

Policy Brief

Building climate resilient farmers: Is crop-livestock integration a Solution?

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KEY MESSAGE

- Crop-livestock integration (CLI) is underperforming in Burkina Faso and can be effectively improved.
- CLI strongly associate with crop-livestock water productivity.
- CLI plays associate with farm biodiversity, carbon sequestration and soil fertility.
- Need of educational, financial, technical and conceptual supports of CLI for resilient farming in Burkina Faso.

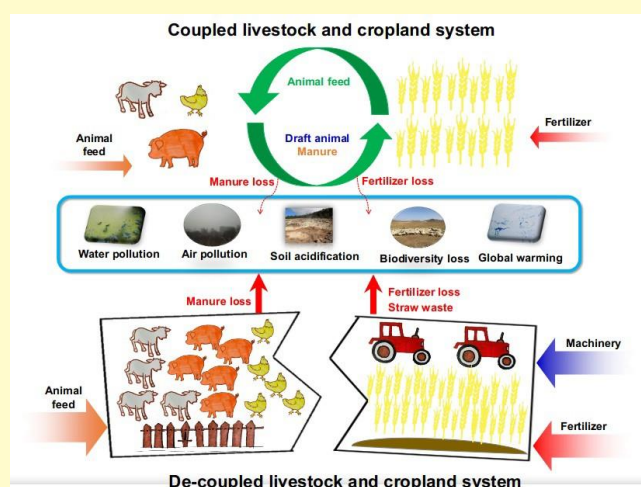


Fig. 1 Coupling/Decoupling of livestock and cropland (Jin et al., 2021).

Introduction

CLI is a climate-smart alternative indicated as such by several research work across the World and West Africa in particular. It is seen as a way of sustainable production accessible even to small farmers in the perspective to diversify their productions and reduce their vulnerability to climate change (Ryschawy et al., 2017; Alary et al., 2017; Vall et al., 2017). Nevertheless, Such mixed-farming system is under-documented in Burkina Faso with little information on its effectiveness and role in boosting farm productivity. This brief assess its effectiveness and implication in water productivity across three climatic zones of Burkina Faso. Based on the low performance revealed in each zone and from the positive implication for water productivity, it is important to act and make CLI one of the priority of agricultural policies of the country.

Methodology

The information backing this brief was generated from farmers' households surveyed data and secondary data. The surveyed data were collected through face-to-face interview with 589 respondents. Secondary data were gathered from literature and through discussions with agricultural extension services in each climatic zone.

Findings

- Low proportion of farmers' household revealed an effective coverage of integration needs;
- Overall a low percent of effective coverage of integration needs was observed across zones:

Highest coverage of Manure Needs : Dori (37.5 ± 27.3)% ;

Highest coverage of Fodder Needs : Niou (71.02 ± 46.8)% ;

Highest coverage of Draft Power Needs : Dano (138.9 ± 90.6)% (Fig.2).

