



# Interactions between stakeholders and ecosystem services: social networks and power

Améline Vallet

Bruno Locatelli

Harold Levrel

Nicolas Dendoncker



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# Tradeoffs, Power and Ecosystem Services

- Several typologies include tradeoffs between stakeholders (Mouchet et al. 2014; Rodríguez et al. 2006)
- Research efforts mainly focus on tradeoffs between ES (Lee et Lautenbach 2015)
- The concept of ecosystem services is poorly related to the questions of equity, power asymmetries and environmental justice (Ernstson 2013; Felipe-Lucia et al. 2015)

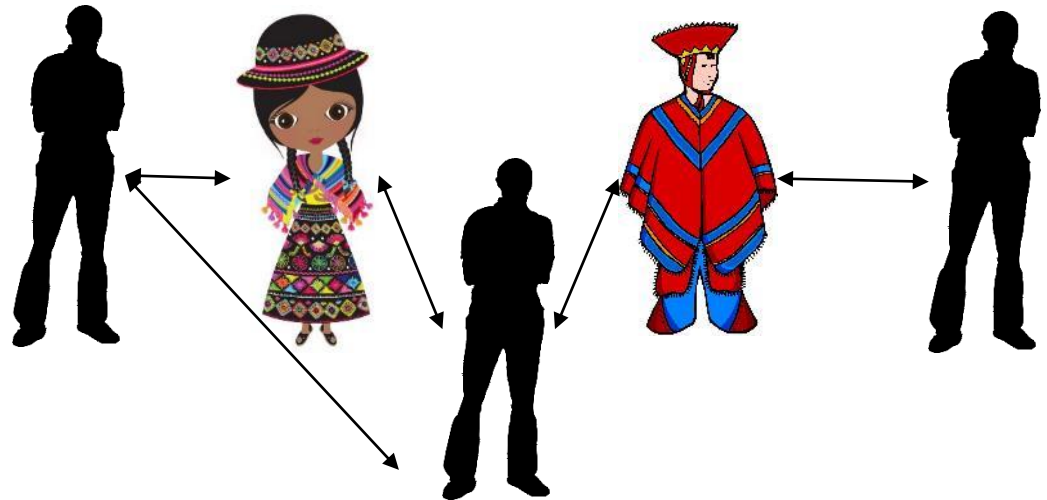
# Questions

- What are the power asymmetries related to the benefits from and management of ecosystem services ?
  - Are beneficiaries also managers?



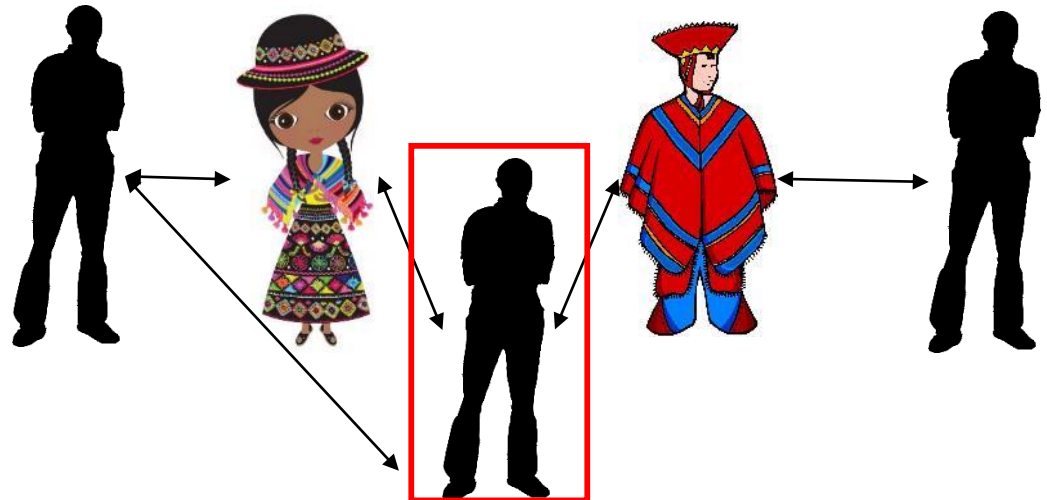
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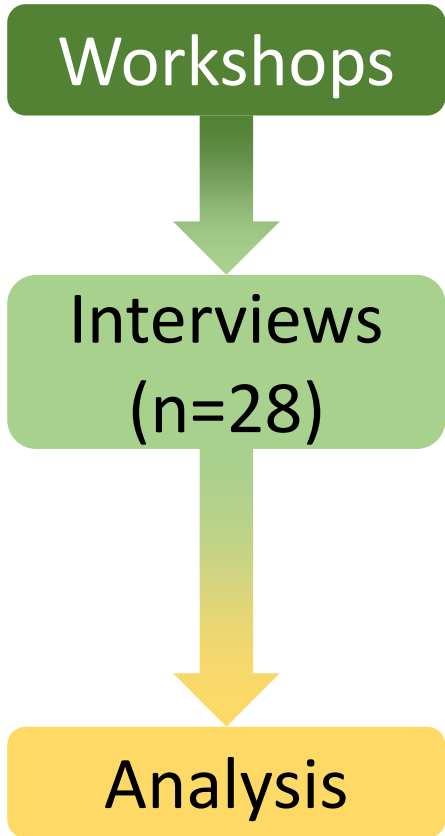


