

Interlinking ecosystem services and Ostrom's framework through orientation in sustainability research

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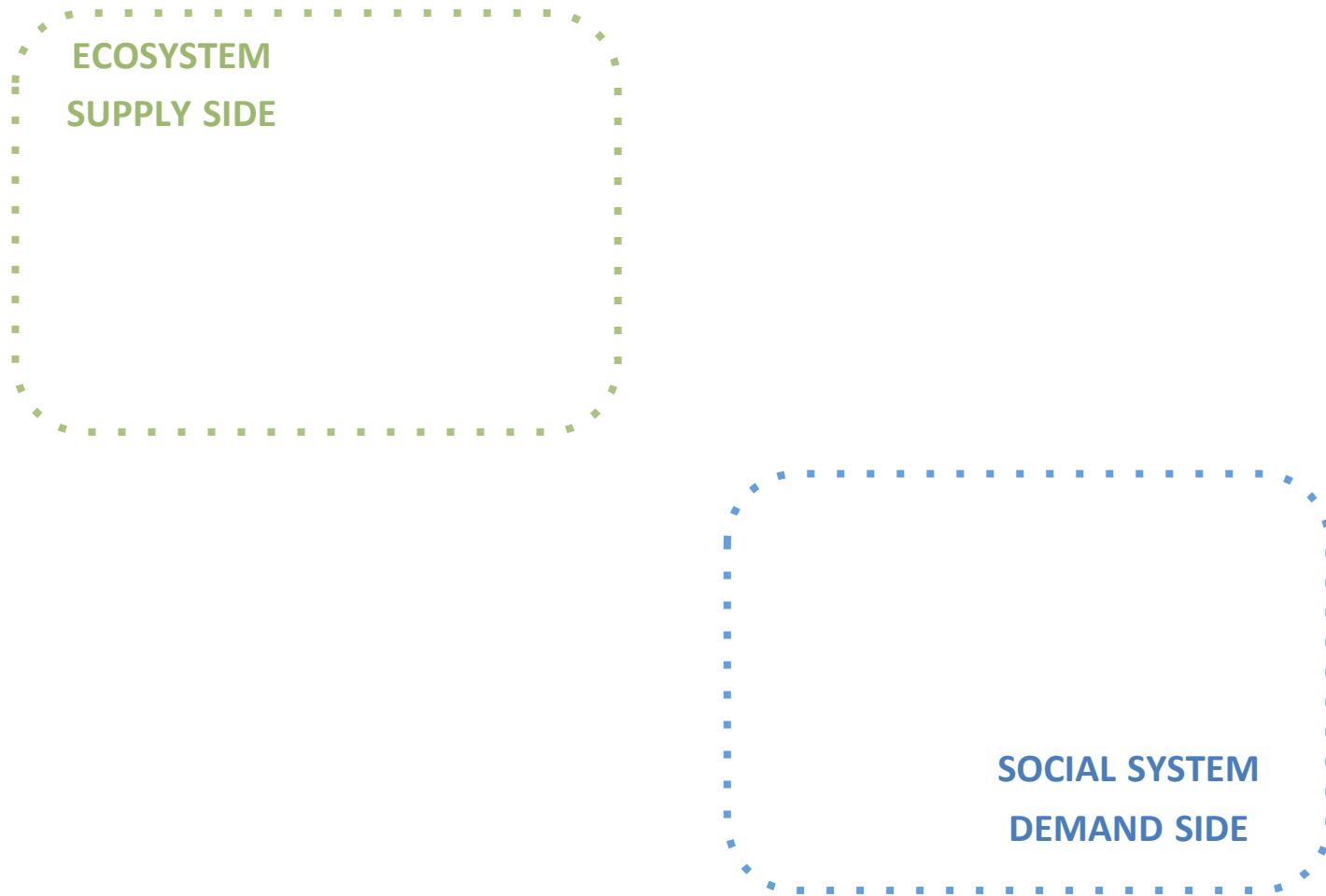
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Outline

- Social-ecological systems
- ES cascade & diagnostic SES Framework
- SES research in sustainability science
- Interlinking ES and SESF

