Modelling Conservation Conflict

Brad Duthie

Reframing the Food–Biodiversity Challenge

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Given the serious limitations of production-oriented fra
a new conceptual framework for how to analyze the nex
biodiversity conservation. We introduce four archetyp

RESEARCH ARTICLE

Global economic trade-offs between wild nature and tropical agriculture

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Abstract

Global demands for agricultural and forestry products provide ec
estation across the tropics. Much of this deforestation occurs wit
the spatial distribution of benefits and costs of deforestation. To i
land-use policies, we combine geographic information systems (
of ecosystem services (ES) studies to perform a spatially explicit
between agricultural benefits, carbon emissions, and losses of m
because of tropical deforestation from 2000 to 2012. Even thoug
services presents large inherent uncertainties, we find a pattern
that the externalities of destroying tropical forests are greater tha
nomic benefits derived from agriculture in all cases but one; whe

REVIEW

The interaction of human population, food production, and biodiversity protection

Eileen Crist,[1]* Camilo Mora,[2] Robert Engelman[3]

Research suggests that the scale of human population and the current pace
contribute substantially to the loss of biological diversity. Although technolo
and unequal consumption inextricably mingle with demographic impacts on
environment, the needs of all human beings—especially for food—imply that
population growth will undermine protection of the natural world. Numerous
have been proposed to boost food production while protecting biodiversity, bu
proposals are unlikely to staunch biodiversity loss. An important approach t
biodiversity and human well-being is through actions that can slow and even
population growth: investing in universal access to reproductive health services
contraceptive technologies, advancing women's education, and achieving gende

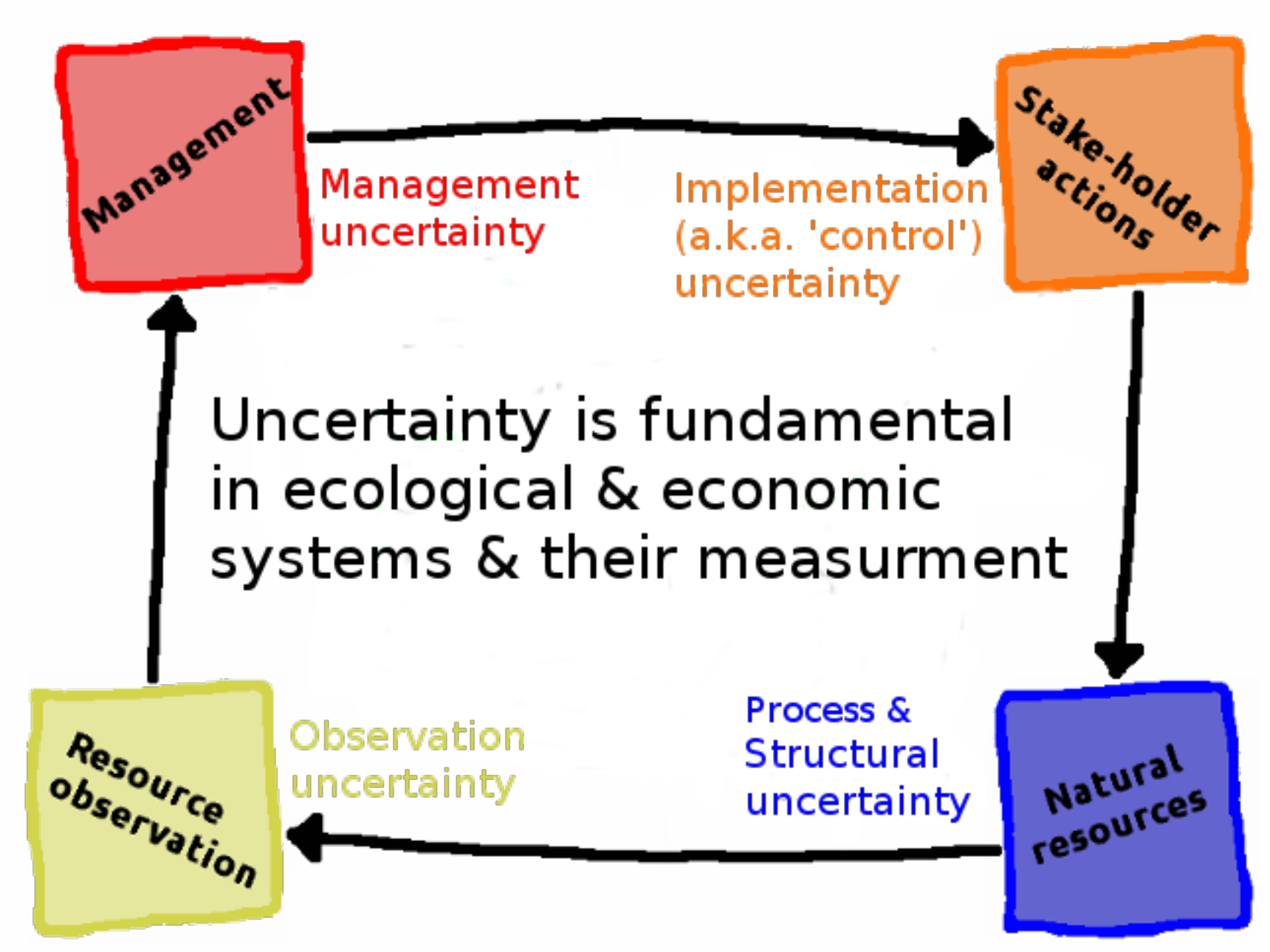
chieving high standards of human welfare | through intensification rather than

