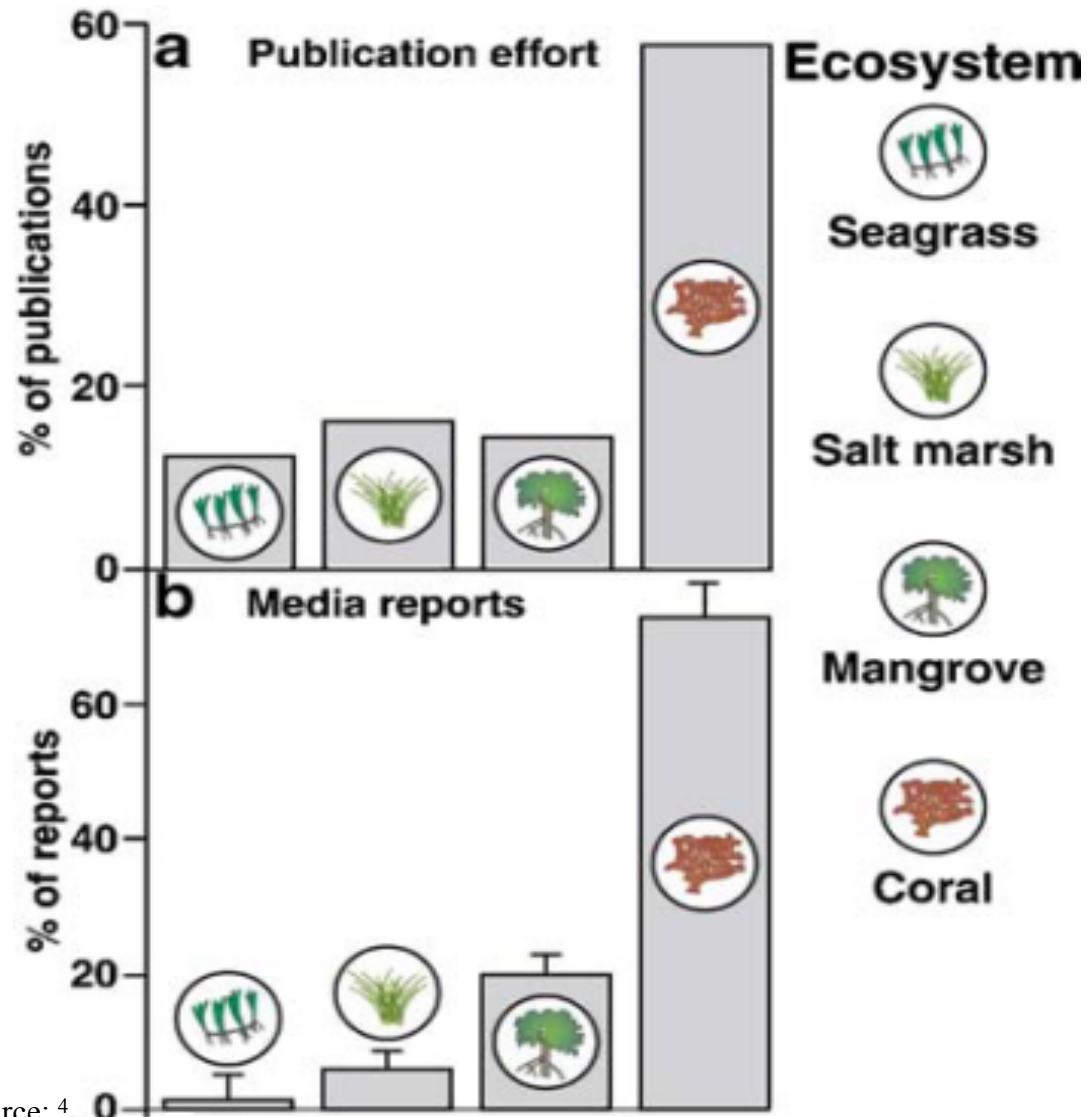
Human Influence on Seagrasses



- The direct & indirect effects of human activities account for most losses of seagrass meadows in recent decades.
- Water quality degradation resulting from increased sediment & nutrient runoff from **human-altered water catchments** is of particular concern.
- Coastal development, industrial & domestic pollution are also major contributors.
- Destructive fishing practices & non-control of mechanical damage through anchor, propeller, & fishing gear. Anchoring and **propeller scars** takes ~ 2-5 years to heal.

