SUSTAINABILITY OF WATERSHED ECOSYSTEM SERVICES: WATER

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Kahublagan sang Panimalay Foundation Inc,

AN INVESTIGATION ON THREE VITAL RELATIONSHIPS WHICH COULD SUSTAIN ECOSYSTEM SERVICES - WATER

Taken from a report on “Adopting Sustainable Financing Mchanism for the Benefit of Watershed Communities” by Jessica C. Salas for the Foundation for the Philippine Environment, 2017.

Objective

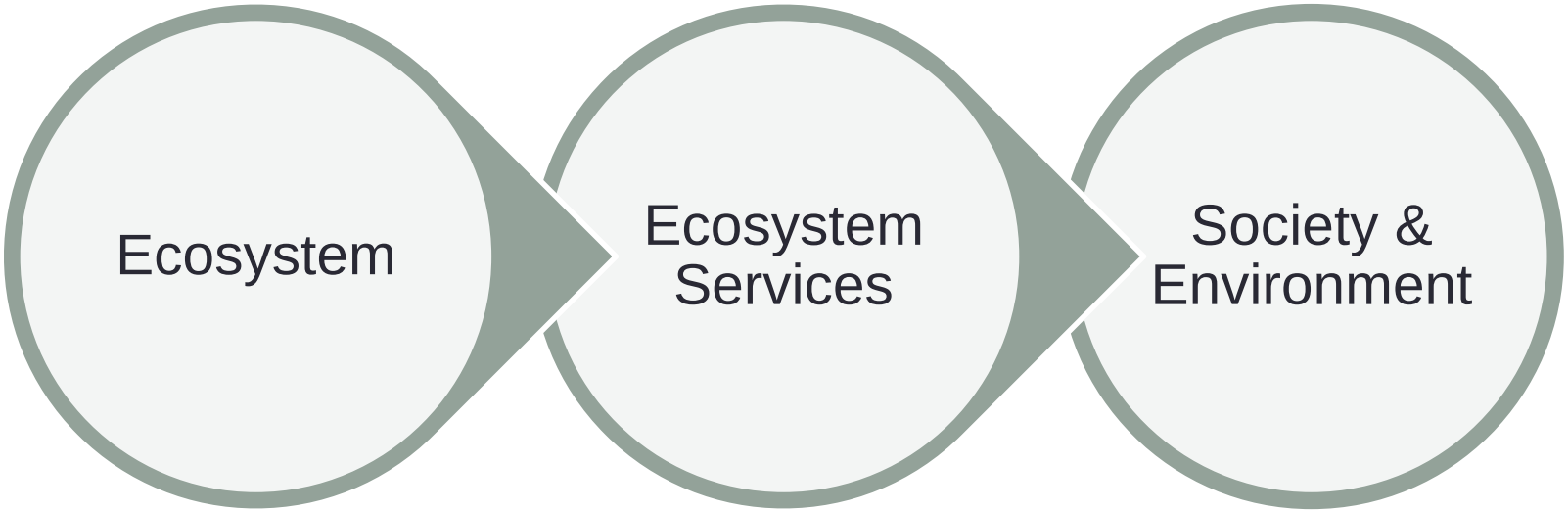
- The study is an attempt to continue the search for sustainable water for communities and the environment by looking at the role of three critical relationships:

1. the forest ecosystem and the ecosystem services it produces, specifically, water

2. The forest and its significant forest community

3. The forest community and a significant downstream community

Theoretical Framework



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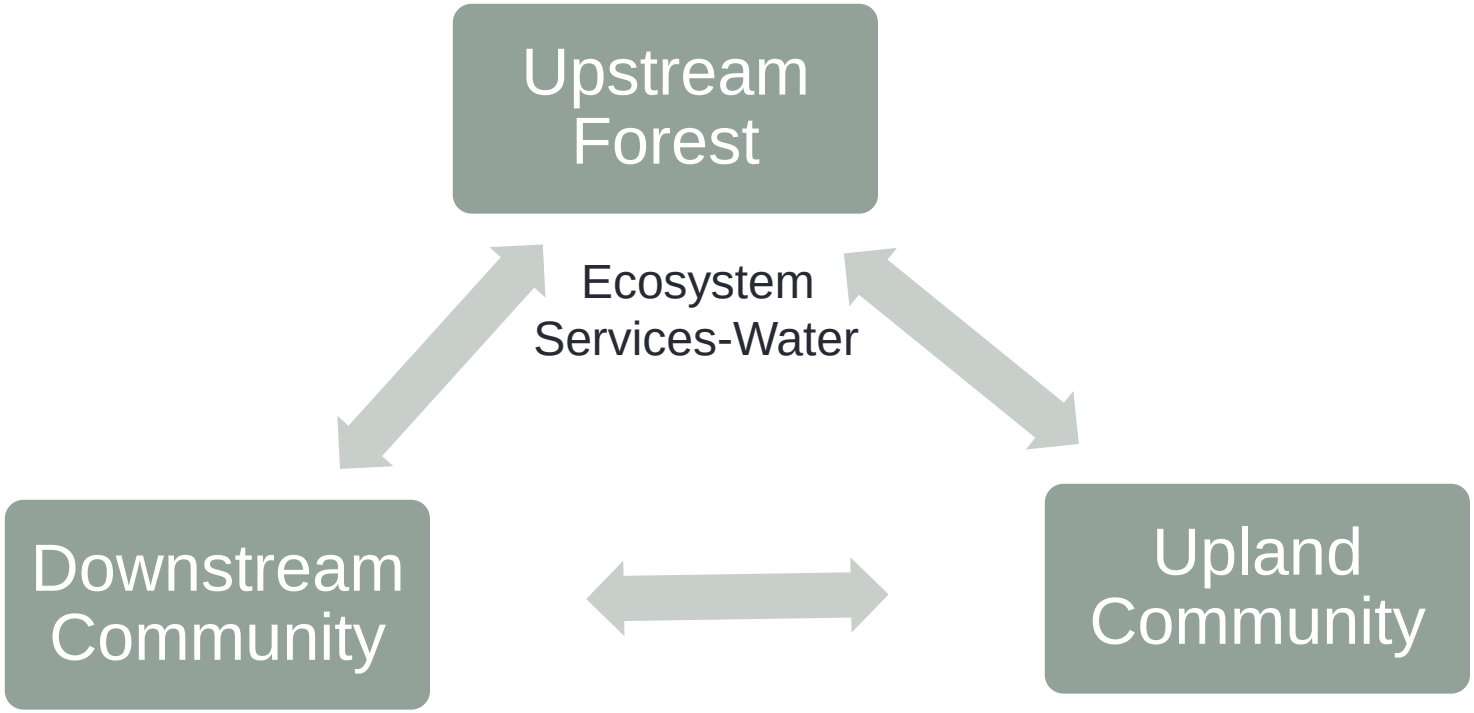
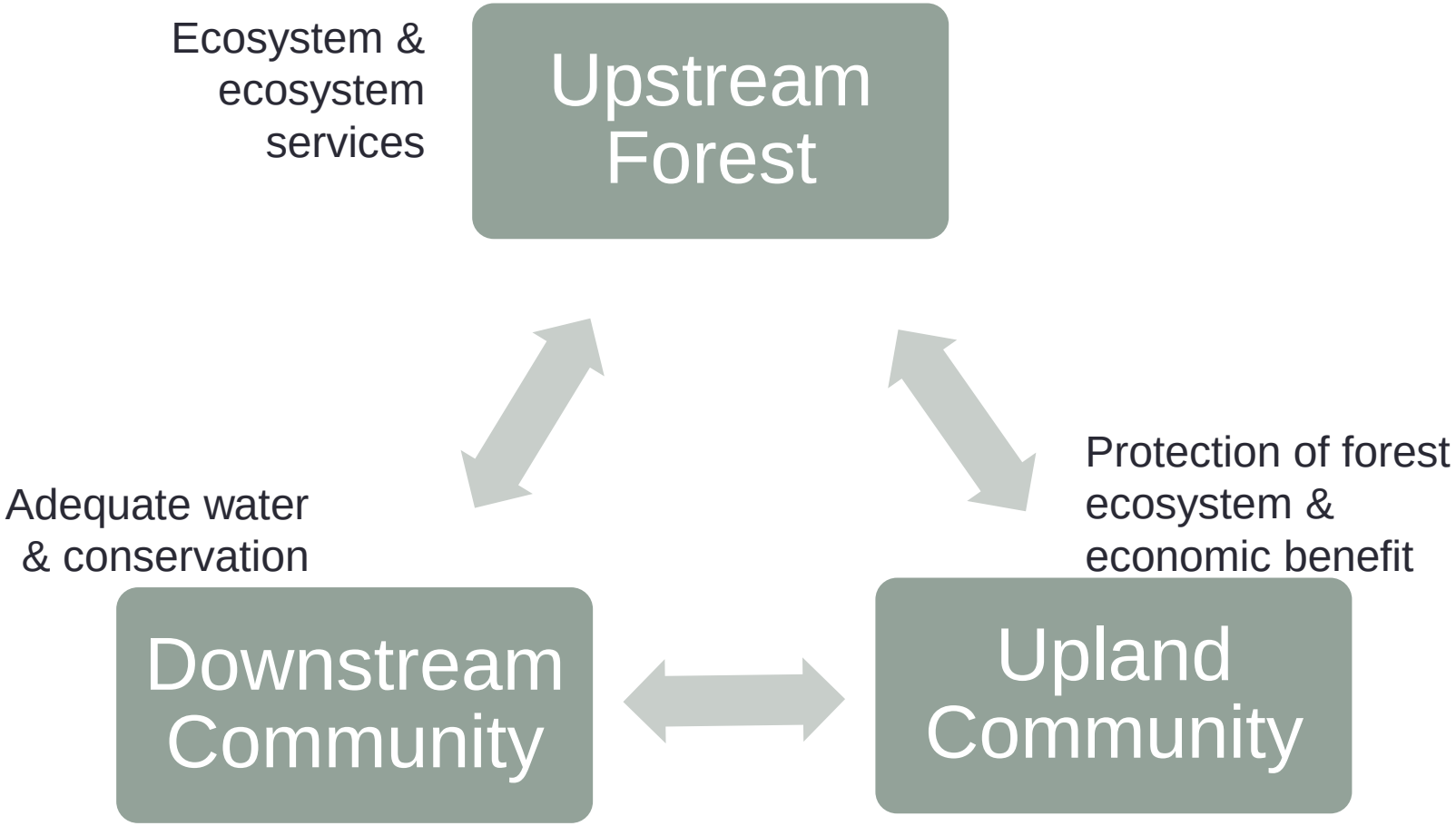
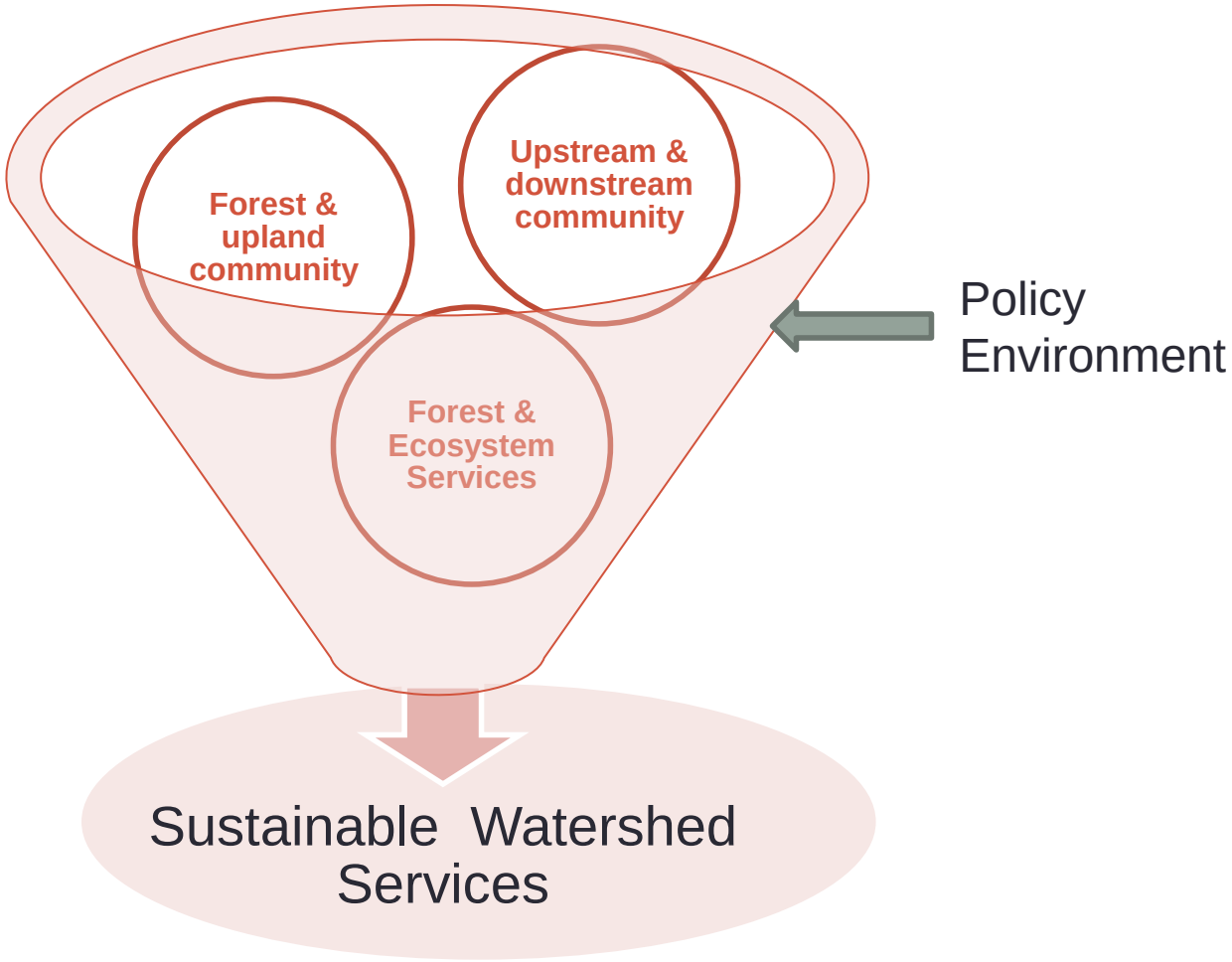
Upland and lowland communities relate to water source in the Watershed