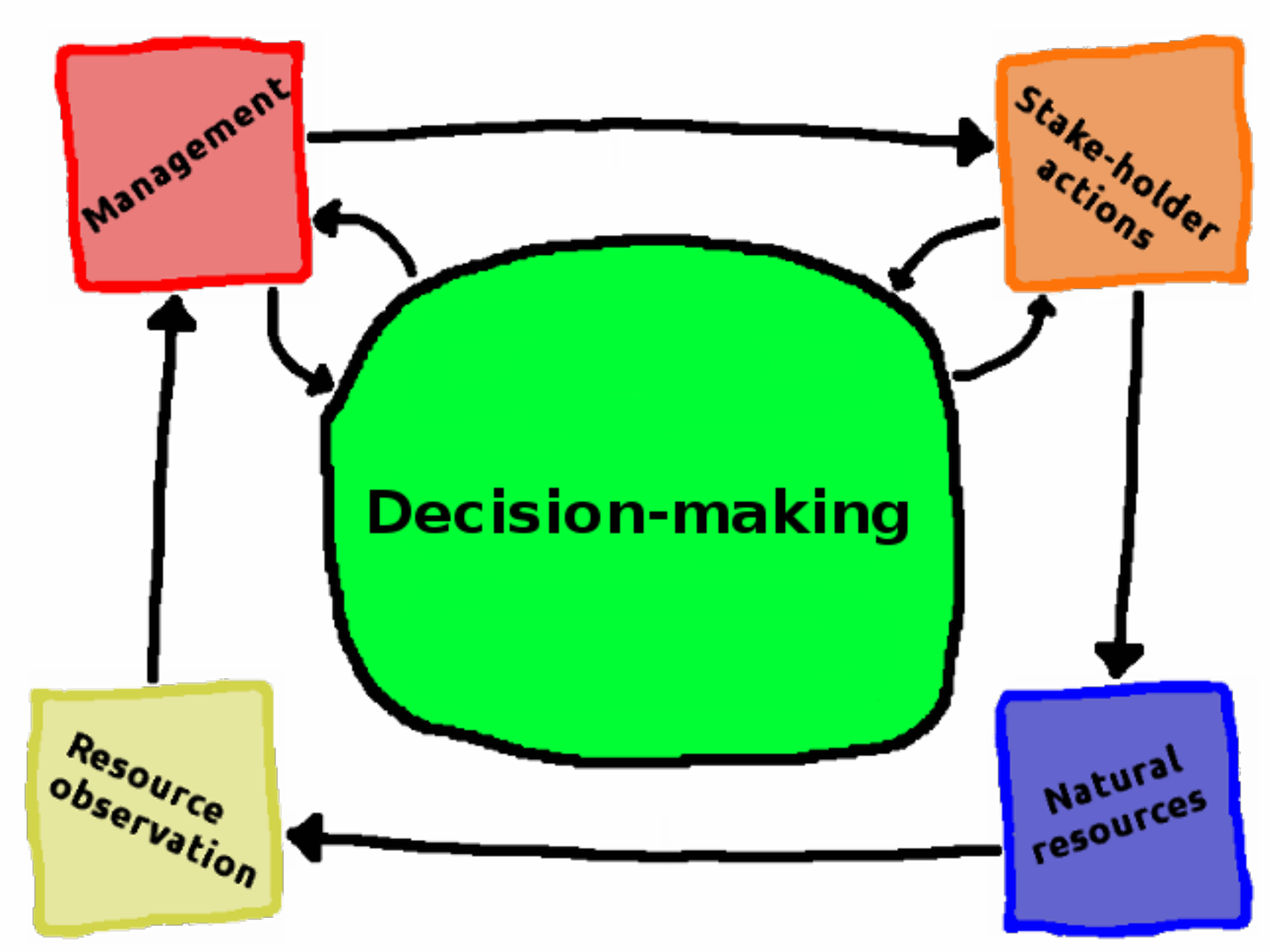
Biodiversity at risk under future cropland expansion and intensification