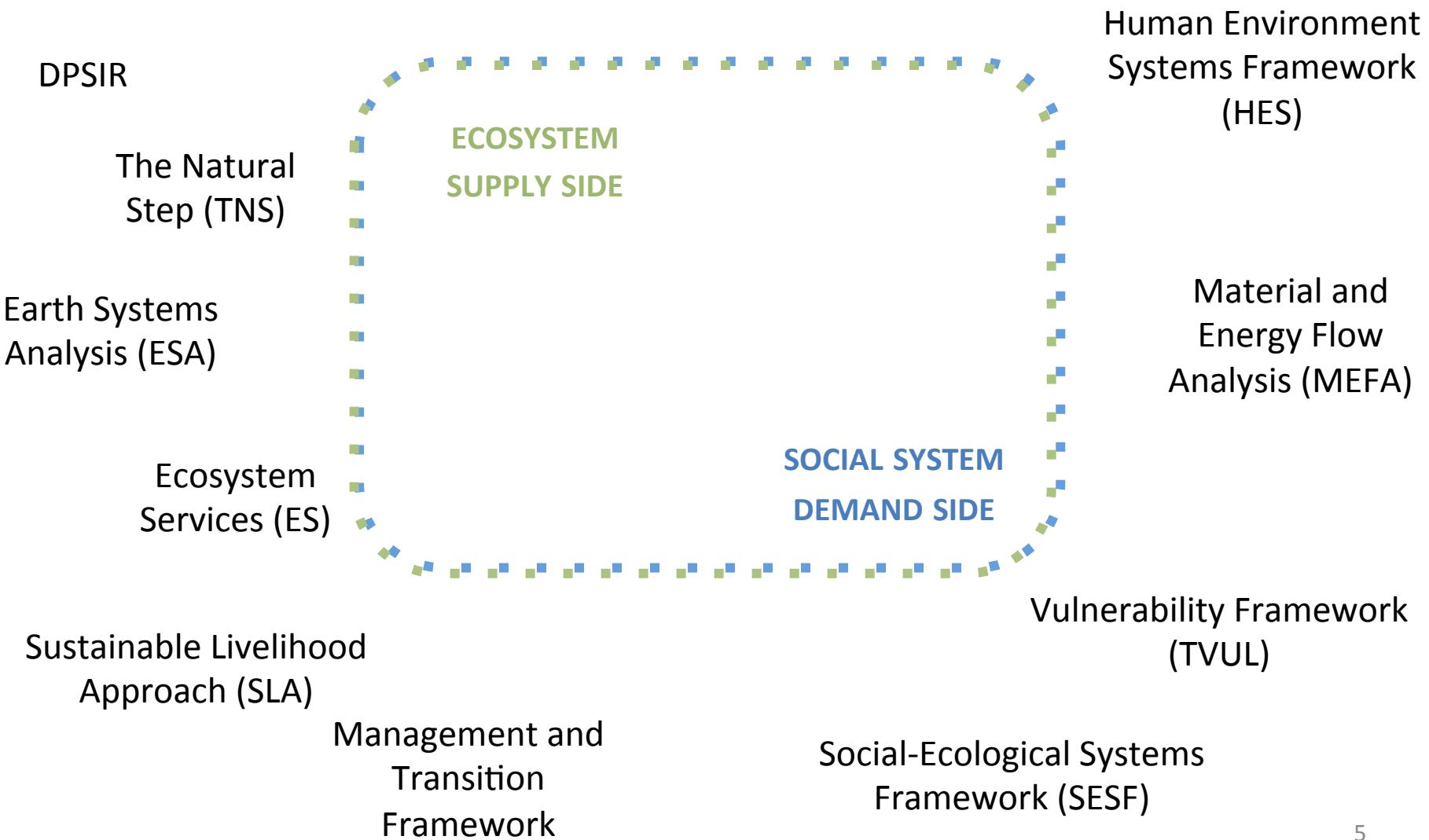
Social – ecological system thinking



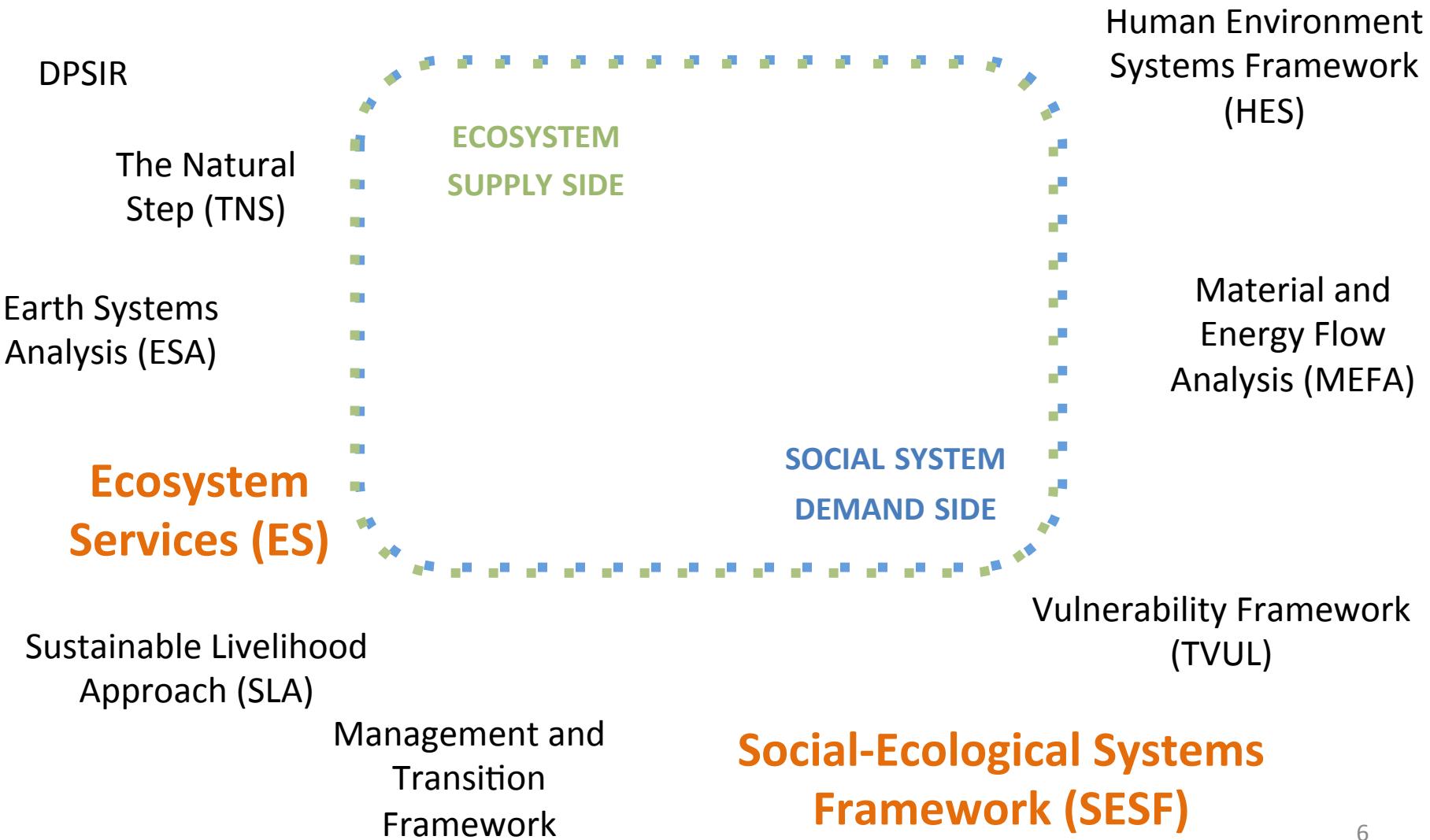
Social – ecological system thinking



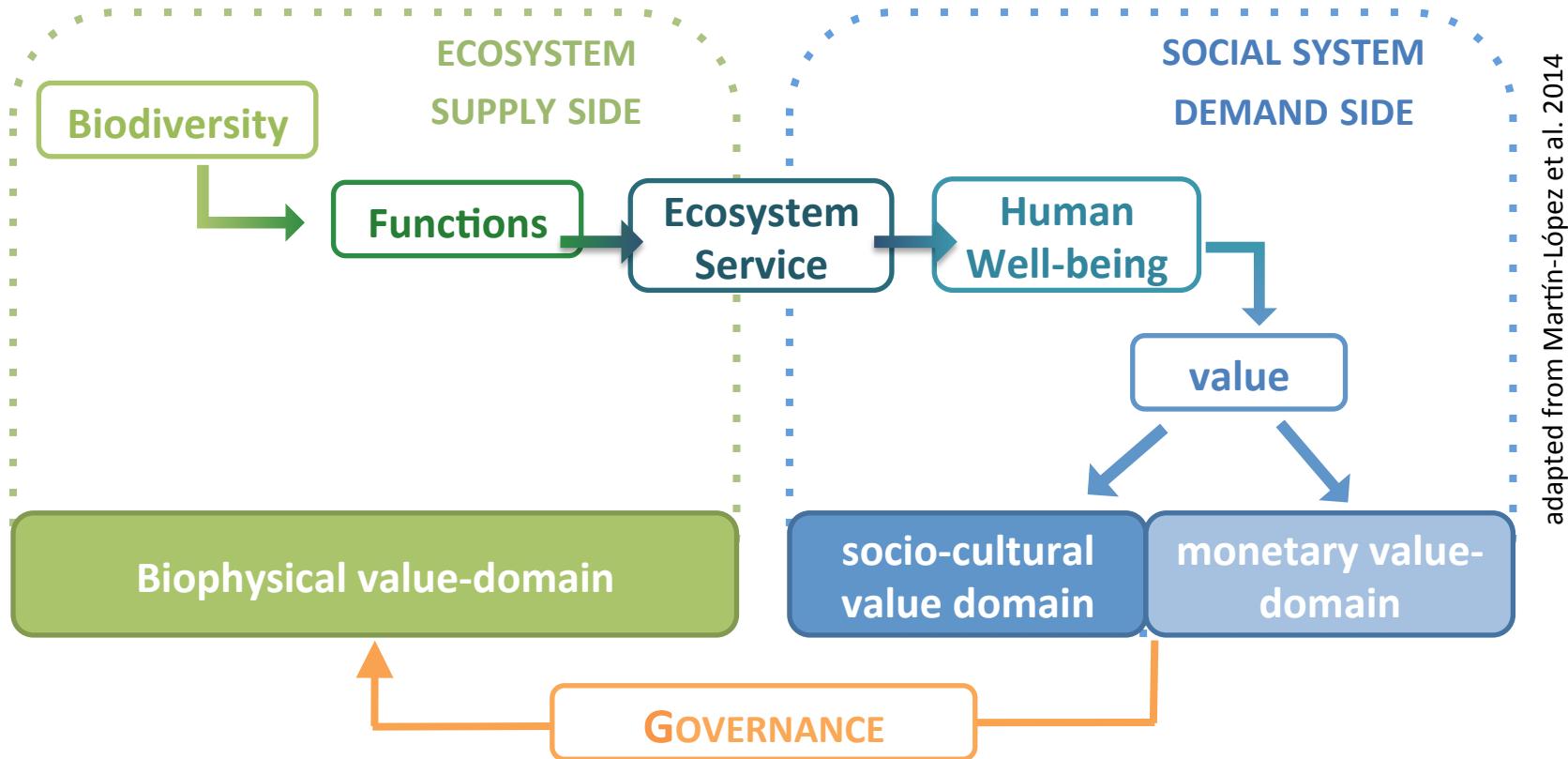
Social – ecological system thinking



Social – ecological system thinking



ES cascade



ES cascade

- Biodiversity
- Function
- ES
- Value
- Governance



regional
climate
regulation

aesthetic

woodland
habitat

identity

crop
production

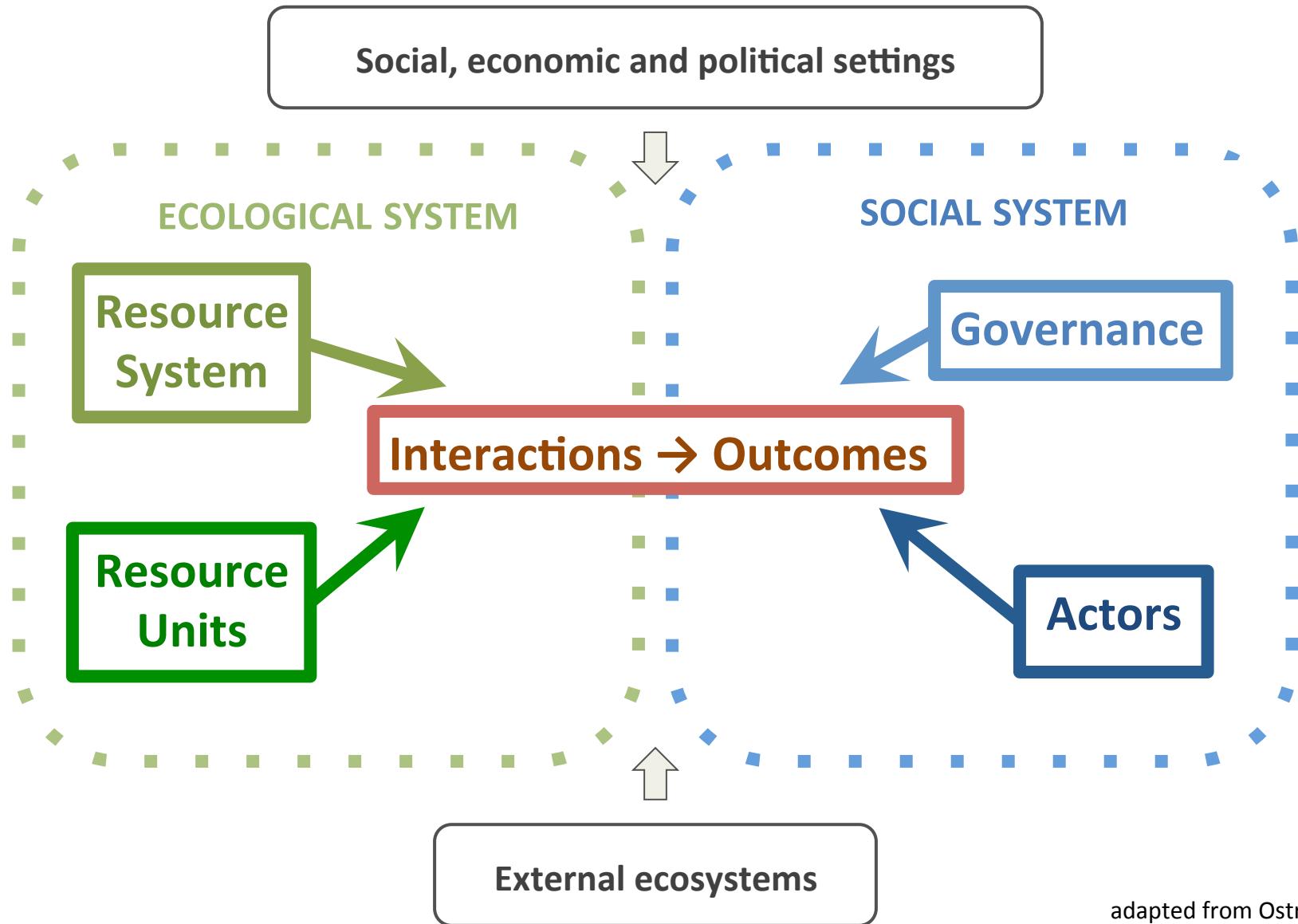
water
retention

decision-
making

ecological
integrity

timber
price

Diagnostic SES Framework (SESF)



Diagnostic SES Framework (SESF)

Second-level variables under core subsystems for analyzing social- ecological systems (Ostrom, 2007)

Social, Economic, and Political Settings (S)
S1- Economic development. S2- Demographic trends. S3- Political stability.