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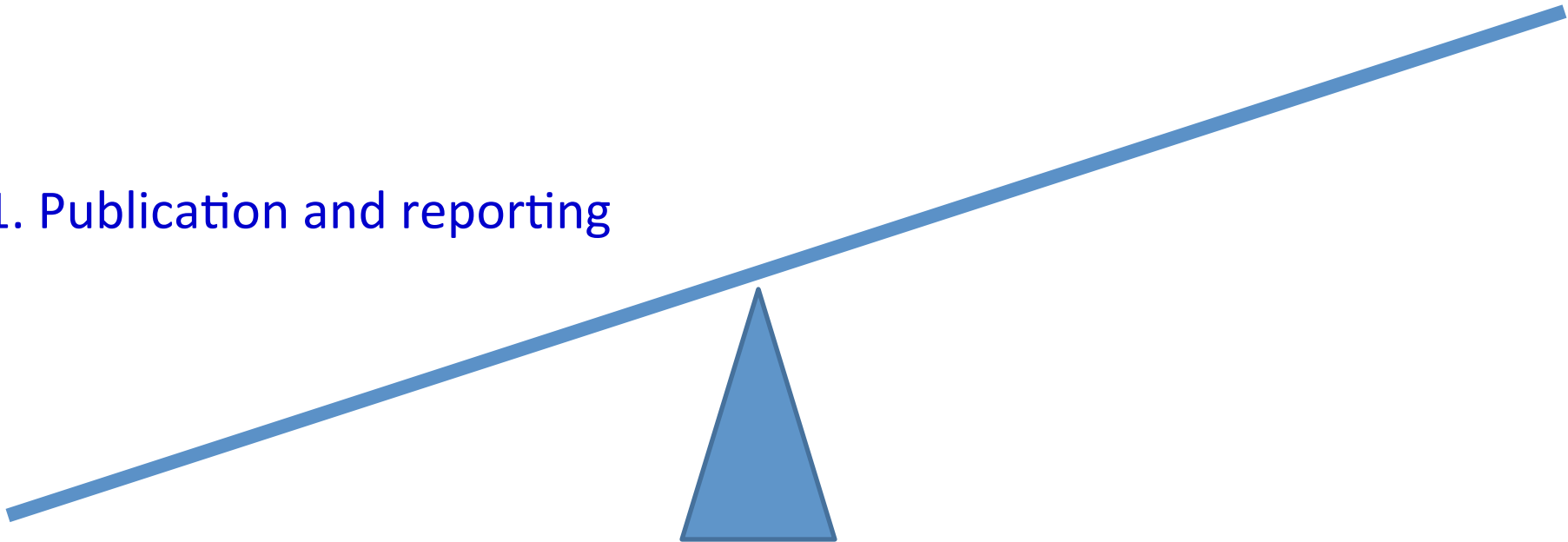
Publications and reports



Source: 4

Keeping Balance:

1. Publication and reporting



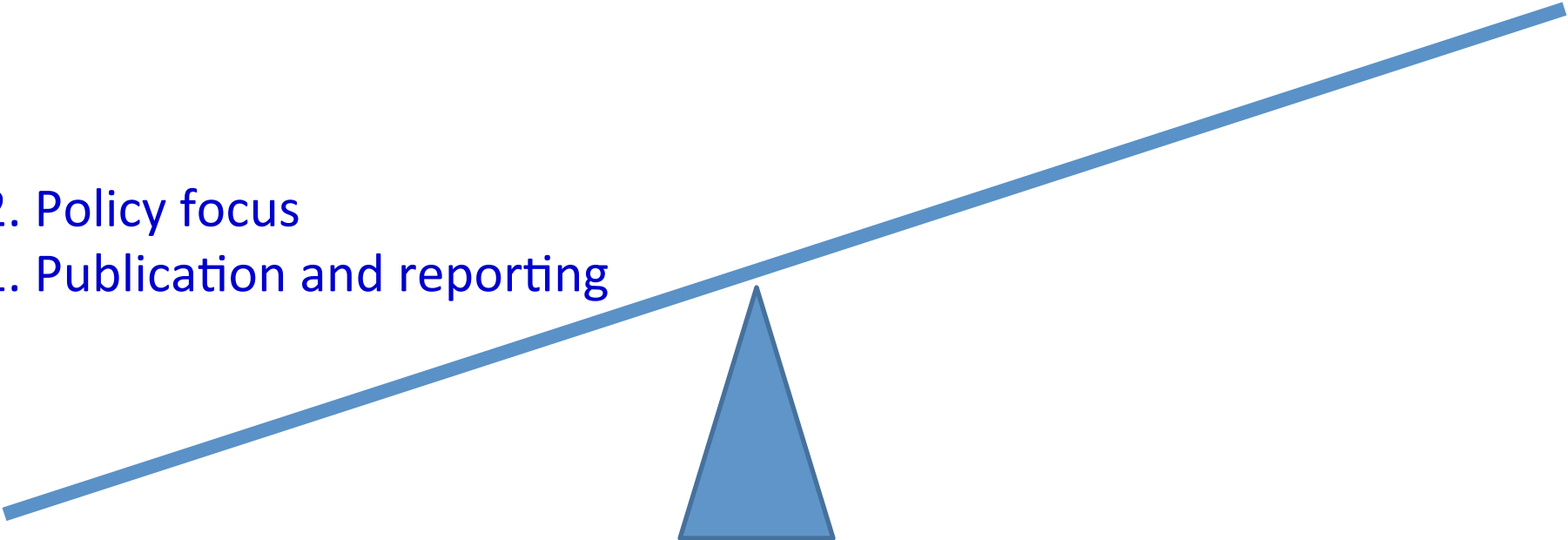
Gaps in Relevant Oceans Policy

- Surprisingly seagrass habitat is not currently mentioned in key regional policy instruments such as:
 - Pacific Island Regional Ocean Policy & Framework for Integrated Strategic Action¹²
 - Framework for a Pacific Oceanscape¹³.

¹² Marine Sector Working Group (MSWG) of the Council of Regional Organizations in the Pacific (CROP); 2005.

