Supplementary materials

Evidence of Agroecological Performance in Production Systems Integrating Agroecology and Bioeconomy Actions Using TAPE in the Colombian An dean–Amazon Transition Zone

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Supplementary figures

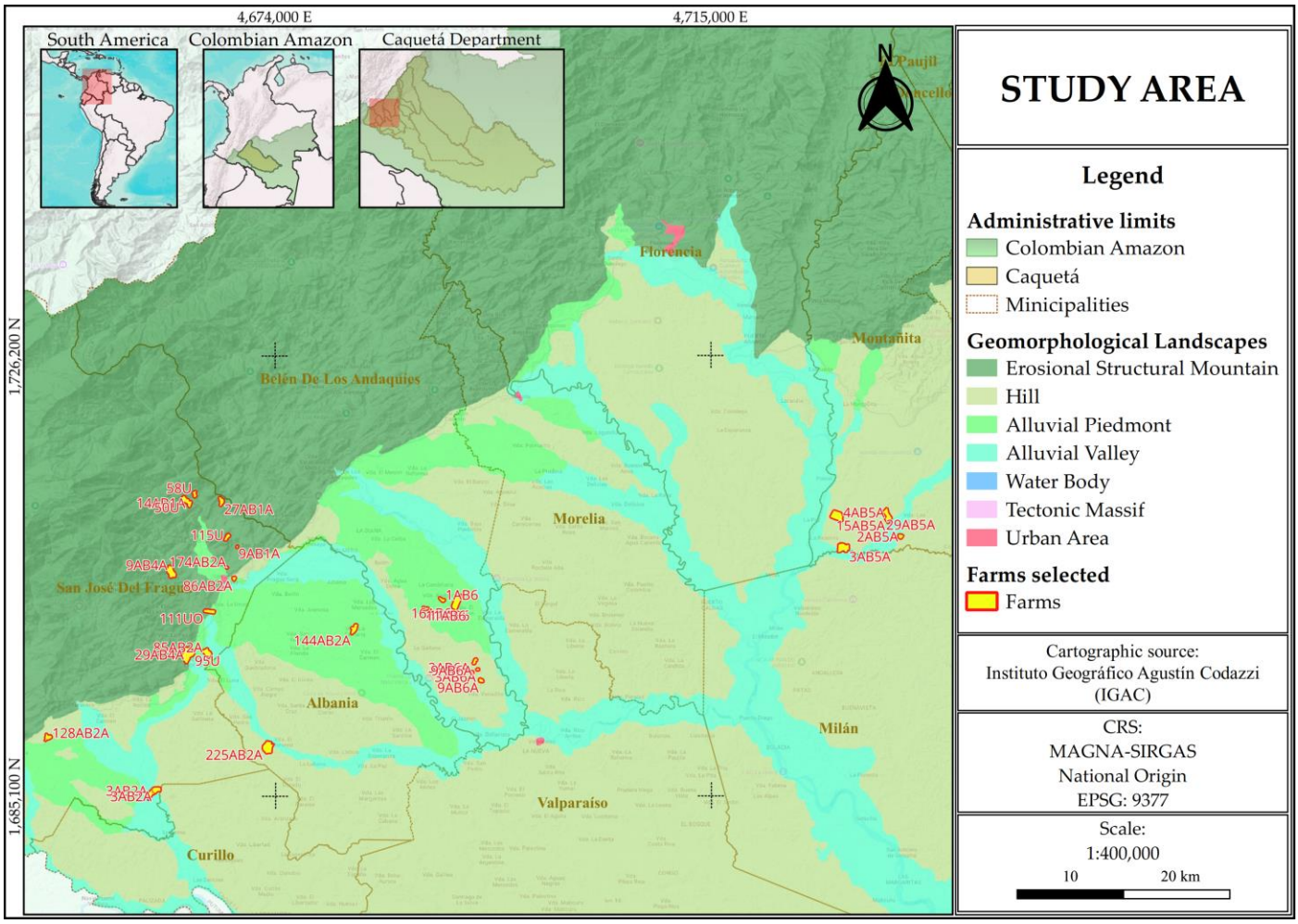

Figure S1. Geographic location of the evaluated farms in the Colombian Andean–Amazon Transition Zone.