Poster DCNR Victoria, Australia

Bases for the three vital relationships in the watershed for water





SIGNIFICANT RELATIONSHIPS

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Methodology: Use of case studies

(Noor Model)

"Case studies are being concerned with how and why things happen, allowing the investigation of contextual realities…"

The Framework	Field Work	Case Analyses	Framework Modification
The theory to be tested	Cases to explain the how and the why	Relationship Process, Sustainability Criteria Individual case Analysis Cross Analysis of cases	New Framework resulting to Policy recommendations

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Procedure

1. Building the theoretical framework
2. Identifying the cases
3. Data gathering
4. Qualitative analysis workshop
5. Cross analysis and criteria formation
6. Comparison of findings with current global information
7. Consolidation and recommendation
8. Research utilization conferences

Case Studies

1. **Pantabangan Watershed: Aetas, Irol-les and the Italengs and other upland dwellers & the Irrigators' Association of UPRIIS**
2. **Angat Watershed: the Dumagats the Remotados & the (MWSS) Metropolitan Waterworks & Sewerage System**
3. **A recharge area at Caliban Imbang Watershed, the upland communities of North Negros Natural Park (NNNP) & Groundwater Reserve of Bacolod City Water District (BACIWA)**
4. **Maasin Watershed: KAPAWA people's organization and Metro Iloilo Water District**
5. **Maagnao Sub-watershed of Manupali Watershed: the Talaandig Tribes and Unifrutti Group of Companies**
6. **Lake Lanao Agus River Watershed: the Maranaw Communities and the National Power Corporation (NPC) – Mindanao Generation**

LITERATURE STUDIES

1. Ecosystem functioning
2. Indicators of ecosystem process and structure
3. Myths used as indicators of ecosystem health
4. Current findings of global forest watch, WRI
5. Institute for Sustainable Forest - Practices in forest management with elements of sustainability
6. Ecosystem sustainability - FAO

1. Ecosystem Functioning

(Ecosystem Management Training Manual, UNEP IISD)