Laura Kehoe[1,2*], Alfredo Romero-Muñoz[1], Ester Polaina[3], Lyndon Estes[4,5,6], Holger Kreft[7] and Tobias Kuemmerle[1,8]

Agriculture is the leading driver of biodiversity loss. However, its future impact on biodiversity remains unclear, especially because agricultural intensification is often neglected, and high path-dependency is assumed when forecasting agricultural development—although the past suggests that shock events leading to considerable agricultural change occur frequently. Here, we investigate the possible impacts on biodiversity of pathways of expansion and intensification. Our pathways are not built to reach equivalent production targets, and therefore they should not be directly compared; they instead highlight areas at risk of high biodiversity loss across the entire option space of possible agricultural change. Based on an extensive database of biodiversity responses to agriculture, we find 30% of species richness and 31% of species abundances potentially lost because of agricultural expansion across the Amazon and Afrotropics. Only 21% of high-risk expansion areas in the Afrotropics overlap with protected areas (compared with 43% of the Neotropics). Areas at risk of biodiversity loss from intensification are found in India, Eastern Europe and the Afromontane region (7% species richness, 13% abundance loss). Many high-risk regions are not adequately covered by conservation prioritization schemes, and have low national conservation spending and high agricultural growth. Considering rising agricultural demand, we highlight areas where timely land-use planning may proactively mitigate biodiversity loss.


Management
Stake-holder actions
Natural resources
Resource observation
Management Strategy Evaluation