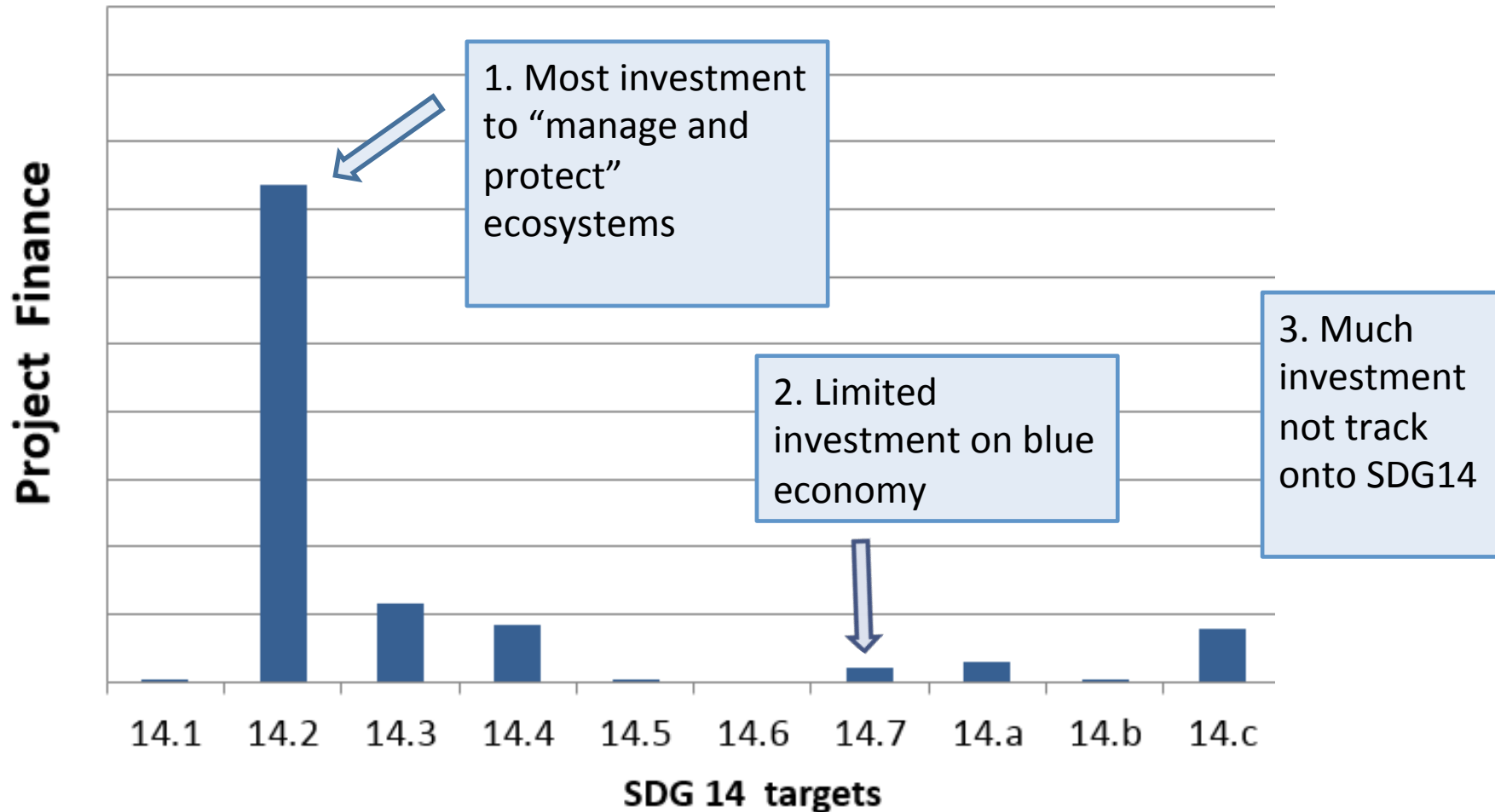
¹³ Pacific Islands Forum Secretariat (PIFS), 2010.

Keeping Balance:

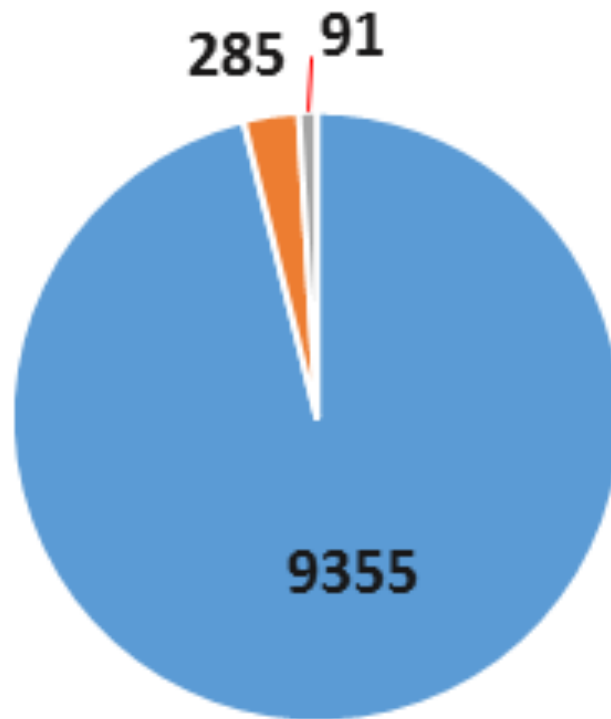
- 
- 2. Policy focus
 - 1. Publication and reporting

SDG14 – profiling ocean investment

- Multi- & bilateral oceans investments last 10 years



Marine development finance - seagrass



<1%

■ Total Coastal in Millions (\$USD)

■ Total Seagrass Implicit in Millions (\$USD)

■ Total Seagrass Explicit in Millions (\$USD)

Keeping Balance:

- 
- 3. Development finance
 - 2. Policy focus
 - 1. Publication and reporting

Biodiversity portfolio analysis



Biodiversity portfolio analysis

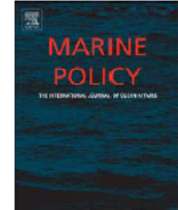
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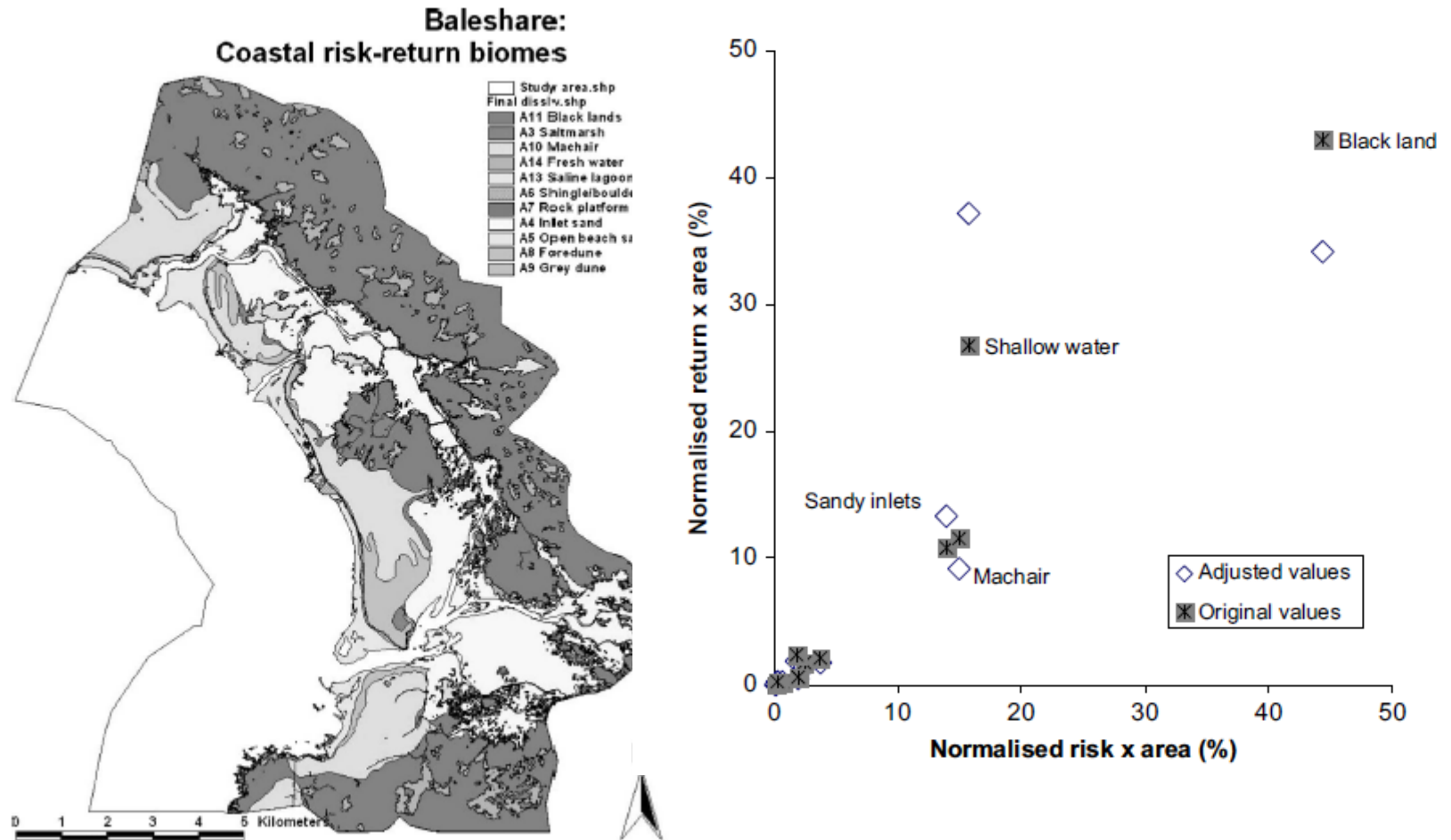
Landscape-scale analysis of ecosystem risk and returns: A new tool for ICZM

Jeremy Hills^{a,*}, Margaret Carlisle^b, Martin Le Tissier^a, David Muir^c, Caroline Robinson^d

Optimising the returns from a share portfolio, or a suite of ecosystems in a landscape, is dependent on the relationship between the units in terms of risk and return.