Ecosystem Services depend on

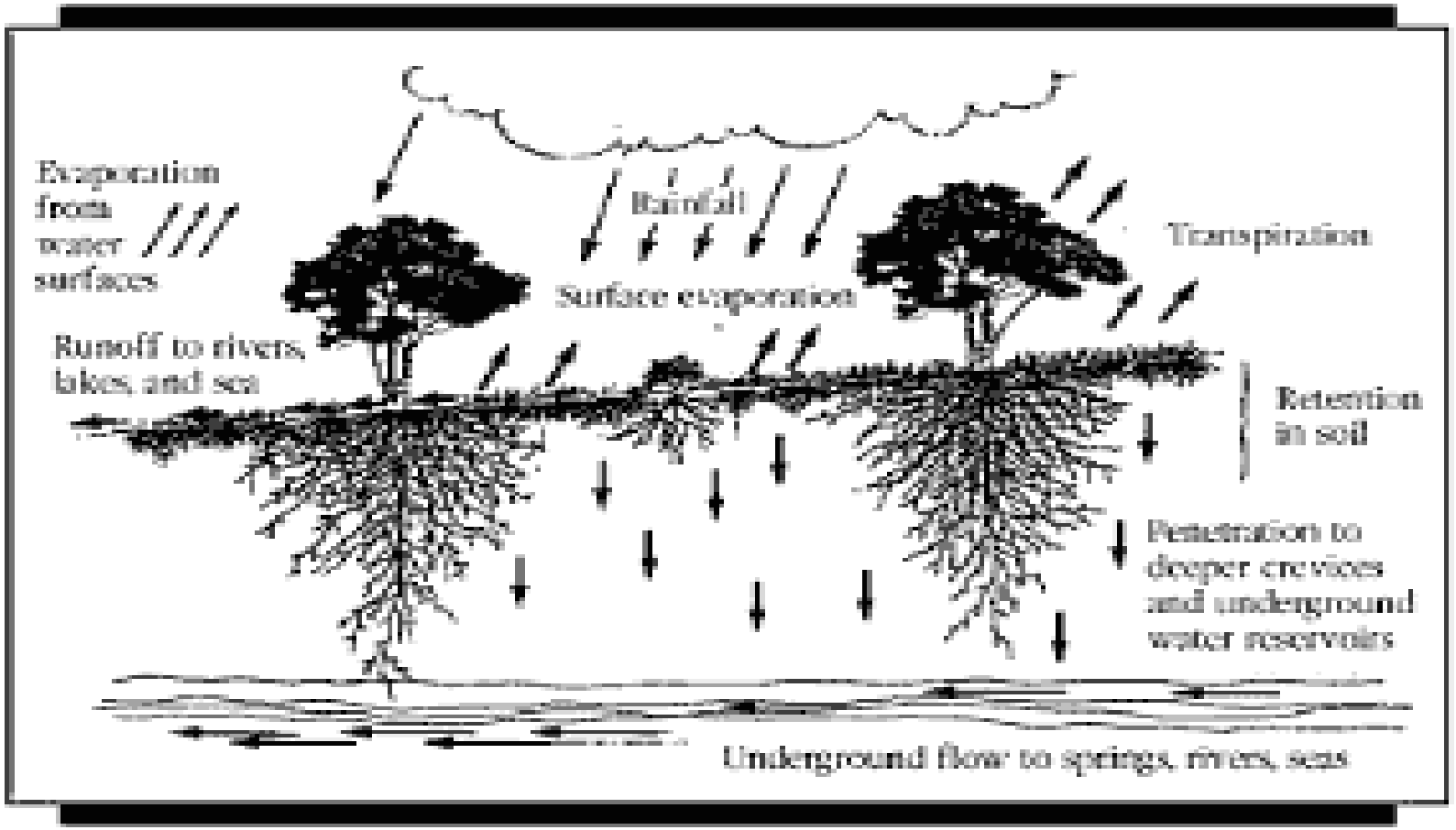
Function and Structure

of the ecosystem

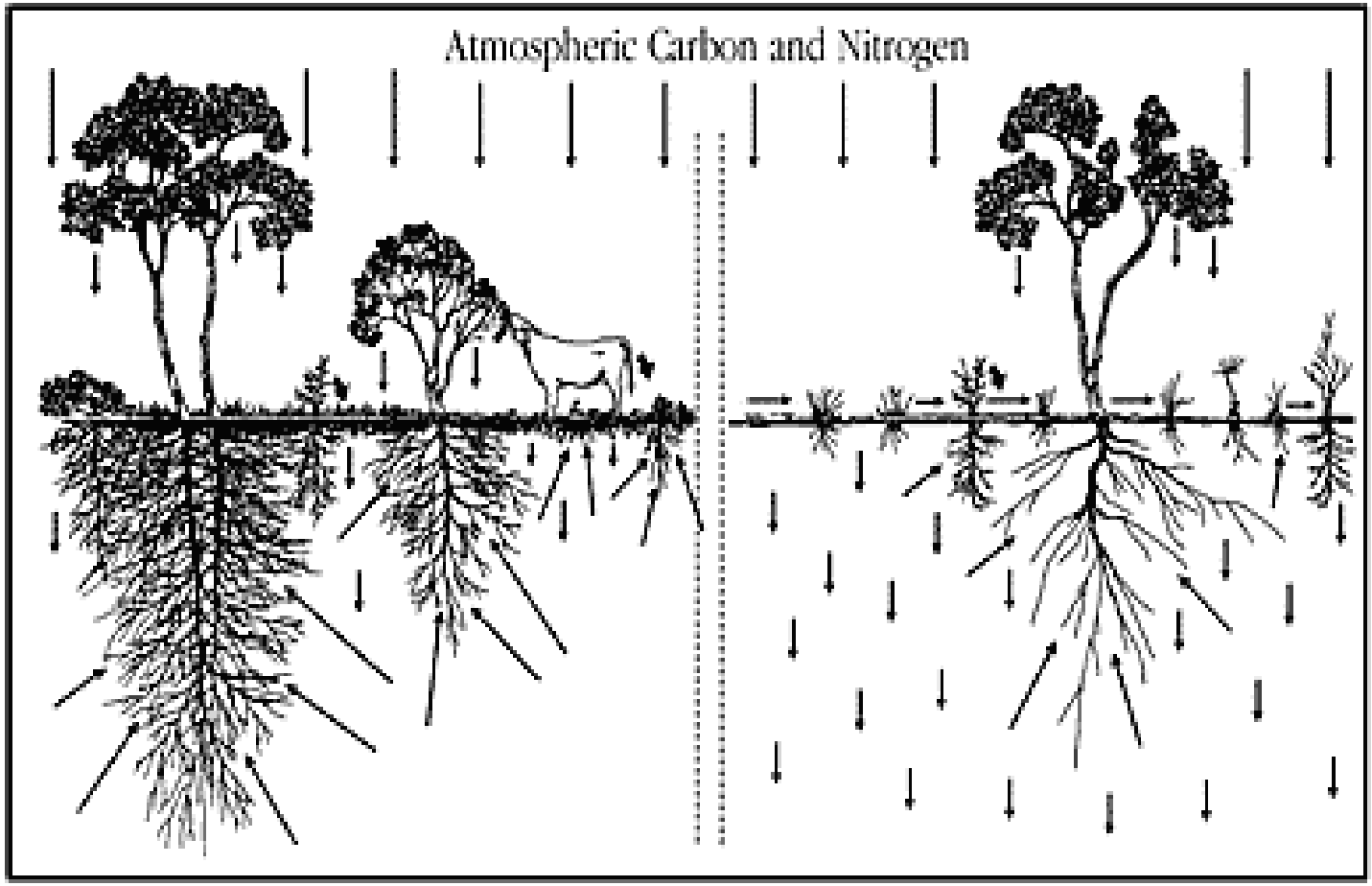
Core Ecosystem Processes

1. Water cycling
2. Mineral cycling
3. Solar energy flow
4. Biological growth

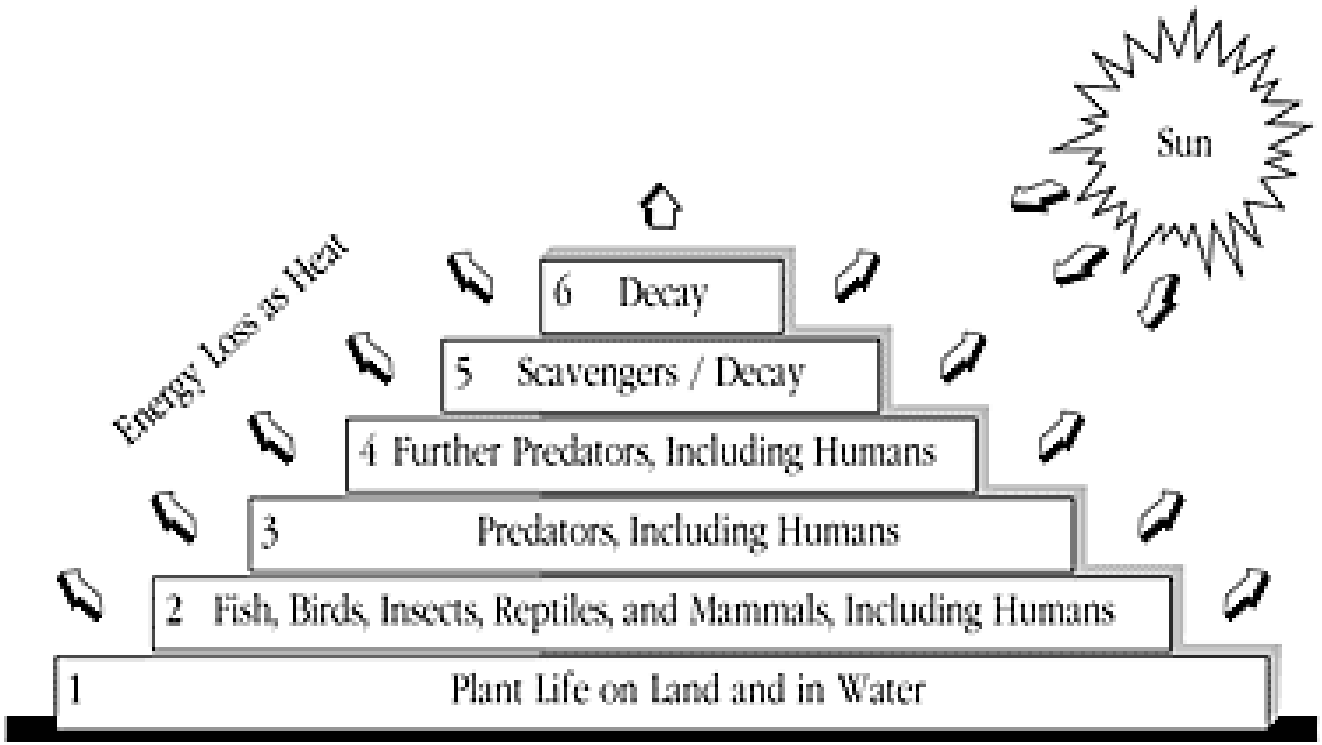
1. Water Cycling



2. Mineral Cycling

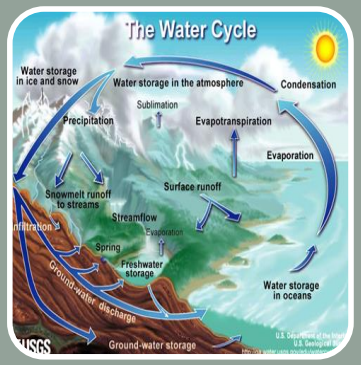


3. Solar Energy Flow

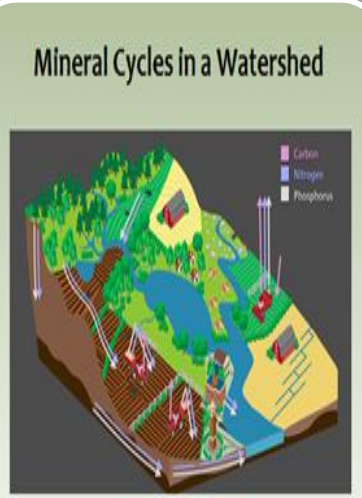


4. Biological Growth

2. PUBLISHED INDICATORS FOR ECOSYSTEM PROCESSES (UNEP-IISD)



WATER CYCLE: Surface runoff, surface evaporation, infiltration into soil, transpiration from soil, penetration to underground water resources, rainfall, soil water moisture, flow from springs, rivers



MINERAL CYCLING: Percentage of ground covered by vegetation and leaf litter, abundance of decomposers and herbivores, decomposition time of leaf litter and animal dung, presence of porous and capped soil, turbidity level of water bodies

SOLAR ENERGY FLOW: measured at each level of food web: bio mass and diversity of species, growth rates and duration of growth, content of forage, depth of organic soil layer, abundance of soil community invertebrates, availability of food

BIOLOGICAL GROWTH: Growth rates of populations of species at each level of food web, growth in terms of ecological succession, to succession regrowth, biodiversity of species, biomass all levels

ECOSYSTEM STRUCTURE

1. VEGETATIVE LAYER
2. FOOD WEB
3. SOIL STRUCTURE
4. WATER BODIES

PUBLISHED INDICATORS FOR ECOSYSTEM STRUCTURE

VEGETATIVE COVER: Ground level vegetation (bushes, grass, trees) consider root systems and water requirements and conditions for bio growth