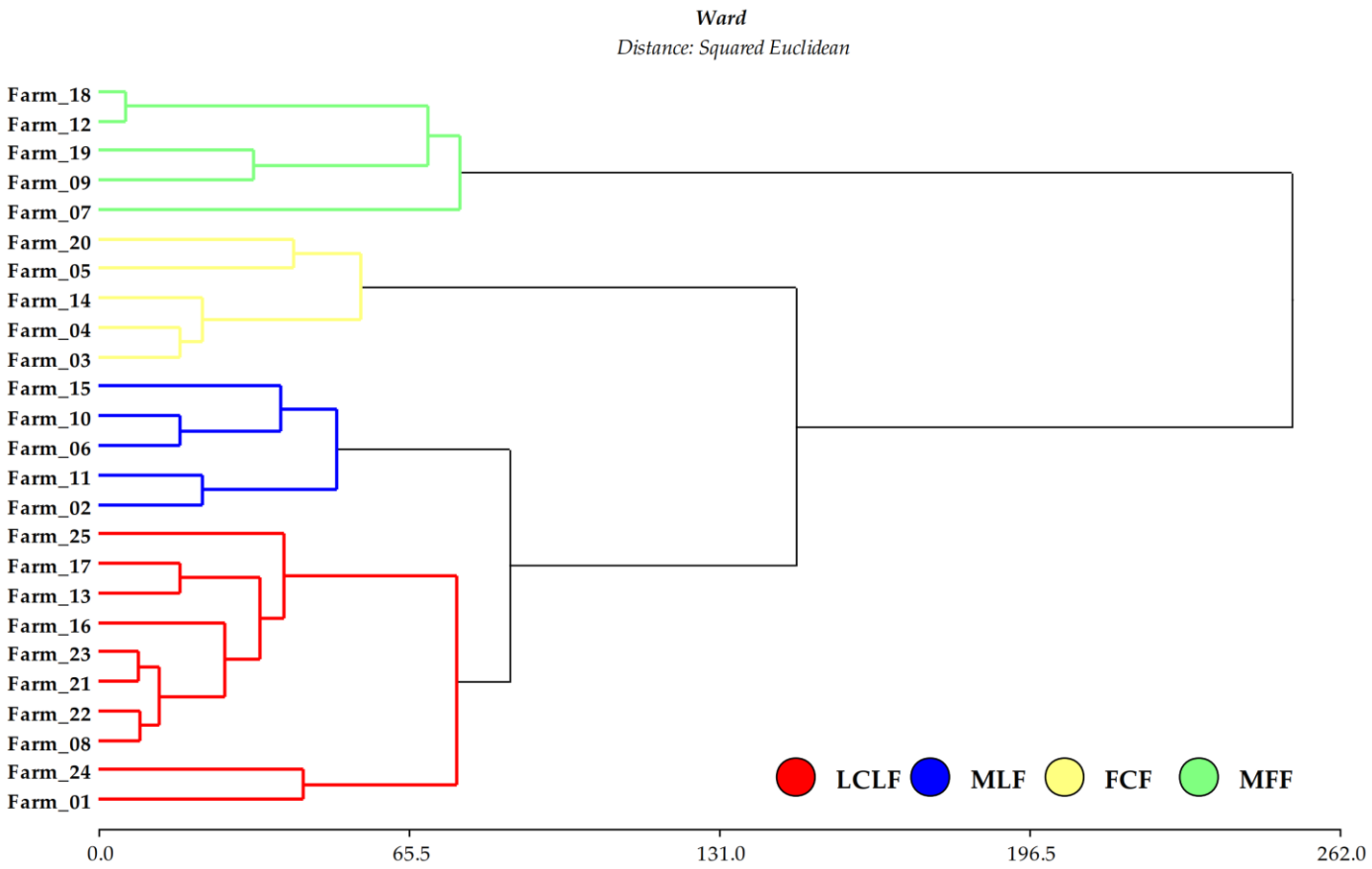

Figure S2. Dendrogram of the hierarchical cluster analysis using Ward's method and squared Euclidean distance. Large Crop-Livestock Farms (LCLF), Mixed Livestock Farms (MLF), Family Cattle Farms (FCF), and Mixed Family Farms (MFF).