S4- Government settlement policies. S5- Market incentives. S6- Media organization.

Resource System (RS)

- RS1- Sector (e.g., water, forests, pasture, fish)
- RS2- Clarity of system boundaries
- RS3- Size of resource system
- RS4- Human-constructed facilities
- RS5- Productivity of system
- RS6- Equilibrium properties
- RS7- Predictability of system dynamics
- RS8- Storage characteristics
- RS9- Location

Governance System (GS)

- GS1- Government organizations
- GS2- Non-government organizations
- GS3- Network structure
- GS4- Property-rights systems
- GS5- Operational rules
- GS6- Collective-choice rules
- GS7- Constitutional rules
- GS8- Monitoring & sanctioning processes

Resource Units (RU)

- RU1- Resource unit mobility
- RU2- Growth or replacement rate
- RU3- Interaction among resource units
- RU4- Economic value
- RU5- Size
- RU6- Distinctive markings
- RU7- Spatial & temporal distribution

Users (U)

- U1- Number of users
- U2- Socioeconomic attributes of users
- U3- History of use
- U4- Location
- U5- Leadership/entrepreneurship
- U6- Norms/social capital
- U7- Knowledge of SES/mental models
- U8- Dependence on resource
- U9- Technology used

Interactions (I) → Outcomes (O)

- I1- Harvesting levels of diverse users
- I2- Information sharing among users
- I3- Deliberation processes
- I4- Conflicts among users
- I5- Investment activities
- I6- Lobbying activities

- O1- Social performance measures
(e.g., efficiency, equity, accountability)
- O2- Ecological performance measures
(e.g., overharvested, resilience, diversity)
- O3- Externalities to other SESs

Related Ecosystems (ECO)

- ECO1- Climate patterns. ECO2- Pollution patterns. ECO3- Flows into and out of focal SES.