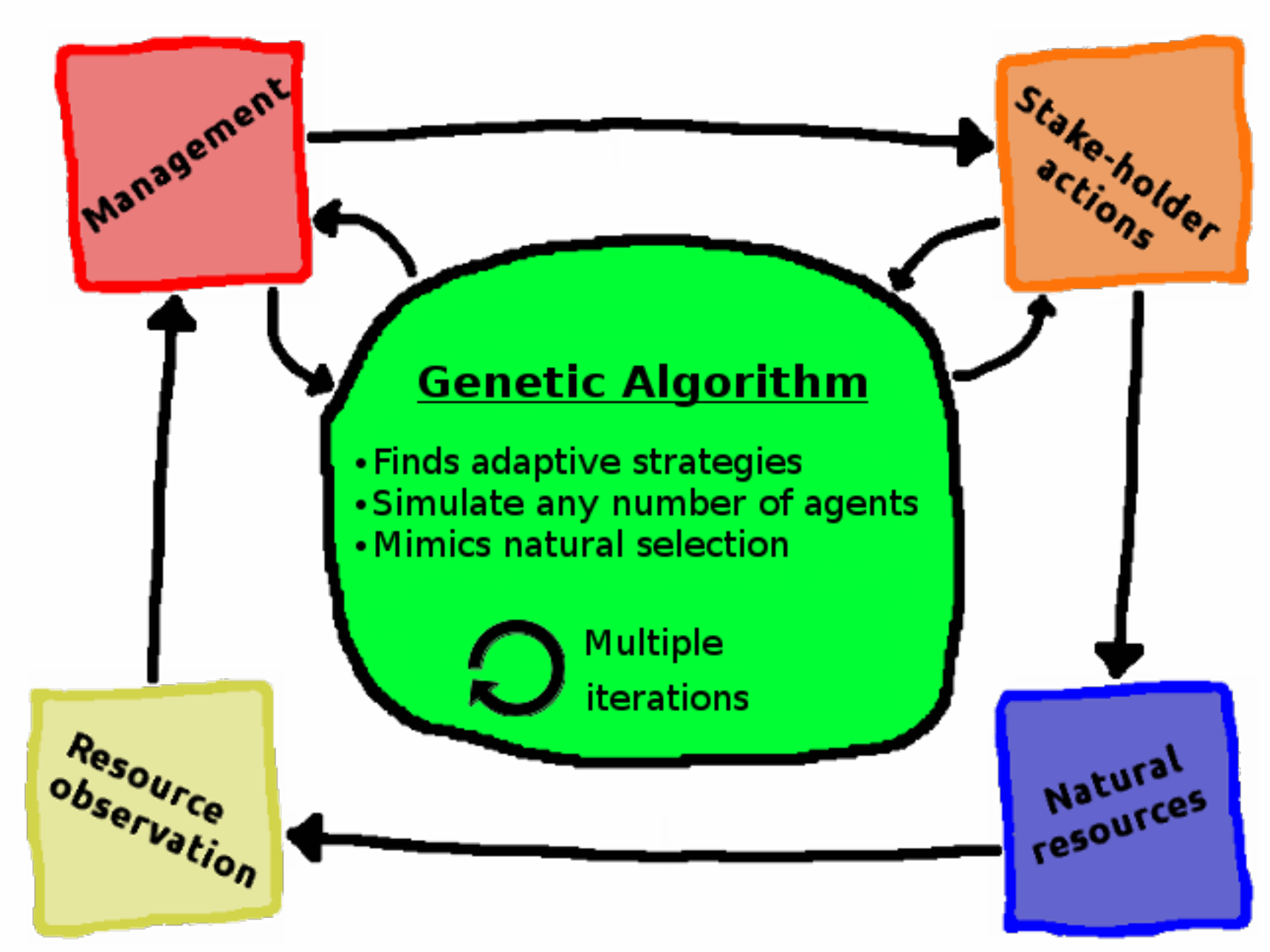

Management
Management uncertainty
Implementation (a.k.a. 'control') uncertainty
Stake-holder actions
Uncertainty is fundamental in ecological & economic systems & their measurment
Resource observation
Observation uncertainty
Process & Structural uncertainty
Natural resources


Management
Stake-holder actions
Decision-making
Resource observation
Natural resources