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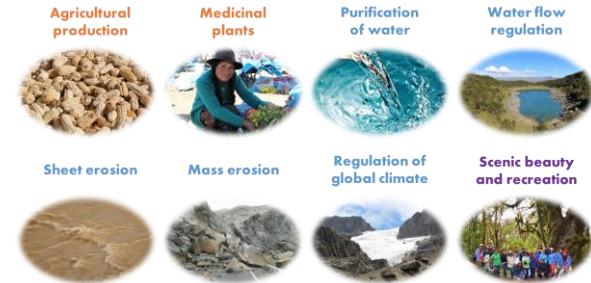
- What are the power asymmetries related to the benefits from and management of ecosystem services ?
  - Are beneficiaries also managers?
  - Are beneficiaries and managers well integrated in the network?
  - Which stakeholders facilitate interactions in the network?



# Methods



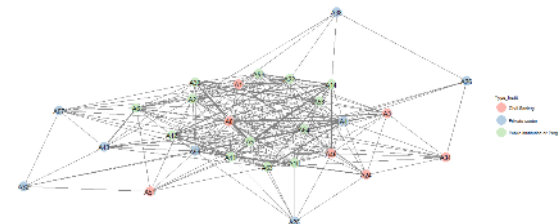
- Selection of ecosystem services
- Identification of stakeholders



- What services benefit each stakeholder?
- What services do stakeholders manage?
- How do stakeholders relate?