SES Framework

- Resource System
- Resource Units
- Actors
- Governance
- Action Situation

Conflicts

economic
value: price

Sector:
forest,
agriculture

Number
of users

Harvesting
levels

Governance
organizations

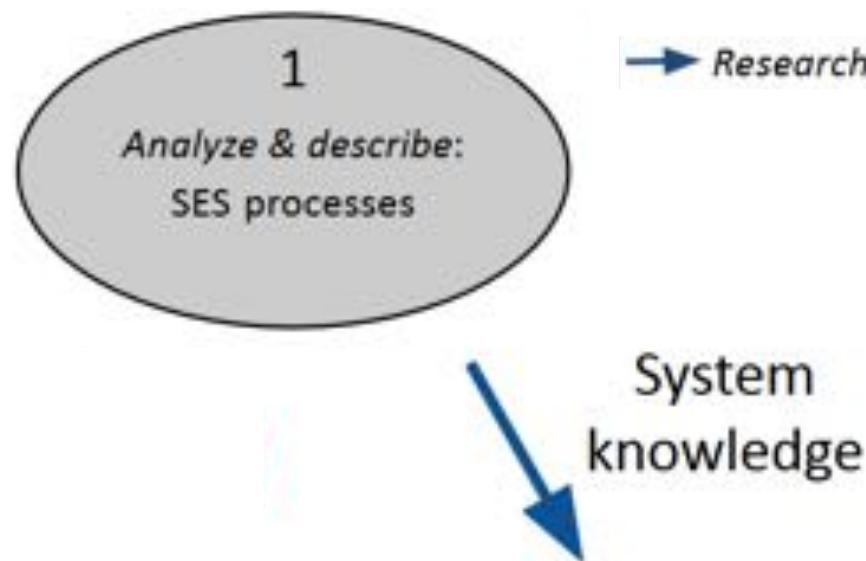
growth rate

Property
right
system

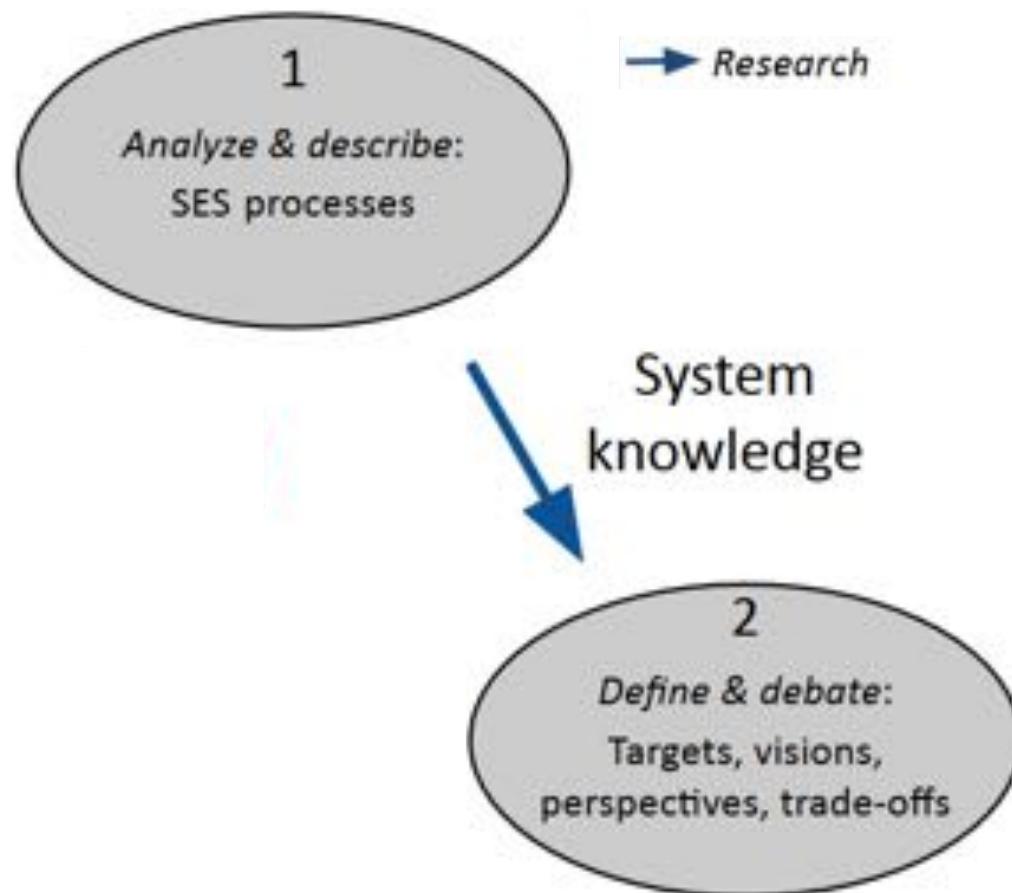
