

A SOCIAL-ECOLOGICAL SYSTEM and its DYNAMICS viewed by POSSIBILISTIC models



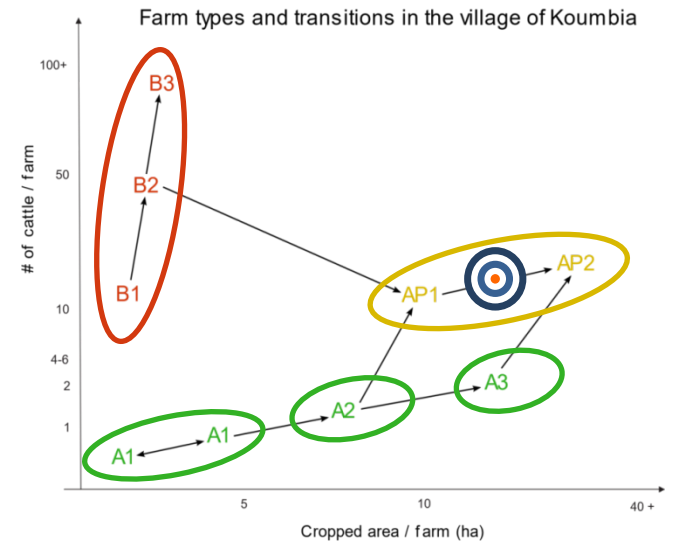
Cosme M. & Gaucherel Cédric (INRAE AMAP)



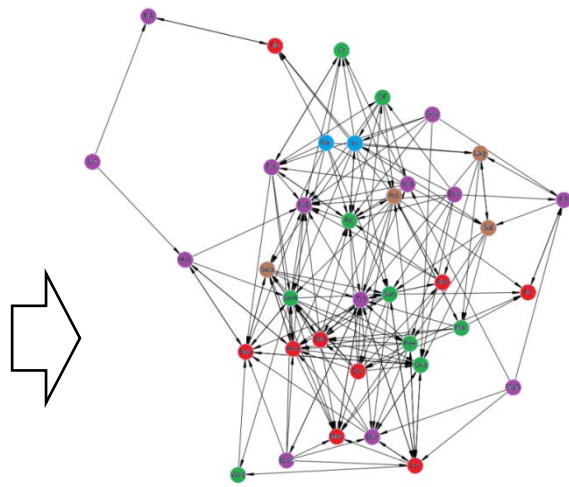
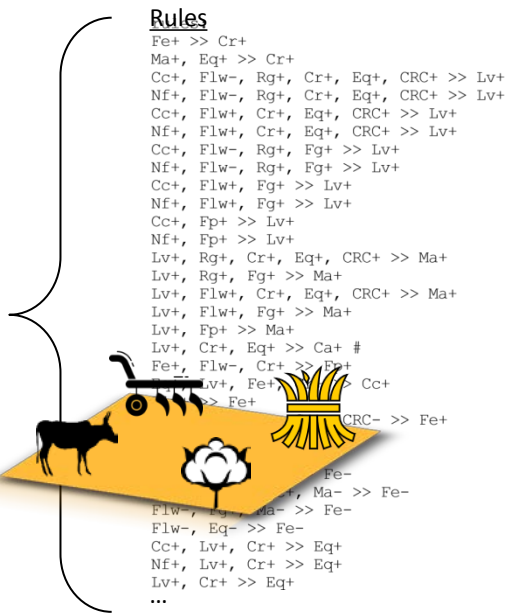
Question: How can a poor farm (A1) develop a sustainable agropastoralism (AP🎯)?