FOOD WEB: sufficient plant growth to sustain crops and animal species, presence, abundance, movements of herbivores, predators, decomposers

Soil Structure: soil is bare or covered, has formed a hard cap, depth of organic layer, soil crumb structure provided by decomposing organic matter.

WATER BODIES: surface water needed by desired species and the landscape, stored water, level water table , underground aquifer

3. Myths used as indicators of ecosystem health vs. scientific consensus

Dan Gilmour, RICOFTC*, 2016

- **MYTH: Forests increase water yield (and conversely, removal of forests decreases water yield)**

- **Scientific consensus: Forests use more water than shorter forms of vegetation.**

*Regional Community forestry Training Center for Asia & the Pacific

MYTH: Forests reduce floods (and conversely, removal of forests increases floods)

Scientific consensus:

(1) Increases in flood flows as a result of cutting trees are observable for small to medium-size rainfall events in small catchments—less than about 10 km².

(2) The major determinants of large scale flooding at all catchment scales are: rainfall amount and intensity, antecedent rainfall and catchment geomorphology—not vegetation type

MYTH: Forests increase base (i.e., dry season) flows (and conversely, removal of forests decreases base flows)

- **Scientific consensus:**
- **(1) Reforestation generally results in a decrease in dry season flows that may last for several decades, noticeable in small catchments.**

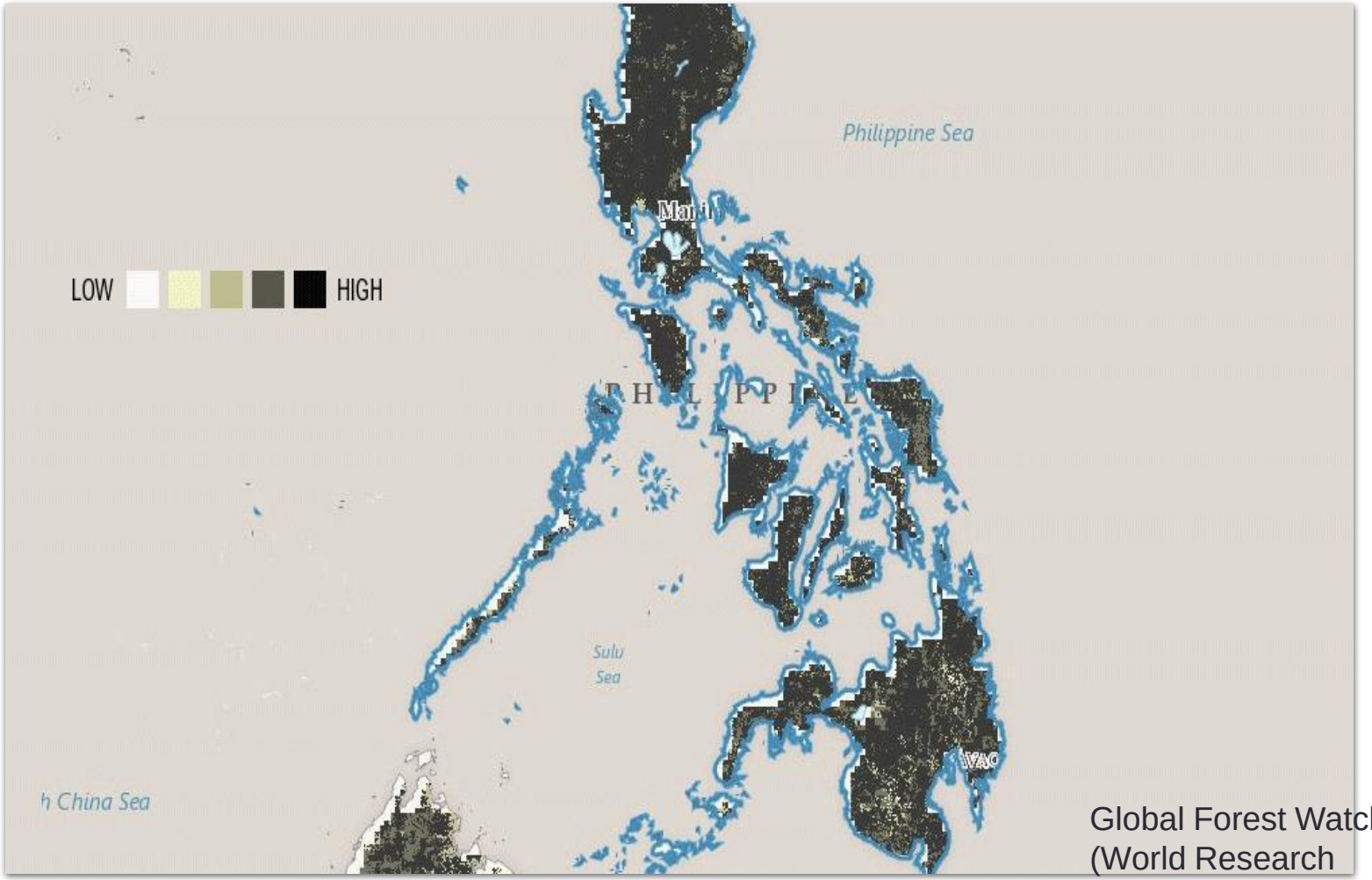
(2) Heavy reduction in forest cover or deforestation generally results in an increase in dry season flows but the longevity of the increase will depend on the future condition of the catchment, particularly the infiltration capacity of the surface soil.