SES research in sustainability science



SES research in sustainability science



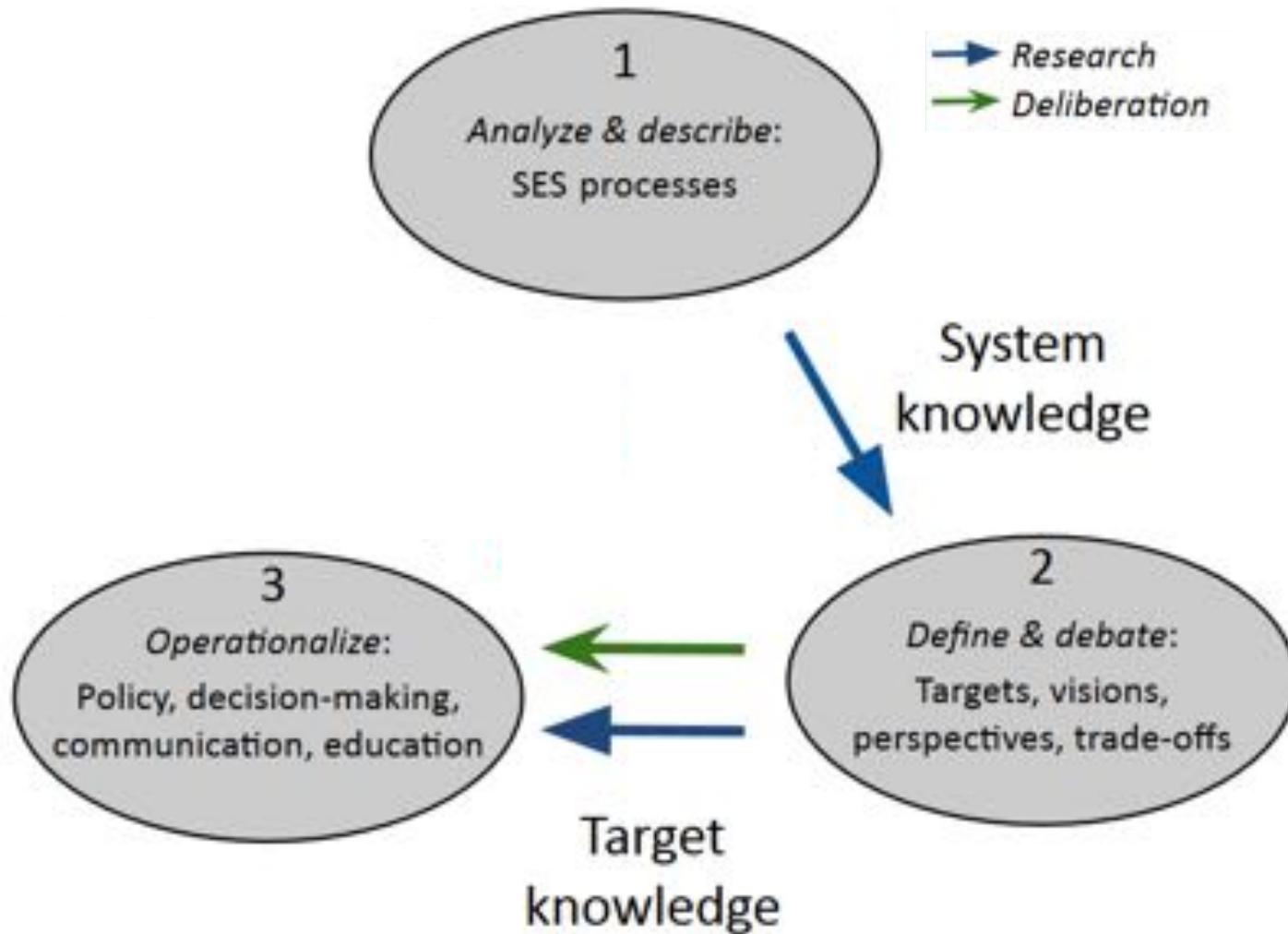
SES research in sustainability science



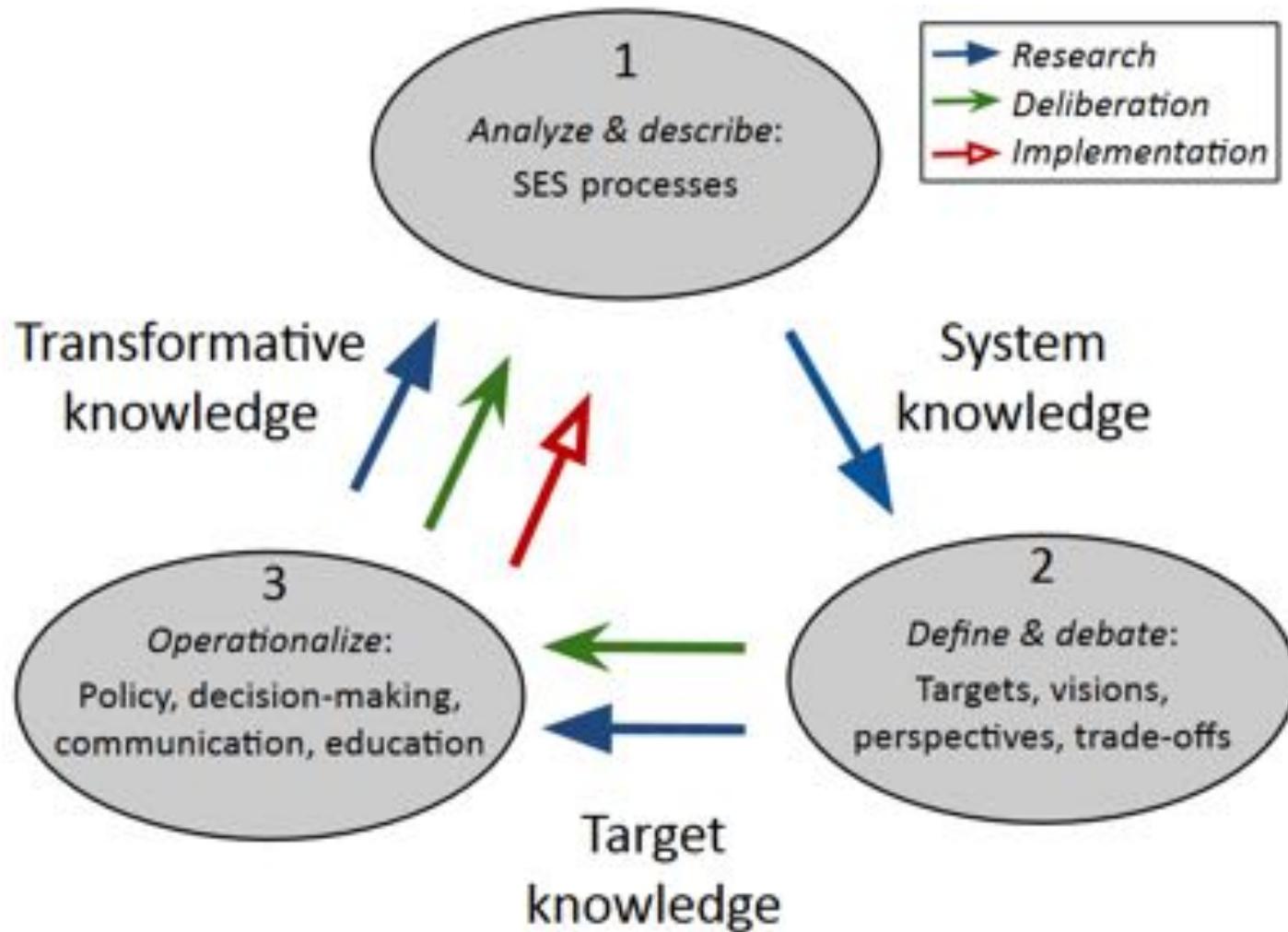
SES research in sustainability science



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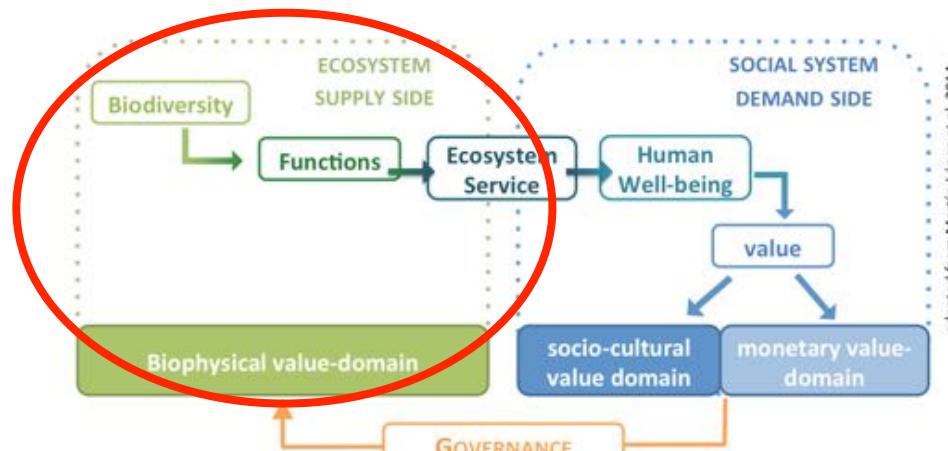