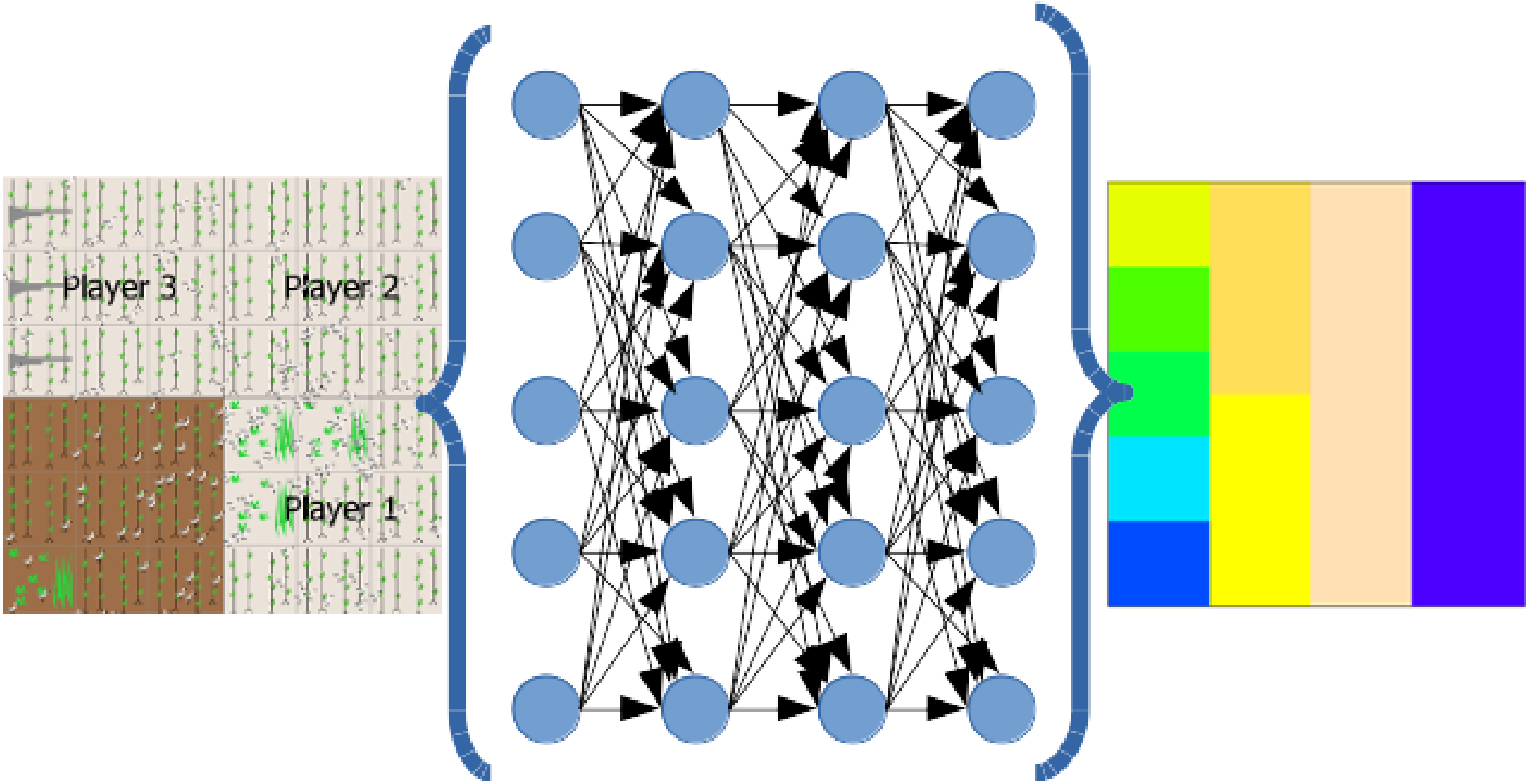
Generalised Management Strategy Evaluation

- Open-source R package on CRAN and GitHub
- Model biodiversity dynamics & realistic human decision-making
- Predict resource & land-use changes in social-ecological systems
- Integrate flexibly with existing ecological models

https://confoobio.github.io/gmse/


Management
Stake-holder actions
Genetic Algorithm
•Finds adaptive strategies
•Simulate any number of agents
•Mimics natural selection
Multiple iterations
Resource observation
Natural resources


Fiodinana 1
Fiodinana teo aloha
Vokatra: 0
+ Soa avy @ ala: 0
+ Tohana/Bonus: 0
= Skoro: 0
Skoro totaly:
TANY MALEMY
TANY MASIMASINA
12
+1 ho an'ny voly manakaiky
max: 15
+1 ho an'ny voly manakaiky
max: 12
0
0
0
ny fandraiseanao anjara?
KAROHANA CONFOOBIO


Player 3
Player 2
Player 1

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