"Forests reduce erosion (and conversely, removal of forests increases erosion)

- **Scientific consensus:**
- **(1) Generally speaking, well-managed forests, free of grazing and other disturbance, provide good catchment cover that minimizes hill slope erosion and produces high quality water free of sediment.**

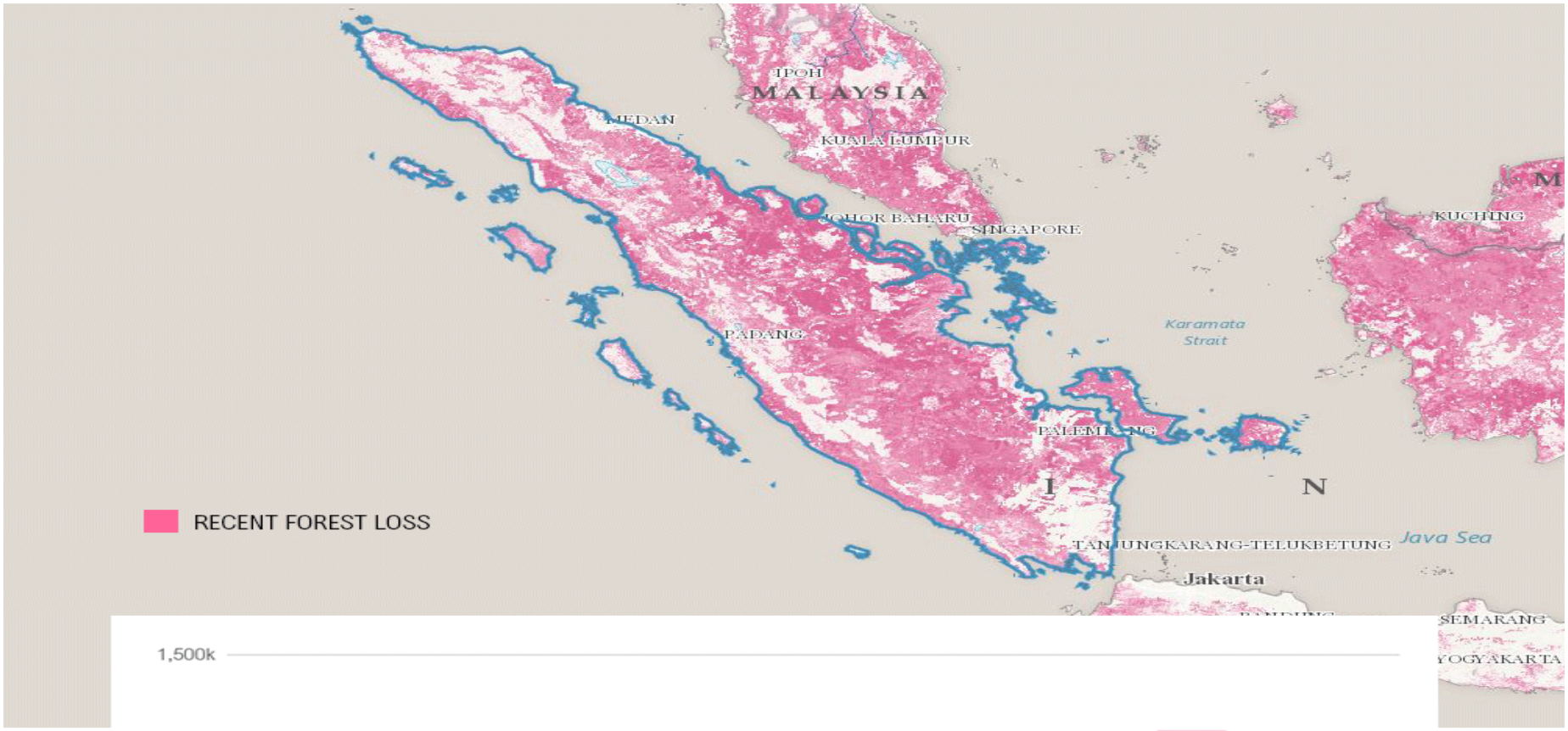
- **(2) Trees *per se* do not prevent erosion and under some conditions significant surface erosion can occur under undisturbed forests. The condition of the soil surface, (particularly the retention of understory vegetation), grasses and litter are the key determinants of surface erosion on hill slopes. "**

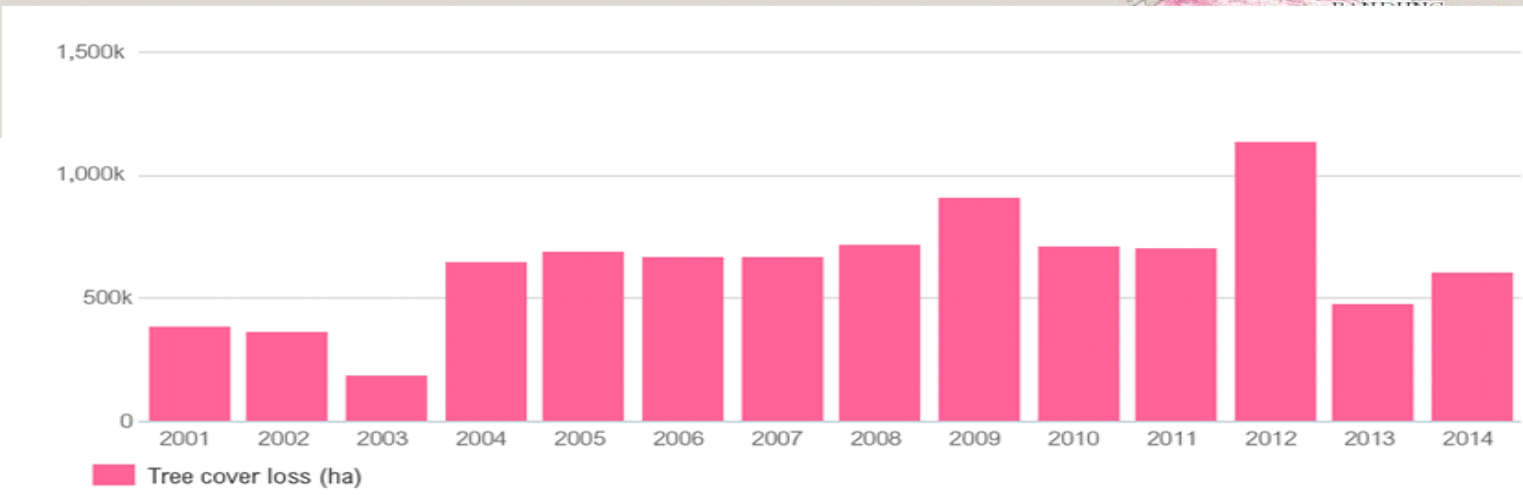
4. Current findings of Global Forest Watch (WRI)
Erosion risk in the Philippines

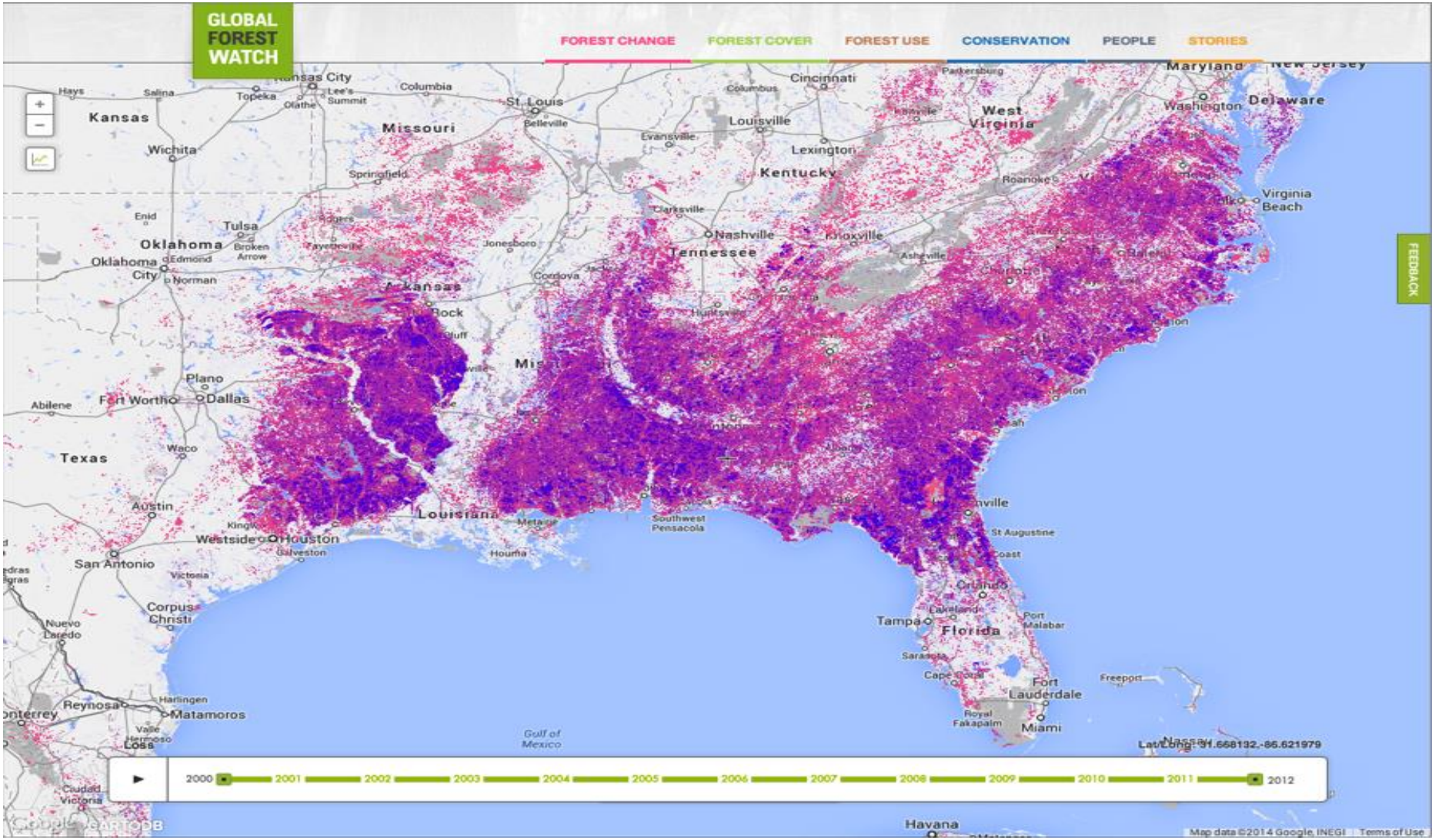


Global Forest Watch (World Research institute)

Recent forest loss in the watershed of Sumatra, Indonesia







The United States' most heavily forested region is made up of production forests

Other sources:

- Institute for Sustainable Forest

  Practices in forest management with Elements of Sustainability

- Ecosystem sustainability according to FAO, United Nations.