SES research in sustainability science

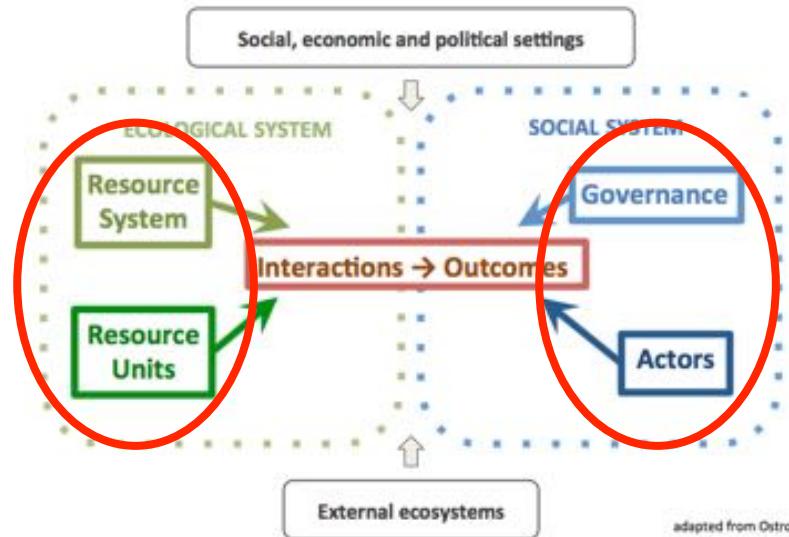


System knowledge

Ecosystem Services



Diagnostic SES Framework

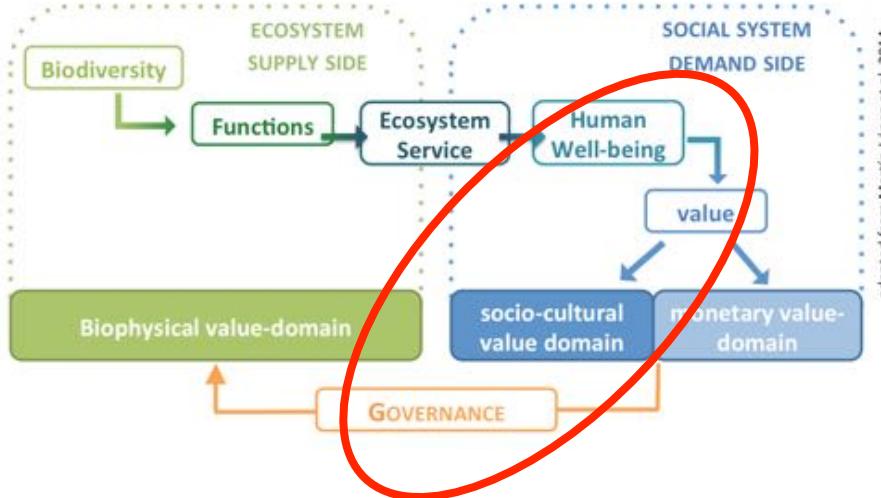


- Understanding of ecosystem/supply side
- Assessment of ecosystem services (based on ES classification, e.g. CICES)

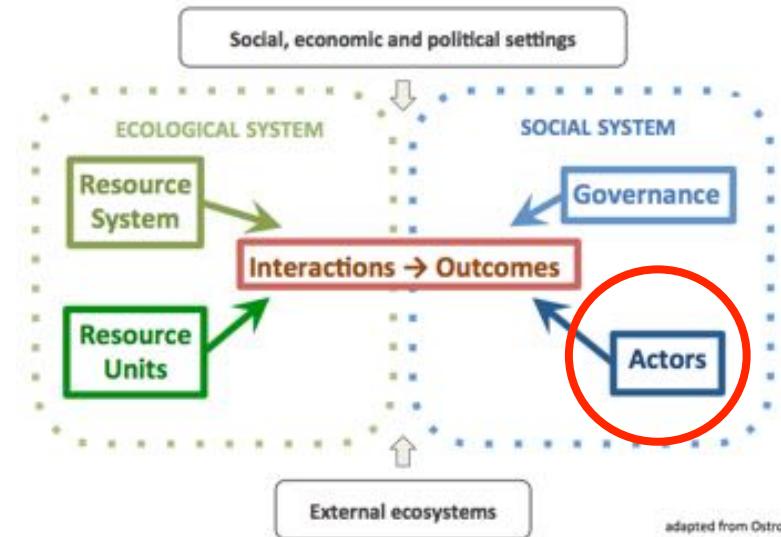
- Description of:
- Resource system
 - Resource units
 - Governance
 - Actors

Target knowledge

Ecosystem Services



Diagnostic SES Framework

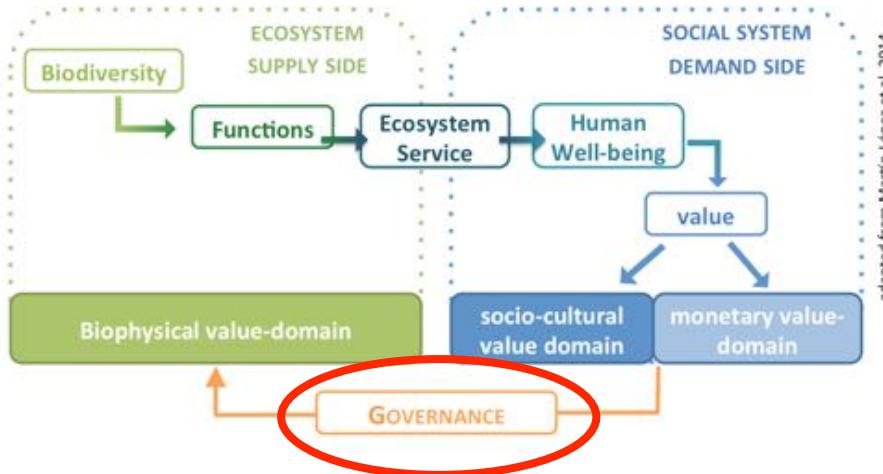


- identification of perceived ES benefits
- adaptation of governance process through stakeholders' perspectives

