

Appendices

Appendix 1. Search strings used for the literature review:

- Search string 1: *(agroecolog* OR agro-ecolog* OR diversified farming systems OR ecological agriculture OR sustainable agriculture OR ecological intensification OR low input* OR organic farming) AND (food security OR food insecur* OR food access* OR food sufficien* OR food insufficien*) AND CU=CountryName*
- Search string 2: *(agroecolog* OR agro-ecolog* OR diversified farming systems OR ecological agriculture OR sustainable agriculture OR ecological intensification OR intercrop* OR low input* OR agroforest* OR legume* OR green manure OR cover crop* OR no pesticides OR organic farming) AND (food security OR food insecur* OR food access* OR food sufficien* OR food insufficien*) AND CU=CountryName*
- Search string 3: *(agroecolog* OR agro-ecolog* OR diversified farming systems OR ecological agriculture OR sustainable agriculture OR ecological intensification OR low input* OR organic farming) AND CU=CountryName*

Countries: Benin, Burkina Faso, Cameroon, Côte d'Ivoire, Ethiopia, Gambia, Ghana, Kenya, Madagascar, Malawi, Mali, Niger, Nigeria, Senegal, Tanzania, Uganda, Zimbabwe

Appendix 2. Categorization of study regions by agro-climatic zone (Sebastian 2015).

Moisture zone*	Zone	Study regions by country
(70-180 days LGP)	Semi-arid	Burkina Faso, north Cameroon, Ethiopia, north Gambia, Kenya (except south-west), central and south Malawi, south-west Mali, south-west Niger, Senegal, north central Tanzania, and Zimbabwe.
180-270 days LGP	Sub-humid	Benin, Burkina Faso, north Cameroon, north and central Ghana, north and central Cote d'Ivoire, central and south-west Kenya, north Malawi, central Nigeria, Tanzania (except the north-west), north-west Uganda, central Madagascar
(>270 days LGP)	Humid	south Cameroon, south-west Ghana, south-west Cote d'Ivoire, south-west Kenya, south-east Nigeria, central Uganda, east Madagascar

* Moisture zones identify the length of growing period (LGP), at which both moisture and temperature are supportive of crop growth: these criteria are met when average temperatures are greater than or equal to 5°C and precipitation plus stored soil moisture equal more than half of potential evapotranspiration

**All sites were located in the tropics, where mean monthly temperatures are greater than 18°C for all months, and encompassed sites located in both warm (lowland <1,200m) and cool (highland >1,200m) tropics

Appendix 3. SDG outcomes and indicators used in the analysis, and SDG category applied for purposes of analysis.

SDG category	SDG	Sub-outcome	Indicators/evidence type
ECONOMIC	1: No poverty	Total agricultural incomes from the sale of farm products Income stability, or the timing and consistency of agricultural income generation. Income diversity through the sale of different agricultural products Non-labor production costs of agricultural inputs	• Farmers' perceptions of income change after agroecological transition • Farmer-reported agricultural income (household survey) • Financial analysis of net value of agricultural product • Agricultural revenue per unit of area • Gross margins of production • Farmers' perceptions of changes in income stability after agroecological transition • Stability of farm/field output (e.g., yield assessments) • Farmers' perceptions of income change after agroecological transition • Farmer-reported agricultural income sources • Farmers' perceptions of change in input expenses after agroecological transition • Quantity of purchased inputs and associated costs

FOOD SECURITY	2: Zero hunger	Yield at crop-, field- and farm-levels	• Field-level data of yields on conventional versus agroecological plots/fields • Farmer-reported yields (household survey) • Farmers' perceptions of yield change after agroecological transition/implementation of agroecological practices
		Food security	• Farmers' perceptions of changes food security after agroecological transition • Farmer-reported length of food deficit periods • Food consumption expenditures, household dietary diversity, Household Food Insecurity Access Scale (HFIAS), anthropometric indicators, and calorie consumption
SOCIAL	3: Good health and well-being	Access to health for farming households	• Farmers' perceptions of changes in ability to afford hospital fees after agroecological transition • Self-reported household expenditures on medical costs, compared between agroecological and non-agroecological farming households
		Cultural value of farming practices, products, and their uses	• Farmers' perceptions of the uses and values of agroecological practices and products
SOCIAL	4: Quality education	Access to education for farming households	• Farmers' perceptions of changes in ability to afford school fees after agroecological transition • Self-reported household expenditures on school costs, compared between agroecological and non-agroecological farming households

SOCIAL	5: Gender equality	Inclusion of women	• Farmers' perceptions of changes in participation of women in household and community-level decision-making processes, resource control, and governance
ENVIRONMENTAL	6: Clean water and sanitation	Soil and water erosion through water and nutrient runoff, impacting soil moisture and humidity levels. Environmental pollution associated with soil and pest management practices	• Farmers' perceptions of groundwater recharge, soil and water erosion rates after agroecological transition • Plot-level measurements of soil structure, water retention • Field/farm-level measurement of water runoff • Farmers' perceptions of changes in application of agrochemicals after agroecological transition • Quantity of agrochemicals applied
ECONOMIC	8: Decent work and economic growth	Employment opportunities linked to farm labor requirements, farm marketing organizations and value chains Total agricultural incomes from the sale of farm products	• Farmers' perceptions of changes in employment opportunities after agroecological transition • Number of jobs created since agroecological transition • Assessment of labour demands regarding agroecology • Farmers' perceptions of income change after agroecological transition • Farmer-reported agricultural income (household survey) • Financial analysis of net value of agricultural product • Agricultural revenue per unit of area • Gross margins of production