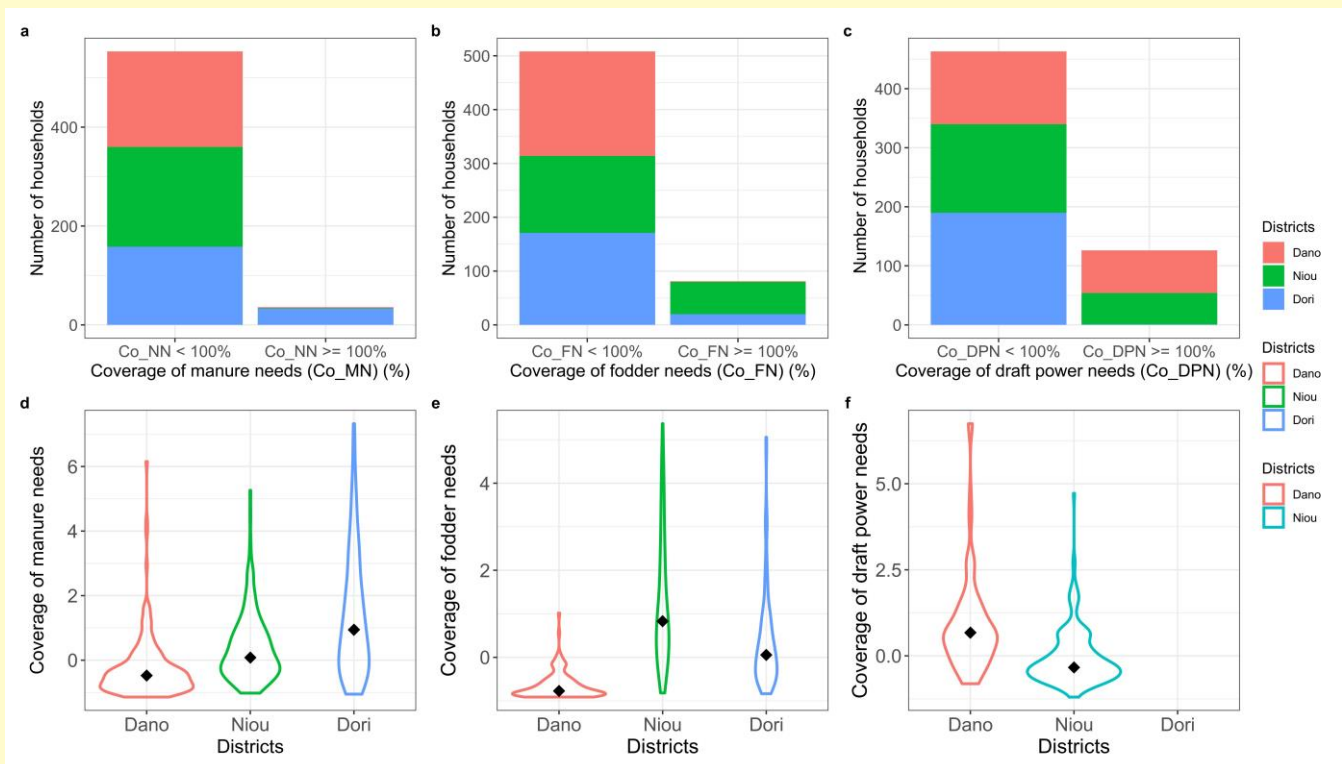


Fig. 2 Coverage of crop-livestock integration needs. (a) and (d) number of households and level of coverage of MN; (b) and (e) number of households and level of coverage of FN; (c) and (f) number of households and level of coverage of DPN.

- Farmers within harsh environment (Sahel (91.6%) and Sudan-Sahel (62.3%)) are more prone to adopt CLI than in the more favorable Sudan zone (48.2% of farmers) that offers enough possibilities to enhance the integration (Fig. 3).
- Low performance characterised CLI across climatic zones. Only 14.8%, 10.5% and 5.1% is performing an effective integration in the Sudan-Sahel, Sahel and Sudan zones, respectively.

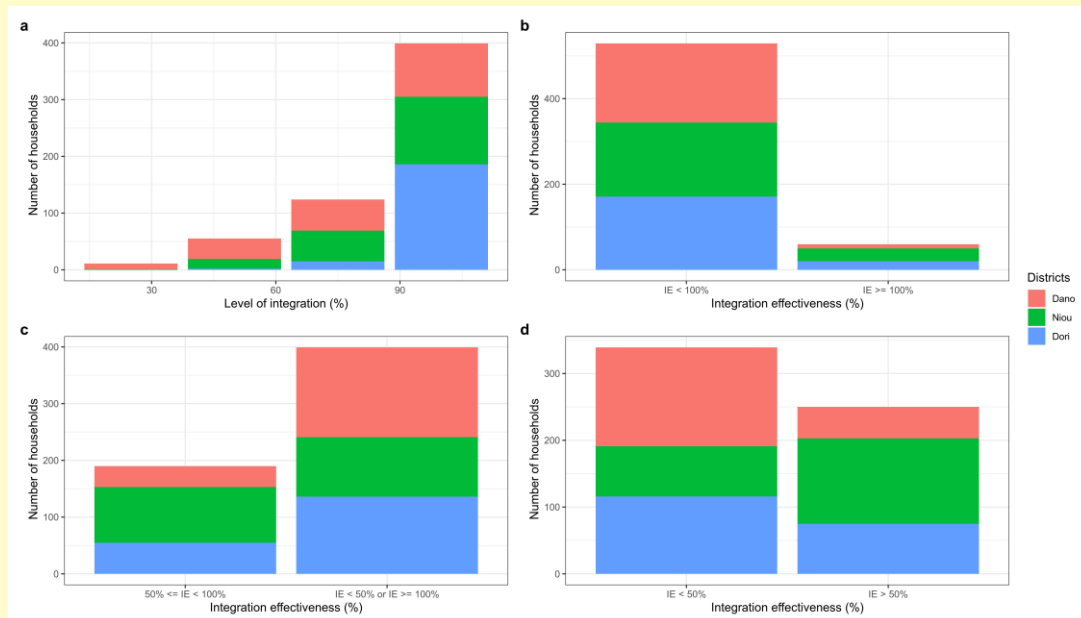


Fig.3 Crop-livestock integration: (a) Number of household per level of integration; (b), (c) and (d) Number of households according to the integration effectiveness.