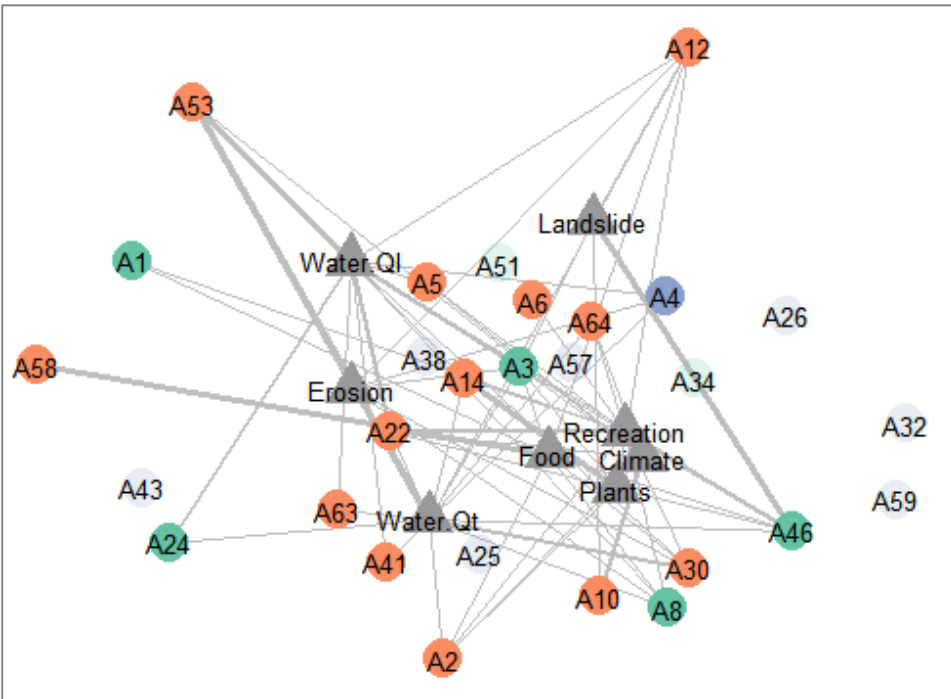
|   | A | B | C |   | A | B | C |
|---|---|---|---|---|---|---|---|
| A |   |   |   | A |   | B | C |
| B | ✓ |   |   | A | - | ✗ | ✗ |
| C | ✓ | ✓ |   | B | ✓ | - | ✓ |
|   |   |   | ✓ | C | ✓ | ✗ | - |

- Clustering of stakeholders based on benefits and management
- Network analysis (connections, key stakeholders, homophily)