Actors' perspectives, goals & values

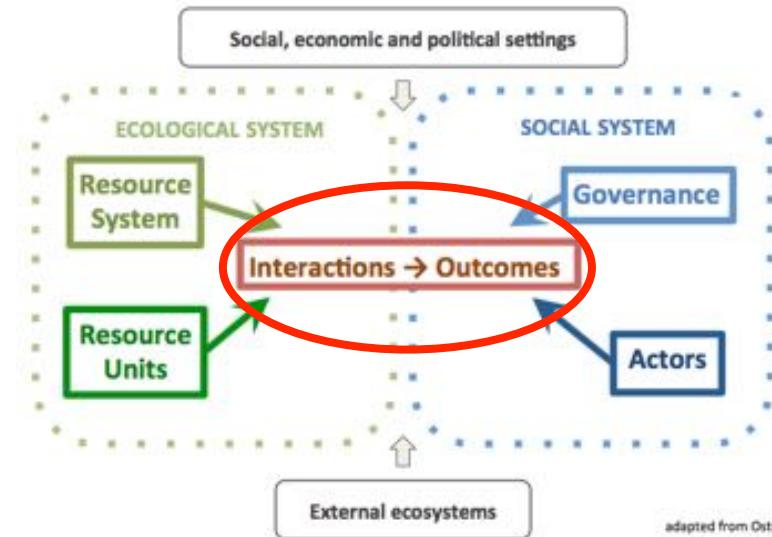
Transformative knowledge

Ecosystem Services



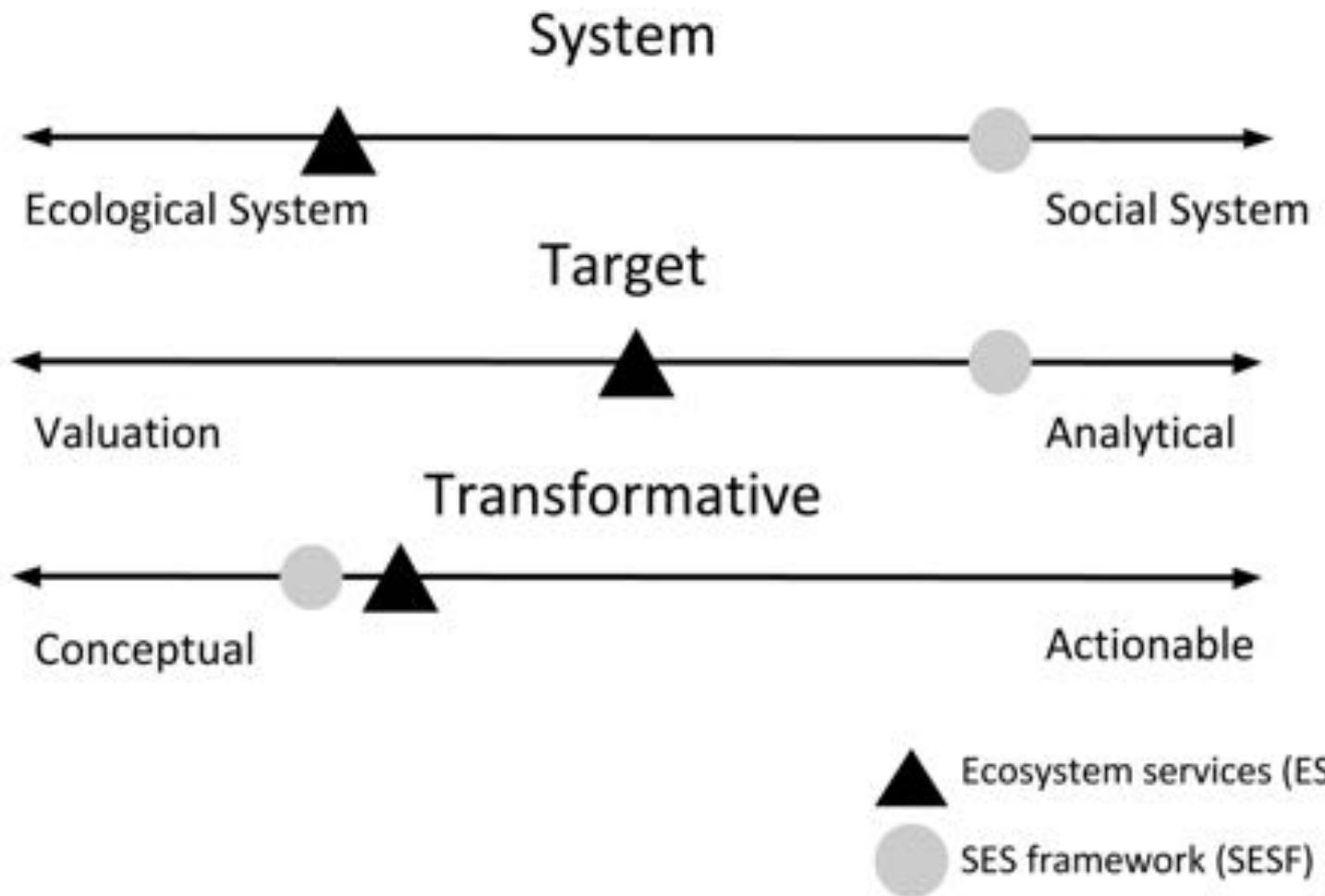
policy pathways, communication paths
between actors

Diagnostic SES Framework



- reconciling trade-offs between different goals & values
- identification of governance pathways
- education

SES knowledge



Compatibility of ES and SESF

What ES can learn from SESF

- incorporate standardized approach to social system
- specify social system & governance stage
 - services-to-ecosystems

What SESF can learn from ES

- expand on ecosystem functioning as fundamental basis for SES
- broaden value domains: not only economic, but also biophysical & socio-cultural

What ES & SESF both can improve

engage more with transformative knowledge application

THANK YOU FOR YOUR ATTENTION!

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