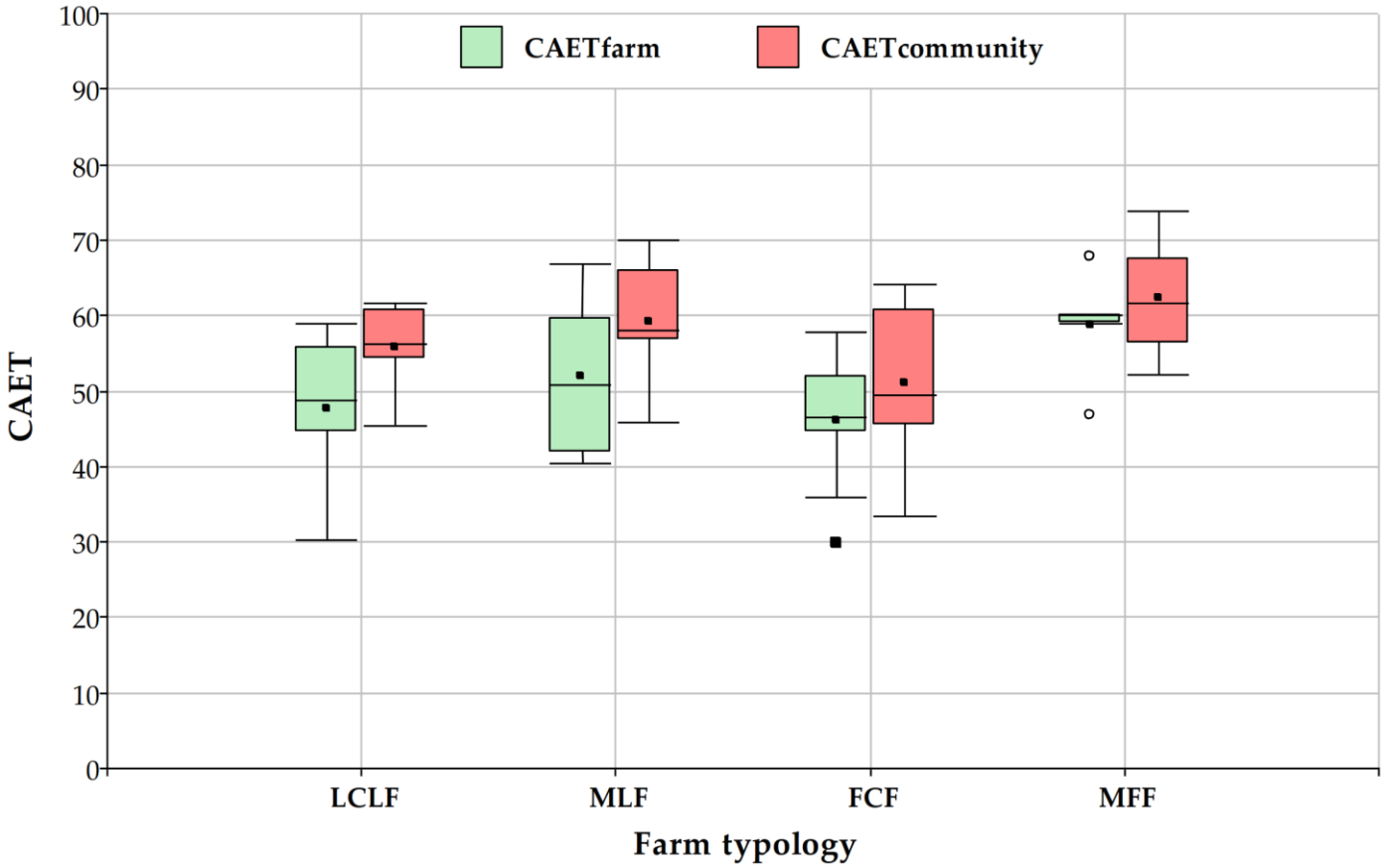

Figure S3. Boxplots showing average CAET Farm and CAET Community scores (%) by farm typology in the Colombian Andean–Amazon Transition Zone. Large Crop-Livestock Farms (LCLF), Mixed Livestock Farms (MLF), Family Cattle Farms (FCF), and Mixed Family Farms (MFF). CAET farm (Diversity, Synergies, Efficiency, Recycling, and Resilience) and CAET community (Culture and Food Traditions, Co-creation and Knowledge Sharing, Human and Social Values, Circular and Solidarity Economy, and Responsible Governance).