FINDINGS & RECOMMENDATIONS

A. CONNECTING FOREST ECOSYSTEM AND ECOSYSTEM SERVICES - WATER

FINDINGS
Low appreciation on the importance of ecosystem and how to maintain/ improve it.
No ES indicators are used in several processes and structure of ES and therefore, status not known, not monitored.
Some indicators are monitored for operation but not to know health of ES.
Three highest indicators used are water quality, quantity, and trees planted.
Popular myths are used as indicator for ES health.

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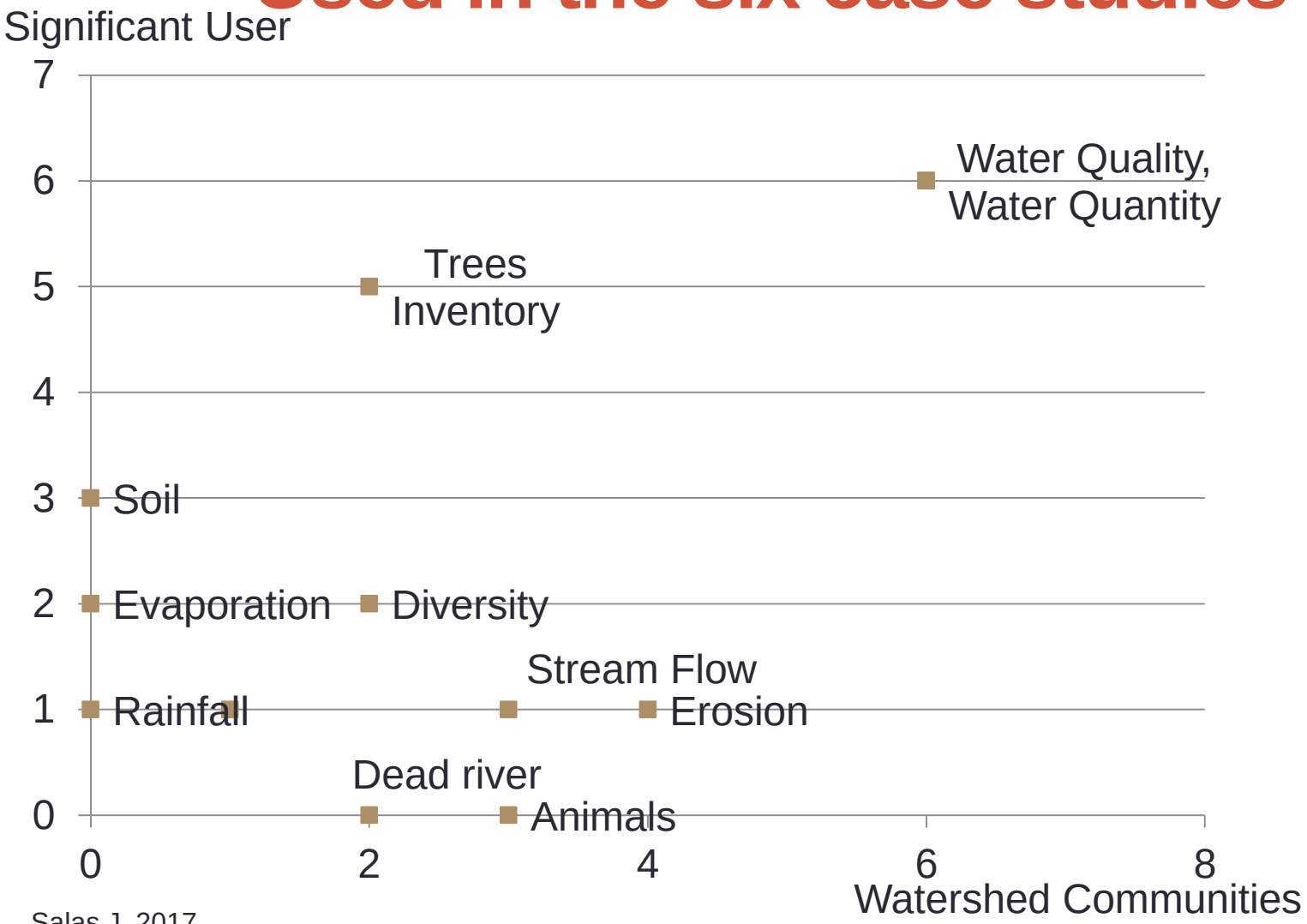
Proxy Ecosystem Indicators Used in the six case studies



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B. CONNECTING FOREST AND THE UPLAND COMMUNITY

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The significant communities in the case studies

- **Ancestral domain of Aetas, Irol-les and the Italengs other upland dwellers and the Pamtabangan-Carranglan Watershed**
- **The Dumagats, the remotados and other upland dwellers and Angat Watershed**
- **North Negros National Park communities and the recharge area at Calibang-Imbang Watershed for its Groundwater Reserve.**
- **KAPAWA People's Organization and the Maasin Watershed**
- **The Talaandig Tribe and Maagnao Manupali Watershed**
- **The Maranaw communities and the Lake Lanao Agus River Watershed**

FINDINGS

The most popular form of intervention activity is Reforestation/ Plantation

Practices in the forest are not decided solely by communities/ individuals. Many are parts of project design.

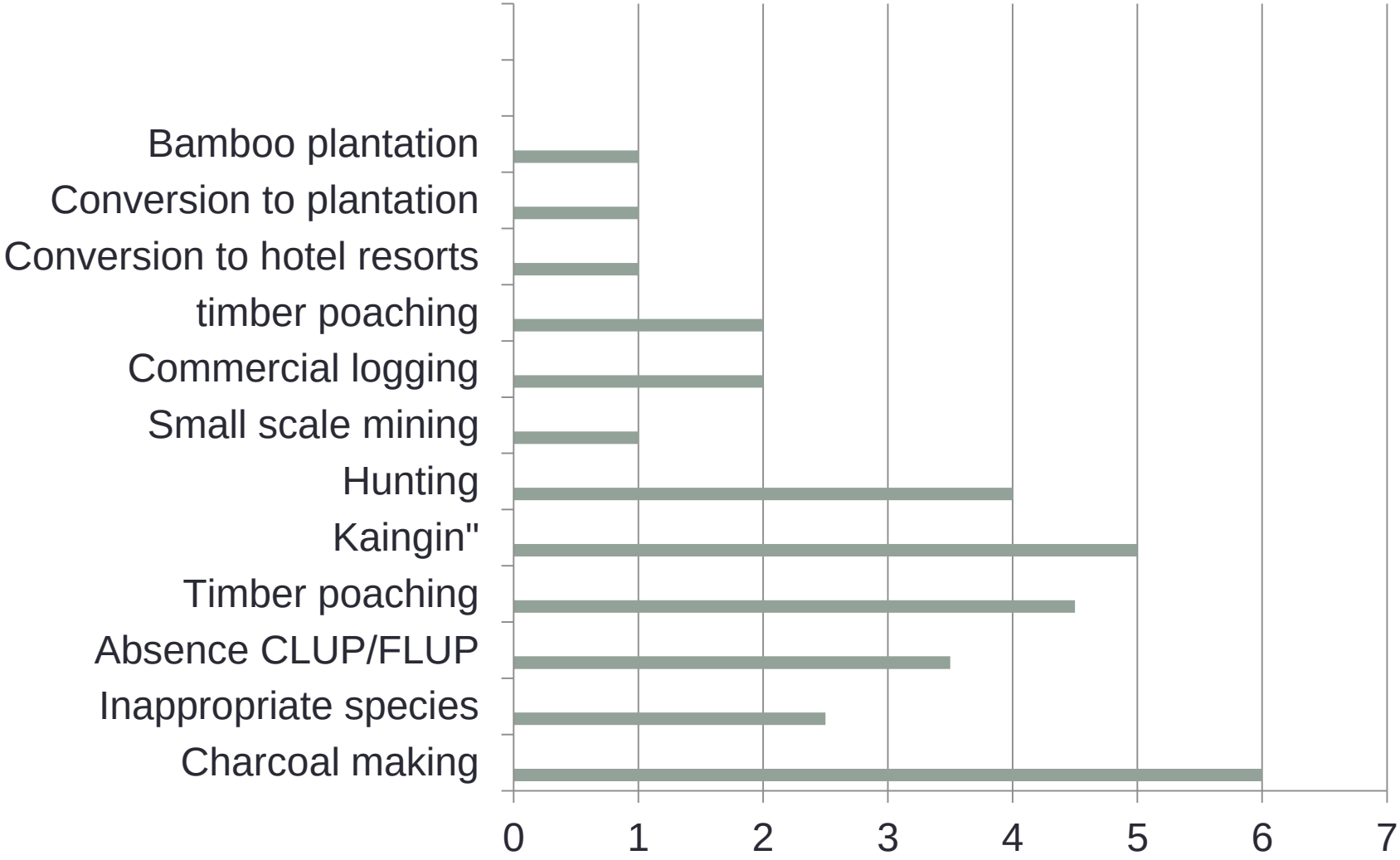
It is possible to harmonize/ rationalize practices perceived as positive or negative through modification, reinforcement, adaptation.