		Income stability, or the timing and consistency of agricultural income generation. Labor time and cost required by farming practices and farming systems.	• Farmers' perceptions of changes in income stability after agroecological transition • Stability of farm/field output (e.g., yield assessments) • Farmers' perceptions of changes in working time after agroecological transition • Number of man days, hours per hectare • Labour productivity/returns to labour • Social characteristics of farm workers (e.g., female versus male)
SOCIAL	10: Reduced inequalities	Inclusion of socially disadvantaged groups Inclusion of women	• Farmers' perceptions of changes in participation of socially disadvantaged groups in household and community-level decision-making processes, resource control, and governance • Farmers' perceptions of changes in participation of women in household and community-level decision-making processes, resource control, and governance
ENVIRONMENTAL	13: Climate action	Greenhouse gas emission and mitigation potential Crop and agroecosystem resilience to extreme climatic conditions, such as drought, highly variable rainfall, and floods	• Assessment of carbon/GHG emissions • Soil organic carbon measurements • Farmers' perceptions of change in agroecosystem health after agroecological transition

ENVIRONMENTAL	15: Life on land	Soil quality and fertility	• Farmers' perceptions of changes in soil fertility/quality after agroecological transition • Field-level data of change of nutrient levels (nitrogen, phosphorous), soil organic matter, and soil structure (texture, aggregation, water holding capacity, etc.) • Farmers' perceptions of change in flora and fauna diversity after agroecological transition • Identification of on-farm species richness/density, collection of soil macrofauna • Farmers' perceptions of groundwater recharge, soil and water erosion rates after agroecological transition • Plot-level measurements of soil structure, water retention • Field/farm-level measurement of water runoff • Farmers' perceptions of changes in application of agrochemicals after agroecological transition • Quantity of agrochemicals applied
		Biodiversity of non-crop species, such as trees and shrubs, insects, and soil fauna	
		Soil and water erosion through water and nutrient runoff, impacting soil moisture and humidity levels.	
SOCIAL	16: Peace, justice and strong institutions	Environmental pollution associated with soil and pest management practices	• Farmers' perceptions of changes in application of agrochemicals after agroecological transition • Quantity of agrochemicals applied • Farmers' perceptions of change in family cohesion, knowledge sharing, cooperation after agroecological transition • Increase in number of farmers' cooperatives
		Strength/cohesion of community-level institutions and knowledge networks	

Appendix 4. Synthesis of reported outcomes of the use of agroecological practices according to different agro-climatic zones in literature reviewed, categorized according to type of sustainability outcome. Percentage indicates the number of documents that reported an outcome out of the total number of publications per agro-climatic zone.

		Semi-arid N=38			Humid N=20			Sub-humid N= 46		
		Positive	Negative	Neutral	Positive	Negative	Neutral	Positive	Negative	Neutral
<i>Economic</i>	Agricultural income	15.8	0.0	0.0	25.0	0.0	0.0	26.1	0.0	0.0
	Non-labour production costs	23.7	0.0	0.0	35.0	0.0	0.0	37.0	0.0	0.0
	Income diversification	23.7	0.0	0.0	30.0	0.0	0.0	28.3	0.0	4.3
	Labour	2.6	7.9	7.9	20.0	0.0	0.0	15.2	4.3	0.0
	Income stability	10.5	0.0	0.0	10.0	0.0	0.0	17.4	0.0	0.0
<i>Environmental</i>	Soil quality/fertility	31.6	0.0	0.0	35.0	0.0	5.0	34.8	0.0	2.2
	Soil and water conservation	7.9	0.0	0.0	15.0	0.0	0.0	8.7	0.0	0.0
	Agrochemical reduction	2.6	0.0	0.0	20.0	0.0	0.0	15.2	0.0	0.0
	Climate resilience	18.4	0.0	0.0	25.0	0.0	0.0	10.9	0.0	0.0
	Greenhouse gas reduction/carbon sequestration	15.8	0.0	0.0	25.0	0.0	0.0	28.3	0.0	0.0
	Biodiversity	13.2	0.0	0.0	5.0	0.0	0.0	8.7	0.0	0.0
<i>Food security</i>	Yield	57.9	5.3	5.3	40.0	5.0	5.0	50.0	6.5	0.0
	Food security	31.6	2.6	2.6	30.0	0.0	0.0	50.0	0.0	0.0
<i>Social</i>	Community-level benefits	7.9	0.0	0.0	5.0	0.0	0.0	10.9	0.0	0.0
	Gender equity	10.5	0.0	0.0	10.0	0.0	0.0	0.0	6.5	0.0
	Social inclusion	2.6	0.0	0.0	0.0	0.0	0.0	6.5	0.0	0.0

Employment	5.3	0.0	0.0	10.0	0.0	0.0	6.5	0.0	0.0
Access to education	5.3	0.0	0.0	15.0	0.0	0.0	4.3	0.0	0.0
Access to health	0.0	0.0	0.0	15.0	0.0	0.0	2.2	0.0	0.0
Cultural value	5.3	0.0	0.0	5.0	0.0	0.0	6.5	0.0	0.0

Appendix 5. Negative feedback loops between the impact of agroecological practices on SDGs. Circle size represents the proportion of literature that reported a negative effect on the SDG.