- The total integration effort is the higher from farmers in the transition zone Niou (675.2 ± 357.2 man.days); followed by the Sudan (Dano) (277.8 ± 272.5 man.days) and Sahel (Dori) zone (261.5 ± 199.6 man.days).
- Higher effectiveness but lower efficiency in Niou (Sudan-Sahel).
- Highest value but lowest value in Niou for the coverage of Crop financial needs and livestock financial needs respectively (Fig.4).

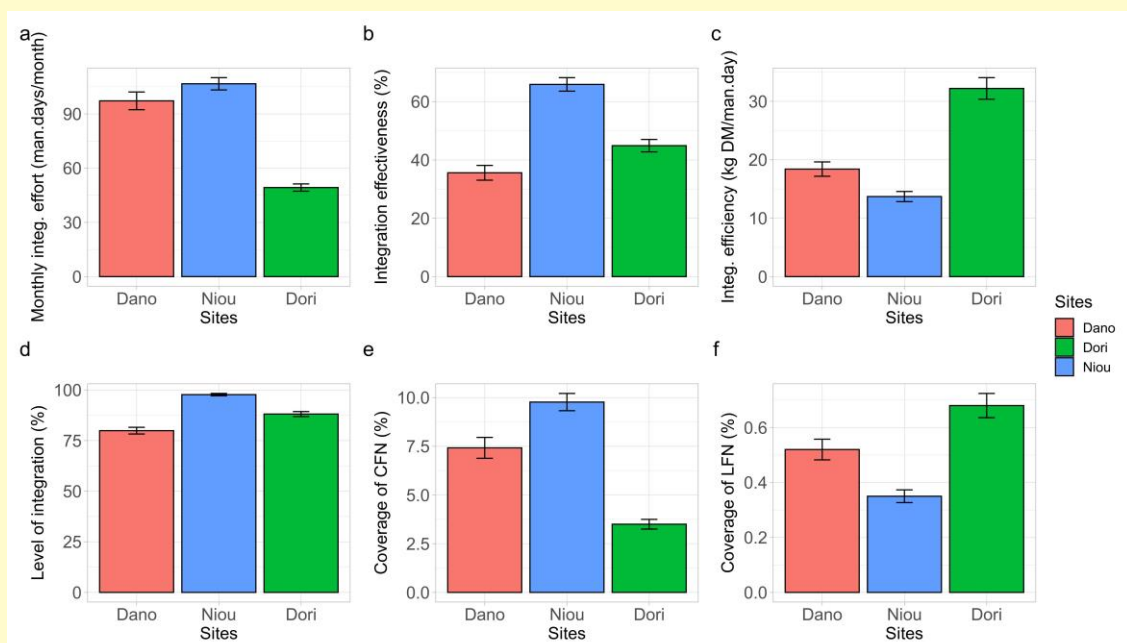


Fig. 4 Crop-livestock integration. (a) Total integration effort (TIE); (b) integration effectiveness (IE); (c) integration efficiency; (d) level of integration; (e) Coverage of crop financial needs (CFN); (d) Coverage of livestock financial needs (LFN).

Manure, fodder and draft power coverage were significantly and positively correlated to water productivity, farm biodiversity, soils nutrients (Nitrogen, Phosphorus, Carbon). Beside that the integration effectiveness was also found significantly associated with water productivity and farm biodiversity.

Table 1. Relationship between integration indicators and sequestration, productivity

CLI	Zones	N	P	Soil C	S	H	CWP	LWP
	Global				0.16*	0.27***	0.22***	
CoMN	Sudan	0.38*		0.38*			0.23***	
	Sudan-Sahel						0.44***	0.21**
	Sahel						0.35***	0.37***
	Global		-0.28**	-0.39**	0.22**	0.19*	-0.12**	-0.31**
CoFN	Sudan							-0.40***
	Sudan-Sahel							-0.26***
	Sahel							-0.33***
	Global		0.24*	0.23*			0.18**	0.30***
CoDPN	Sudan							
	Sudan-Sahel							0.28**
	Sahel							
	Global				0.17*		0.10*	
IE	Sudan						0.20**	
	Sudan-Sahel						0.20**	
	Sahel							

Conclusion

- Farmers within harsh environment (Sahel and Sudan-Sahel) are more prone to adopt CLI than in the more favorable Sudan zone that offers enough possibilities to enhance the integration.
- Crop-livestock integration is underperforming in Burkina Faso and can potentially be improved through increased crop residues and manure mobilisation, as well as increased draft power utilisation.
- Crop-livestock integration is significantly associated with a good performance in water productivity meaning more crop and livestock products (grain, milk, meat) per water drop depleted (high confidence).

Recommandations

- Make CLI one of the priorities in the agricultural policies through educational, financial, technical and conceptual supports;
- Actions for the adoption of CLI by farmers especially in the Sudan zone with good potential.

Acknowledgments



References

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