Locating production forest below protection forest in the watershed continuum affects water quality and quantity downstream. Many FLUP are without appreciation for ES.

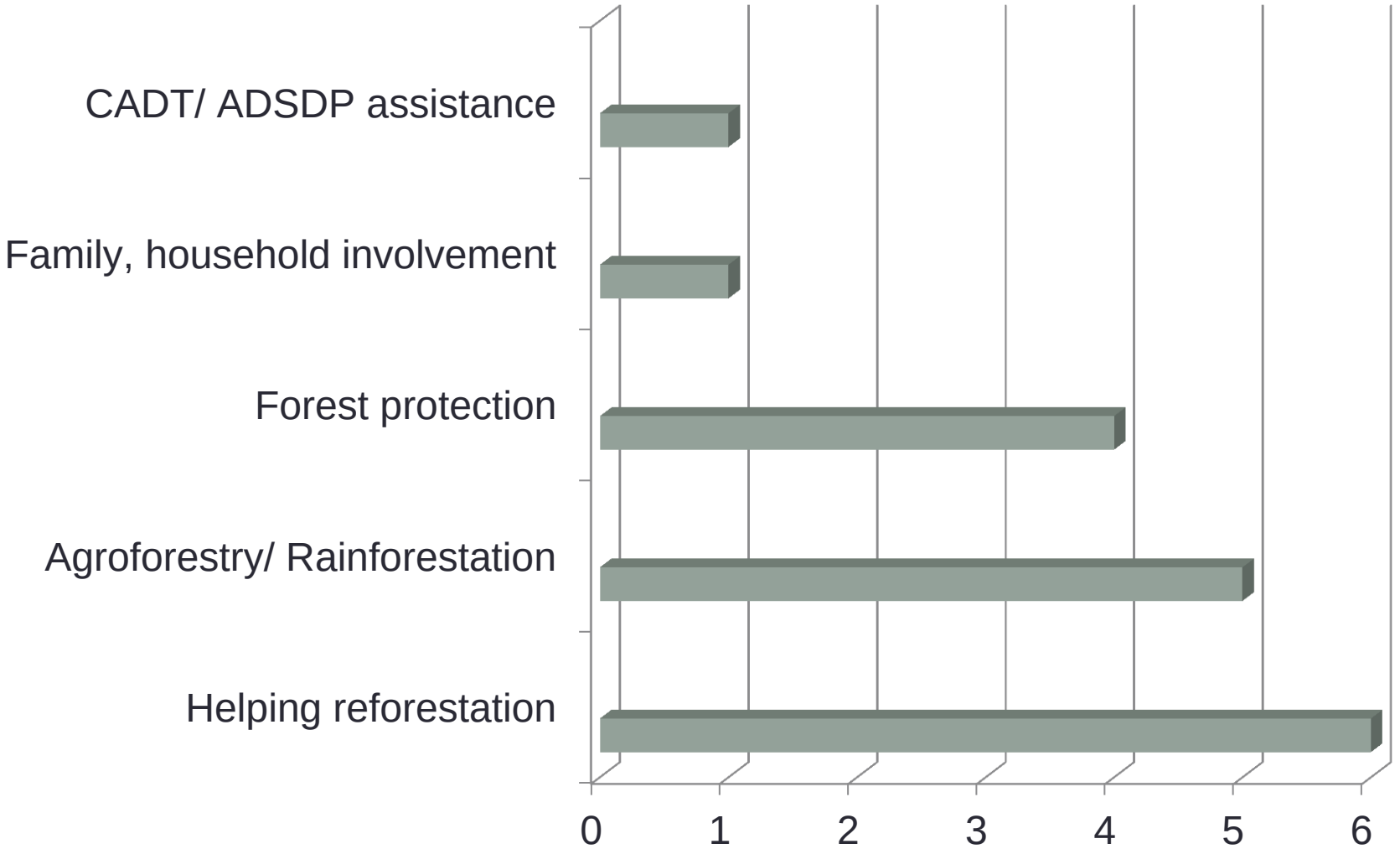
Bantay Gubat tasks limited to apprehension.

Extreme poverty in the upland

Practices with perceived negative impact



Practices with Perceived Positive Impact



C. CONNECTING UPLAND AND LOWLAND COMMUNITIES IN THE WATERSHED

.Focus on the significant communities in an Economic Transaction.

The significant users in the case studies

- Irrigators' Association of UPRIIS or Upper Pampanga River Integrated Irrigation System and Pantabangan-Carranglan Watershed
- MWSS or Metropolitan Waterworks and Sewerage System and Angat Watershed
- BACIWA or Bacolod City Water District and recharge area at Calibang-Imbang Watershed for its Groundwater Reserve.
- MIWD or Metro Iloilo Water District and Maasin Watershed
- UNIFRUTTI –MKAVI or Mt Kitanglad Agribusiness Ventures Inc. and Maagnao Sub Watershed
- NPC or National Power Corporation-Mindanao Generation and Lake Lanao Agus River Watershed

FINDINGS

In all PES cases, payments are determined by buyers using MOA, job orders, traditional forms, verbal agreements.

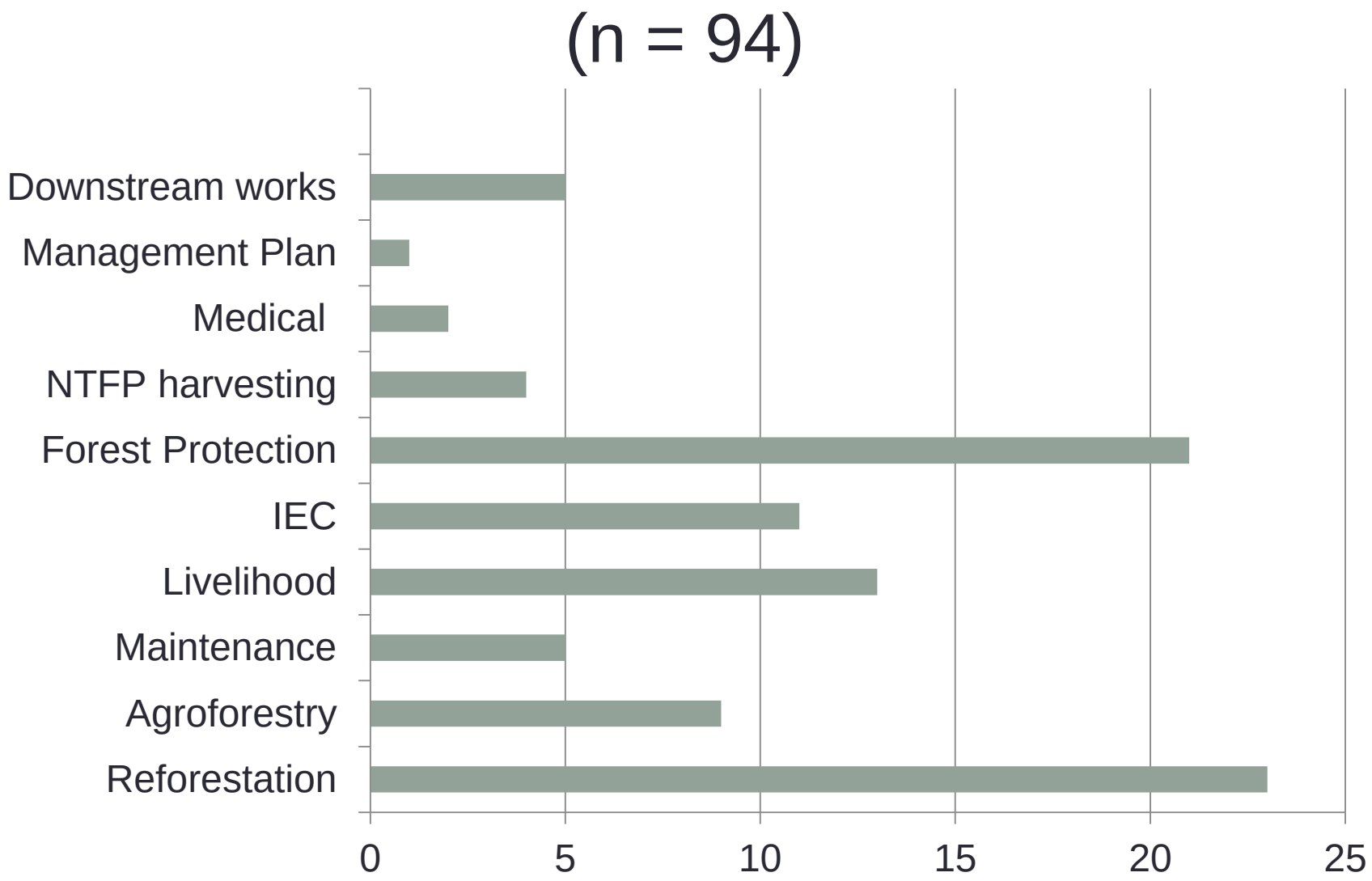
Payments were made for particular activities, not directly intended to restore ES, in spite of the intention to do so.

