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SILVOPASTORAL SYSTEMS IN BRAZIL'S CERRADO: MOTIVATIONS AND ABILITIES OF FARMERS

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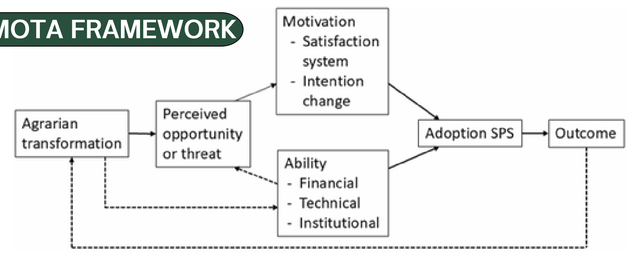
1 INTRODUCTION

- Agrarian transformation in Brazil: expansion and intensification of agriculture → deforestation and degradation
- The Cerrado is a major agricultural production region in Brazil (e.g., worlds' largest soy producer)
- At the same time, the Cerrado has high ecological importance, e.g., ecosystem services water, biodiversity, and carbon
- Silvopastoral systems (SPS) are a traditional land-use in Cerrado
- SPS have the potential to reconcile ecosystem services with agricultural production
- Importance of non-timber forest products and native fruit trees (e.g., Baru or Pequi)
- The Cerrado is underrepresented in agroforestry research Brazil
- Existing agroforestry studies often focus on adoption factors, but behavioral processes underlying adoption are underexplored

2. RESEARCH QUESTIONS

- What are farmers' motivations and abilities to adopt and continue using SPS in the Rio Pardo and Urucuia regions?
- How do motivations and abilities differ across the two study regions, among SPS adopters and non-adopters, and for different farm sizes?

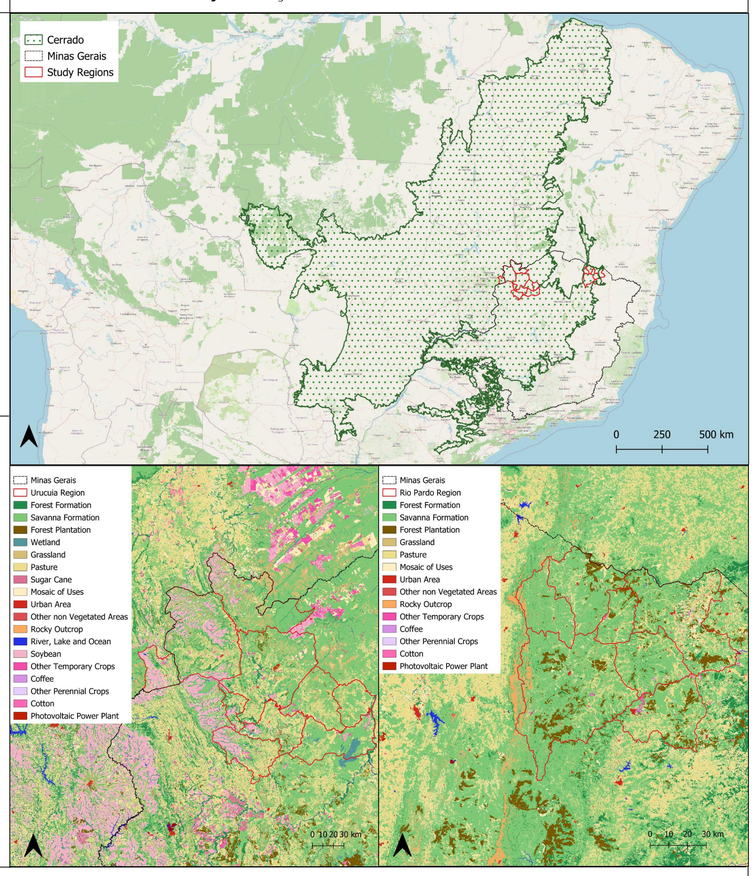
3. MOTA FRAMEWORK



Based on Phi et al. (2015): **motivation** and **ability** determine adoption. MOTA framework can be adapted to different contexts, is action oriented and provides practical insights for governance.

4. METHODOLOGY

- Two study regions: (1) Rio Pardo: hilly, more native vegetation, eucalyptus plantations; (2) Urucuia: more intensive agriculture, especially soy production
- 204 household surveys conducted across both regions
- MOTA scores calculated for each household
- Motivation assessed through environmental perception, satisfaction with farm use, and intention to change [-1 to 1]
- Abilities calculated through financial, technical, and institutional abilities [0 to 1]
- Statistical differences tested among different farmer groups: (1) Study region; (2) SPS adoption status; (3) Farm size category



5. RESULTS

Satisfaction and intention to change

- Overall, farms are satisfied with their current land-use
- Higher satisfaction for SPS non-adopters
- ~50% of farmers intend to change aspects of their land-use
- But: most intentions are unrelated to SPS adoption status