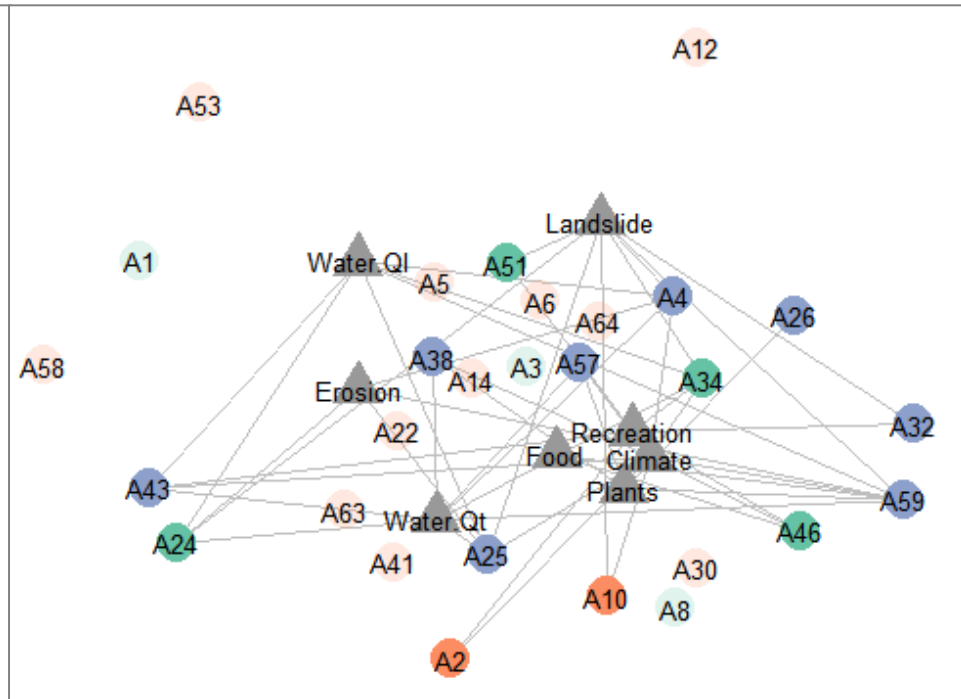


# Benefits and Management networks involve different stakeholders

## Management

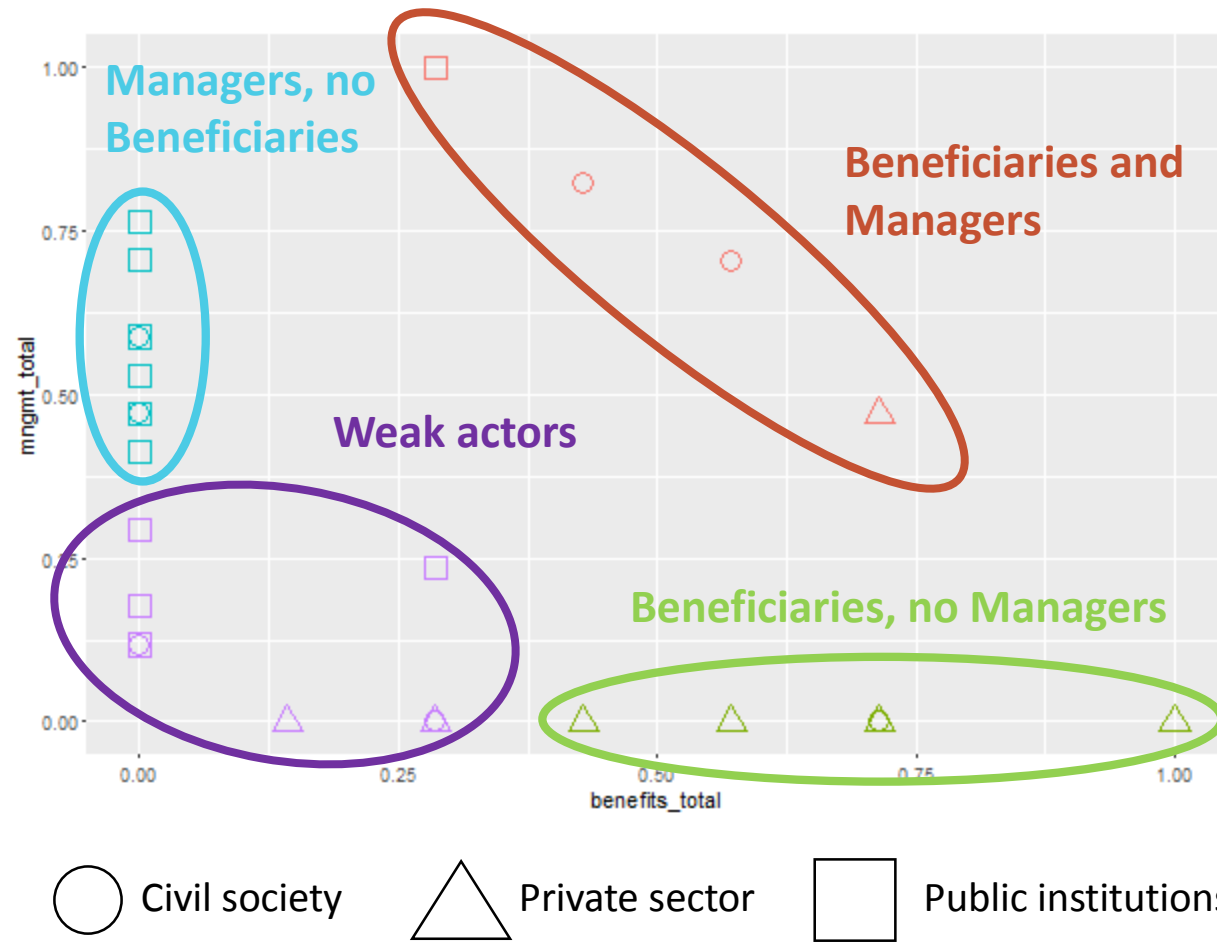


## Benefits



- Public institutions
- Private sector
- Civil society
- ▲ Ecosystem services

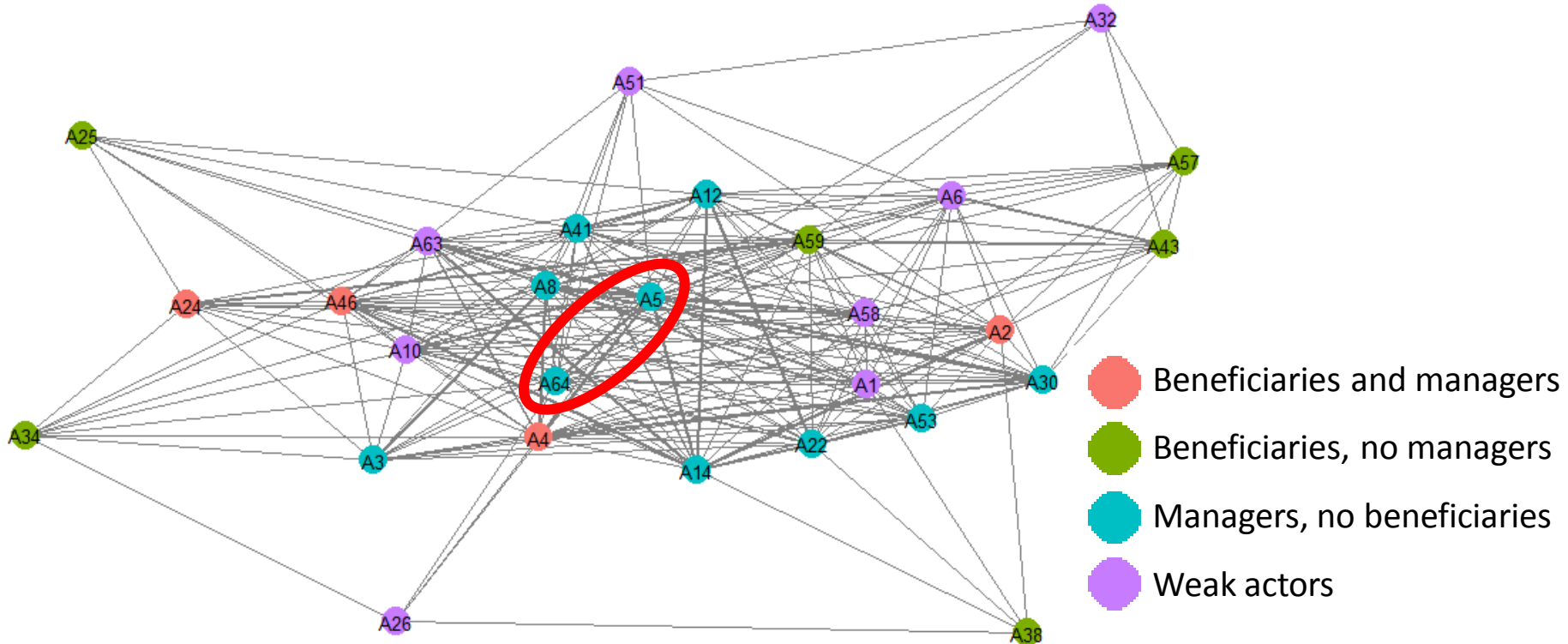
# Hierarchical clustering of stakeholders



- Different types of stakeholders are found in the different clusters (Chi-Square Test,  $p=0.013$ )
- Beneficiaries are mostly from private sector or civil society
- Managers are mostly from public institutions or civil society