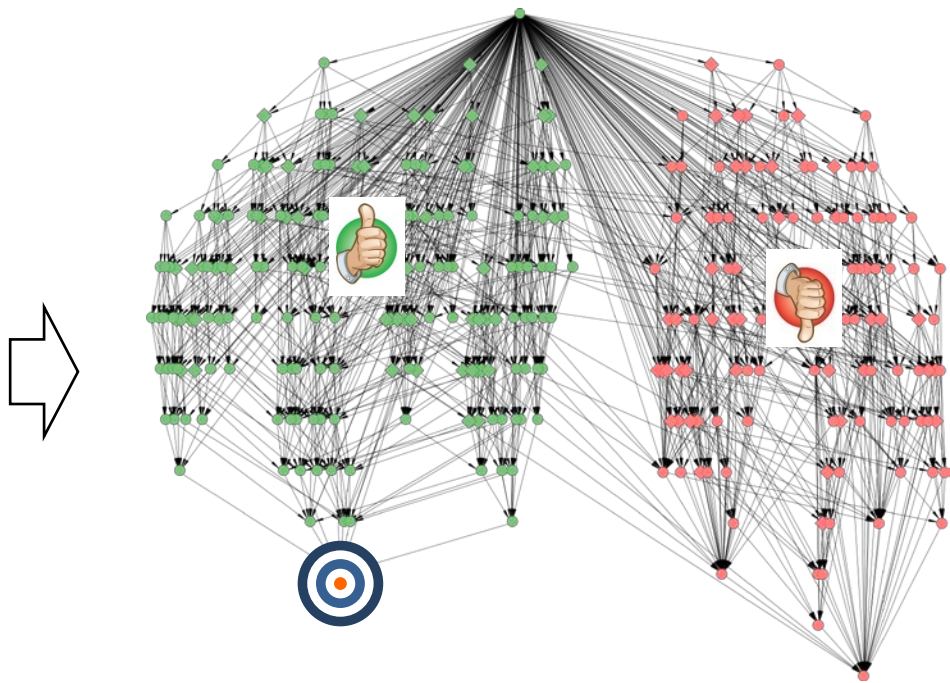
1 We first collate **indigenous and expert knowledge** about the studied system: observed farm types and farm trajectories in West Africa.



From Vall et al., 2006; Ouédraogo et al., 2016; + local knowledge



2 We then define the **model** and its **Ecosystem Network**, summarizing the system structure with involved variables (±) and processes (>>).

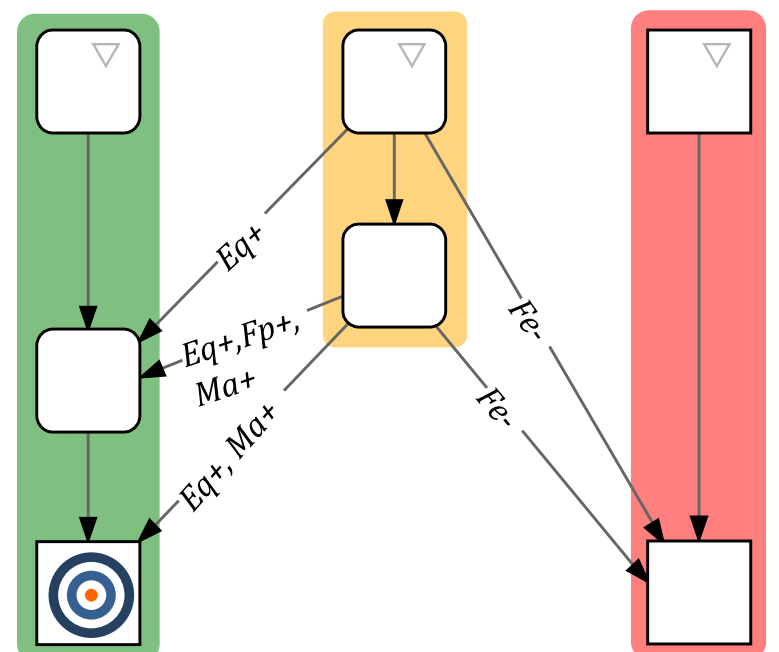


3 We compute the corresponding **state space**, which reveals trajectories **necessarily, possibly and never reaching** the targeted farm type. 🎯

Vall et al., 2008; Moulin et al., 2021; Barrett et al., 2001; Local knowledge

$$CTL: A1 \wedge \exists(A1 U (A2 \wedge \exists(A2 U (A3 \wedge \exists(A3 U AP))))))$$

4 The **sustainable agro-pastoralism** requires: i) erosion control and fodder crops, ii) additional income, iii) manure and iv) equipment.



Answer: Possibilistic models reveal the conditions for reaching the Social-Ecological system target

RELATED ARTICLES

- ✓ Cosme et al., Land 2022;
- ✓ Thomas et al., PLoS Comput Biol 2022;
- ✓ Gaucherel & Pommereau, MEE 2019.