- 1. Biome area**
- 2. Ecosystem service threat (threat & severity) - risk**
- 3. Ecosystem service value - return**

Biodiversity portfolio analysis



Portfolio resilience – inversely related biome pairs

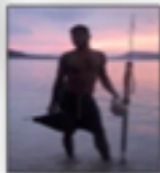
Keeping Balance:

- 
- 3. Development finance
 - 2. Policy focus
 - 1. Publication and reporting

Seagrasses economic services



Commercial fishery



Subsistence fishery



Minerals and aggregate mining



Tourism and recreation



Protection against coastal floods

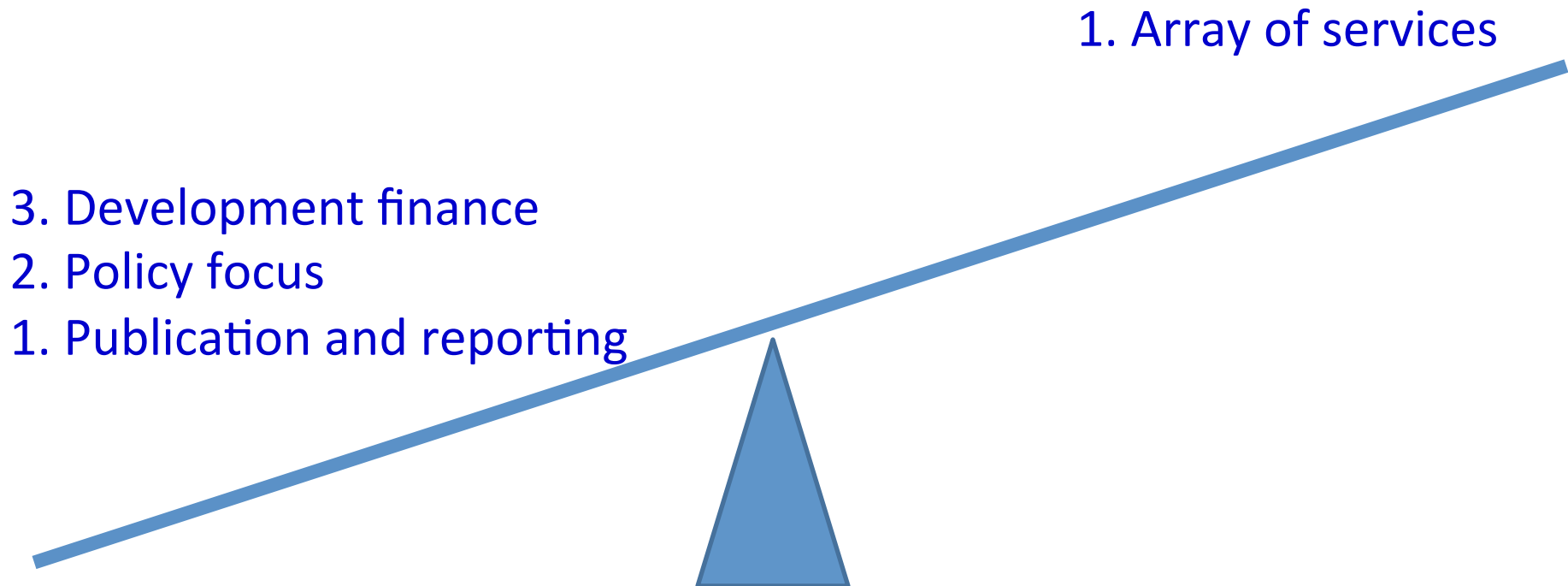


Carbon sequestration



*Research and education
Bio-prospection*

Keeping Balance:




Seagrasses economic valuation - Melanesia

CORAL REEFS, MANGROVES, FOOD SECURITY,
LIVELIHOODS, STORM PROTECTION, TOURISM
ASSETS — THEY'RE ALL CONNECTED

PRIMARY ASSETS

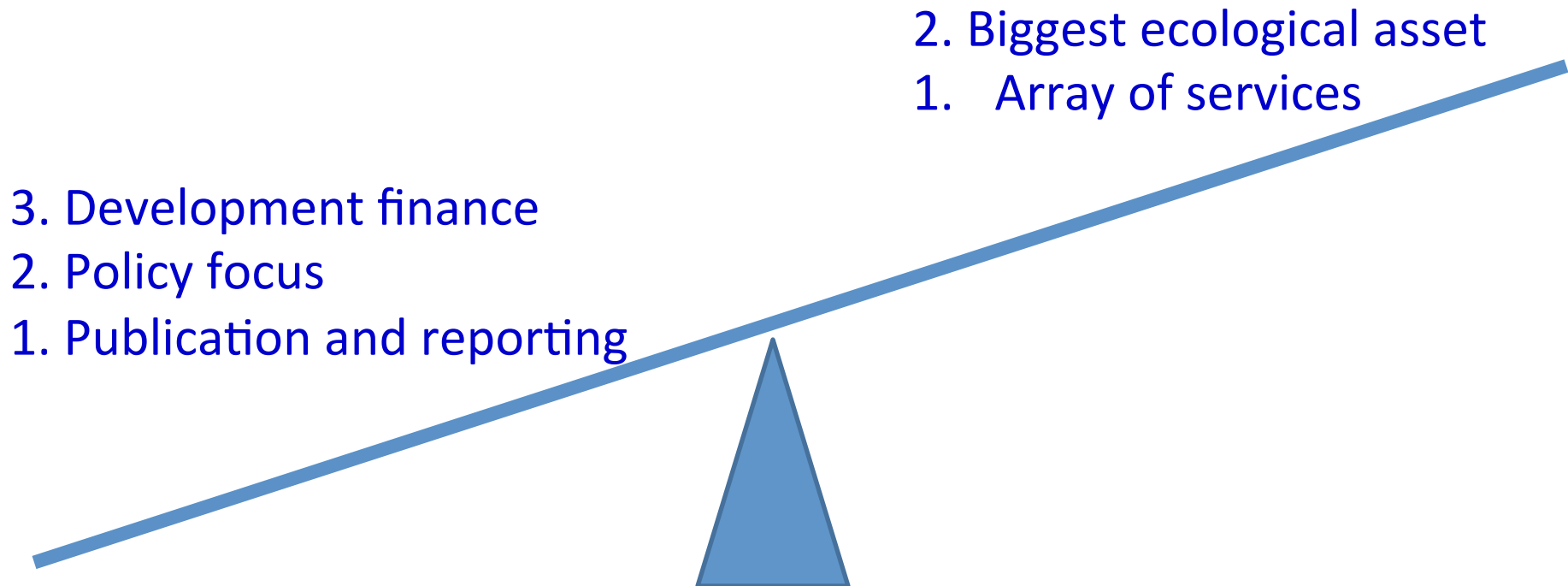
	Marine Fisheries	US\$ 124.1 bn
	Mangroves	US\$ 109.6 bn
	Coral Reefs	US\$ 145.7 bn
	Seagrass	US\$ 151.4 bn

ADJACENT ASSETS

	Productive Coastline	US\$ 14.7 bn
	Carbon Absorption	US\$ 2.9 bn



Keeping Balance:



USP – SRT - project

- Analyse the existing 10-year seagrass dataset and to determine the longitudinal change in seagrass in the region.
- Assess the regional project financing portfolio of interventions in seagrass in the Pacific and future finance flows.
- Produce one regional review publication on the ecological and management status of Pacific seagrass ecosystems.
- Build regional capacity and seagrass mapping and analysis.

Tetepare Descendant Association





Keeping Balance:

- 3. Development finance
- 2. Policy focus
- 1. Publication and reporting



- 2. Biggest ecological asset
- 1. Array of services