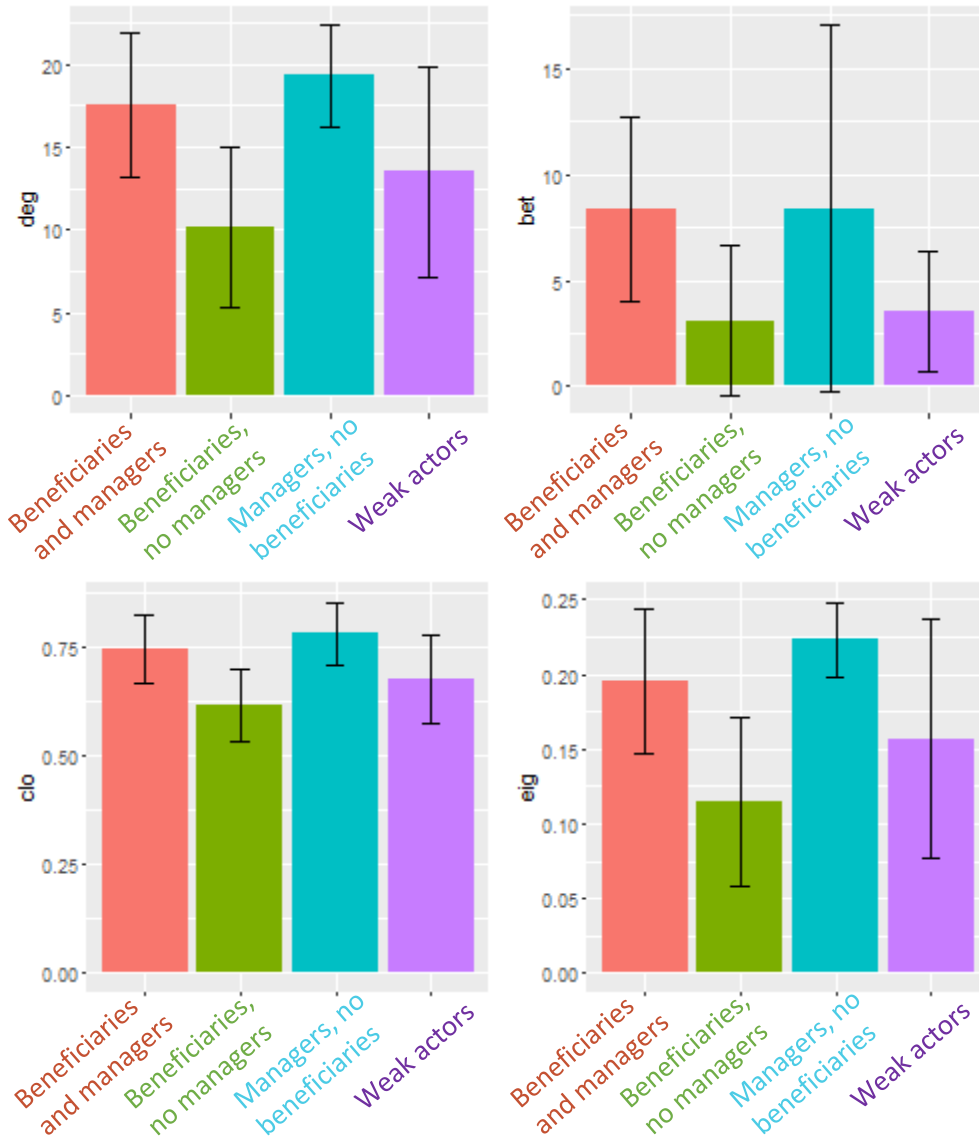


# Beneficiaries are in periphery



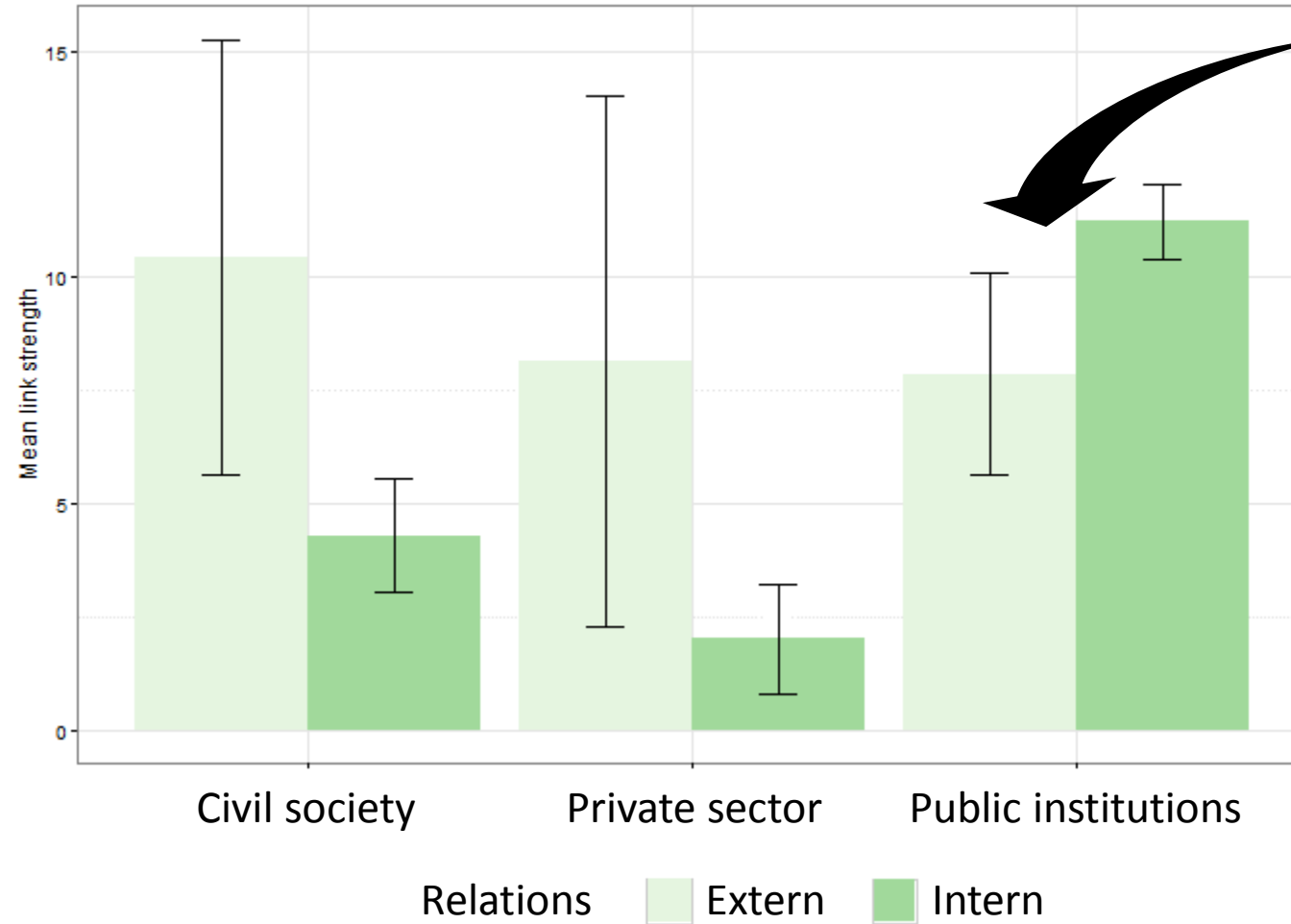
- Stakeholders have different roles in the core and periphery of the network (Chi-Square Test,  $p$ -value=0.0427)
- Managers are in the core of the network
- Municipalities are the two stakeholders (10%) with largest brokerage role

# Beneficiaries are less connected



- All indicators of network connectivity show differences among stakeholders
  - Beneficiaries have lower connectivity
  - Most managers are well connected, but others are not

# Interactions among groups of stakeholders



- Institutions interact mainly among themselves
- Private actors and civil society interact with other stakeholders



# Conclusions

- Description of tradeoffs between stakeholders related to ecosystem services
  - Beneficiaries of ecosystem services are not managers (and vice versa)
  - Power of managing ecosystem services is centralized among a few public institutions
  - There is a mismatch between beneficiaries and managers of ecosystem services

# Thanks for your attention!

If you have questions or comments on this presentation:  
[A.Vallet@cgiar.org](mailto:A.Vallet@cgiar.org)



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