FLUP does not help much because it is mostly done for compliance purposes.

There is an expressed need for an intermediary in establishing sustainable PES.

Highest source of fund is voluntary payment followed by mandated payment; the lowest source is public payment.

Objects of payments



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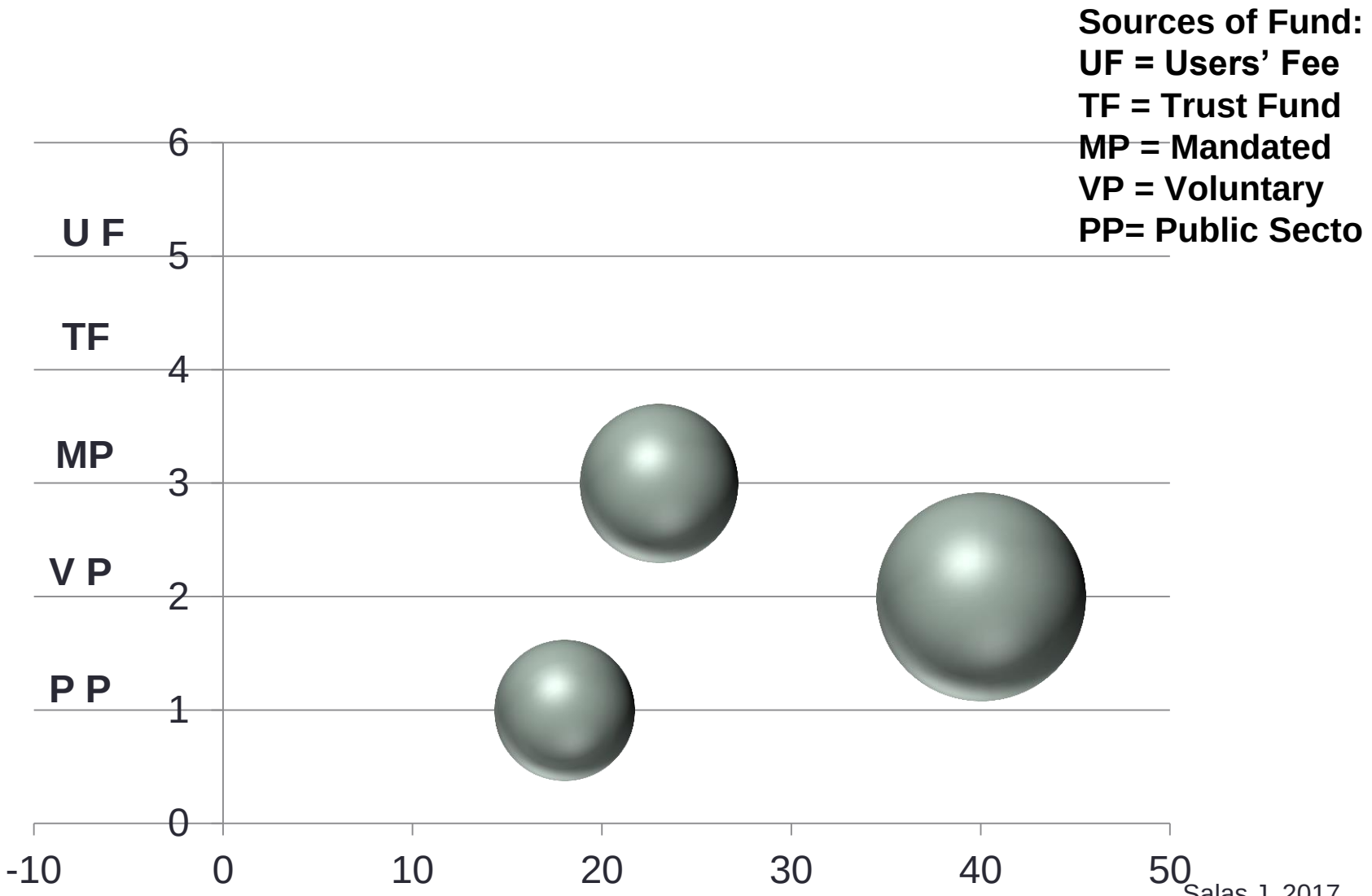
Sources of funds



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RECOMMENDATIONS

POLICY RECOMMENDATIONS

1. Strengthen rights of watershed communities to stay in the watershed.
2. Recognize and quantify the value of active protection services performed by watershed communities by setting conditions in the contract between watershed communities and significant user.
3. The contract between forest communities and significant user/s is to be viewed as a voluntary contract between two legal entities whose contracting rights and obligations are covered by the law.
4. Provide basics of modalities to formalize transactions (rights and obligations of parties, modes of payment, fair ‘price’, independent monitoring and validation, reasonable performance indicators)

References

- Boelee E., Chiramba T. and Khaka E (eds) 2011. An ecosystem approach to water and food security. UNEP; Colombo International Water Management Institute.
- Ecosystems and Human Well being: Synthesis (2005) Millennium Ecosystem Assessment. Washington DC: Island Press.
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- Ecosystem Management: Concept to Local-Scale Implementation Training Manual (2012) UNEP, IISD

THANK YOU FOR YOUR ATTENTION

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FINDINGS	RECOMMENDATIONS
Low appreciation on the importance of ecosystem and how to maintain/ improve it.	Mainstream Ecosystem Management in development project; implementing ES Management training program.
No ES indicators are used in several processes and structure of ES and therefore, status not known, not monitored.	Forests reserved for water supply should follow specific guideline for ES Management, to be headed by a multi-disciplinary team.
Some indicators are monitored for operation but not to know health of ES.	Sustainable financing should be installed for communities
Three highest indicators used are water quality, quantity, and trees planted.	Implement proper cost accounting system, with return and outcomes monitored, for watershed project.
Popular myths are used as indicator for ES health.	More local studies are needed. Demo projects to be implemented before nationwide application of a new initiative

FINDINGS	RECOMMENDATIONS
The most popular form of intervention activity is Reforestation/ Plantation	No plantation in the forest.
Practices in the forest are not decided solely by communities/ individuals. They are part of project design.	Communities should be empowered to participate in planning and deciding conditions in protecting Forest ES.
It is possible to harmonize/ rationalize practices perceived as positive or negative through modification, reinforcement, adaptation.	Ex of rationalized practices: ANR, agroforestry, restoration planning, government recognition of rights,
Locating production forest below protection forest in the watershed continuum affects water quality and quantity downstream. Many FLUP are without appreciation for ES.	Society, through CLUP/FLUP should decide how much land to be allocated to forest and its ESS in response to community water demand.
Bantay Gubat tasks limited to apprehension.	Responsibilities may be expanded to Community IEC on responsibilities and rights, as well as technical knowledge.
Extreme poverty in the upland	Economic transaction with lowland communities be mandated and facilitated.

FINDINGS	RECOMMENDATIONS
In all PES cases, payments are determined by buyers using MOA, job orders, traditional forms, verbal agreements.	Agreements should be made between the significant forest community and the significant user; this may need an intermediary.
Payments were made for particular activities, not directly intended to restore ES, in spite of the intention to do so.	Activities should not be randomly chosen but be part of a plan prepared with ES indicators as outcome.
FLUP does not help much because it is mostly done for compliance purposes.	LGU Reorientation on Ecosystem-based FLUP
There is an expressed need for an intermediary in establishing sustainable PES.	Cost of intermediary facilitation shold be included in the transaction cost of a Sustainable PES
Highest source of fund is voluntary payment fllowed by mandated payment and lowest is public payment.	More government public investment should be made coupled with a cost accounting system which will measure return of investment.