Environmental perceptions

- Problem perception: 88% climate change and 44% soil quality
- Strong consensus: deforestation causes biodiversity loss; importance reforestation; forest protection shared responsibility
- Higher perceptions of forest loss in Urucuia
- SPS adopters and smaller farms show stronger agreement on link between forest loss and climate change

Ability type	Index	Significant group differences	Indicators
Financial Ability	Income	Urucuia > Rio Pardo* SPS Adopters > SPS Non-Adopters* Larger farms > smaller farms***	•Total family monthly income •Income per household member
	Asset Farm Size	/	•Area of the farm
	External Funding	Rio Pardo > Urucuia*	•Use of financing credits •Problem? Access financial resources
Technical Ability	Knowledge	Urucuia > Rio Pardo*** Larger farms > smaller farms***	•Education of household head •Average education adults •Agricultural training •Vocation as farmer •SPS knowledge
	Infrastructure	Rio Pardo > Urucuia***	•Farm accessibility •Distance to nearest city
	Machinery	Rio Pardo > Urucuia*** Larger farms > smaller farms***	•Possession car •Possession tractor •Possession implement •Possession chainsaw •Problem? Machinery availability
	Workforce	Rio Pardo > Urucuia***	•Household size •Number family members in farmwork •Number employees •Problem? Workforce availability
Institutional Ability	Formal Ability	SPS Non-Adopters > SPS Adopters***	•Property rights
	Informal Ability	/	•Participation in social groups •Technical assistance •Problem? Access technical assistance

* p < 0.10, ** p < 0.05, *** p < 0.01

MOTA scores: Rio Pardo and Urucuia

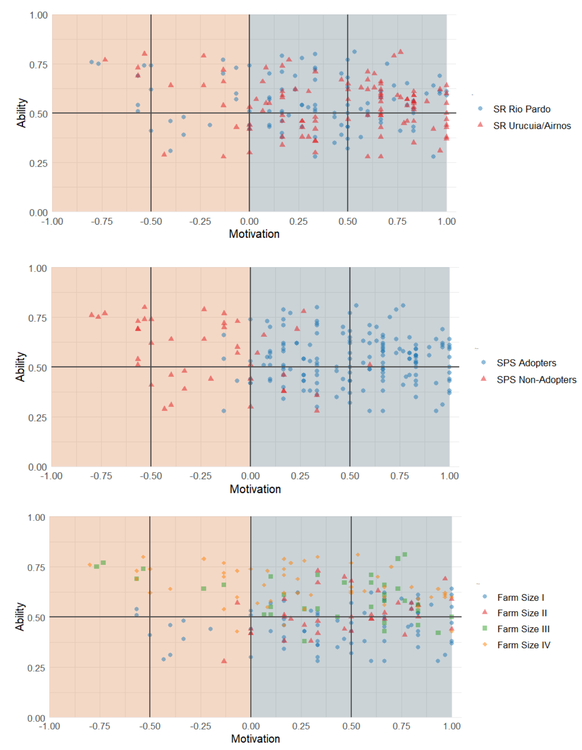
- Overall ability is nearly identical in Urucuia (0.54) and Rio Pardo (0.55), despite differences in underlying ability dimensions
- Different ability dimensions may compensate for each other, resulting in similar overall ability scores
- Motivation differs clearly between regions: higher in Urucuia (0.44) than in Rio Pardo (0.30)

MOTA scores: SPS adopters and non-adopters

- SPS non-adopters (0.58) have slightly higher ability than adopters (0.54)
- Adopters generally show positive motivation (0.52) whereas non-adopters have negative motivation (–0.22)
- Only few adopters with negative motivation, while few non-adopters have positive motivation
- **Motivation** is the main factor distinguishing adopters from non-adopters

MOTA scores: farm size categories

- Ability increases significantly with farm size: 0.46 → 0.51 → 0.60 → 0.65
- This indicates that larger farms have higher capacity for production and freedom in decision-making
- Motivation differences are marginally significant: highest among smaller farms (Sizes I and II) and declines for larger farms (Sizes III and IV)
- **Ability** is the main factor distinguishing different farm sizes



6. DISCUSSION & CONCLUSION

- Systematic differences in motivation and ability of SPS adoption among farmer groups
- General openness to change parts of farming system but SPS as a stable status and long-term commitment
- Abilities of **income, knowledge, and machinery** have strongest disparities among farmer groups
- Smaller farms have higher motivation but lower ability; larger farms demonstrate the reverse trend
- Agrarian transformation: larger farms tend to have more capital; better positioned for market-oriented agriculture; smaller farms "left behind"
- Farmers with SPS have higher motivations but lower abilities; farmers without SPS show the opposite pattern
- Motivation emerges as the factor explaining SPS adoption
- Policy recommendations for SPS adoption:
  (1) Improve perceptions to increase adoption
  (2) Targeted improvement of abilities to promote socially just SPS
- Future research recommendations
  (1) Focus on Cerrado due to ecological and agricultural relevance
  (2) Examine underlying perceptions in more detail

PARTNERS

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