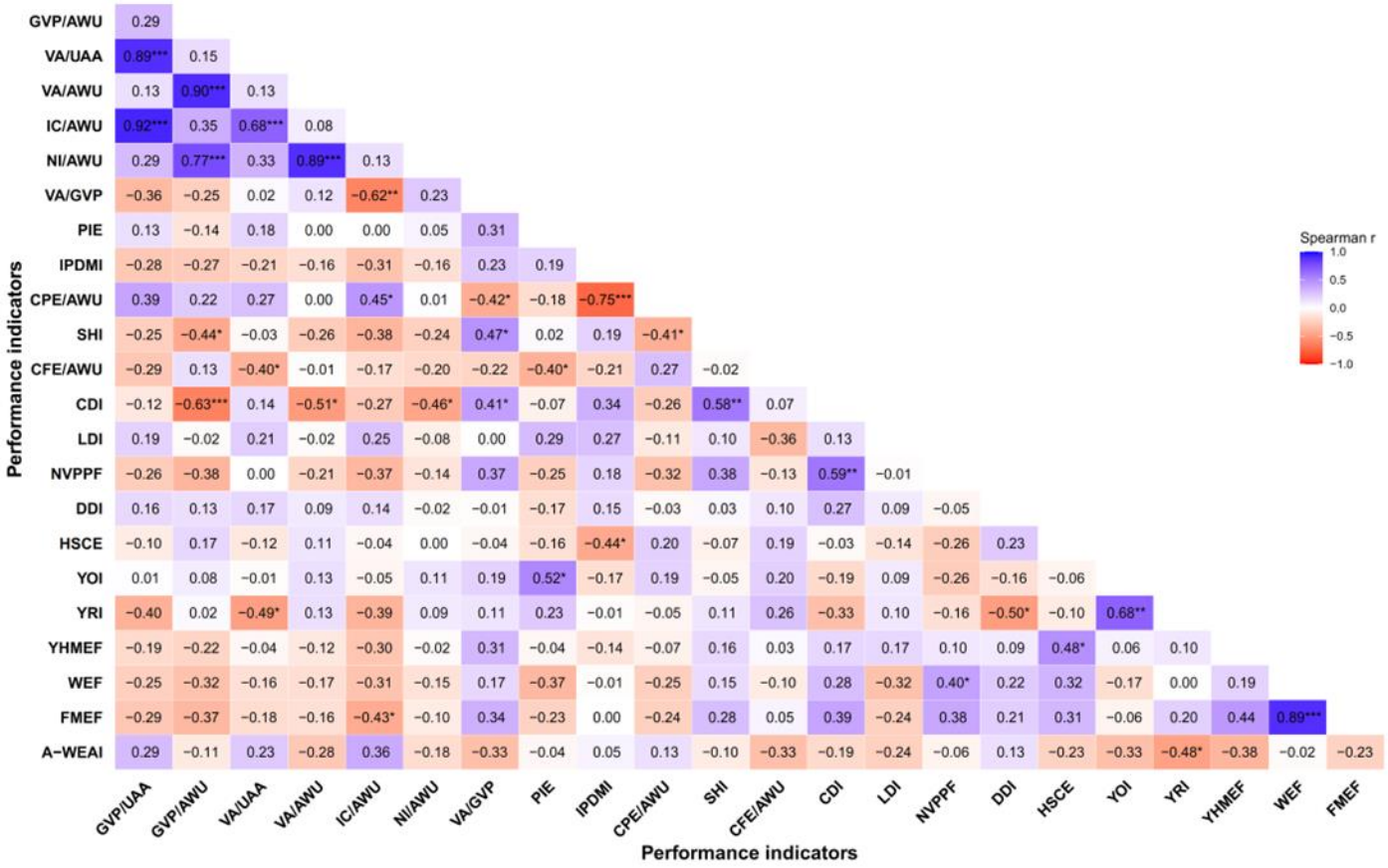

Figure S4. Correlation matrix between performance indicator scores. Gross Value of Production per Utilized Agricultural Area (GVP/UAA), Gross Value of Production per Agricultural Work Unit (GVP/AWU), Net Value Added per Utilized Agricultural Area (VA/UAA), Net Value Added per Agricultural Work Unit (VA/AWU), Intermediate Consumption per Agricultural Work Unit (IC/AWU), Net Income per Agricultural Work Unit (NI/AWU), Production System Autonomy (VA/GVP), Perceived Income Evolution (PIE), Integrated Pest and Disease Management Index (IPDMI), Chemical Pesticide Expenditure per Agricultural Work Unit (CPE/AWU), Soil Health Index (SHI), Chemical Fertilizer Expenditure per Agricultural Work Unit (CFE/AWU), Crop Di-versity Index (CDI), Livestock Diversity Index (LDI), Natural Vegetation and Pollinator Presence on Farm (NVPPF), Dietary Diversity Index (DDI), Household Food Self-Consumption Expenditure per Person (HSCE), Youth Opportunity Index (YOI), Youth Retention Index (YRI), Young Household Members Employed on the Farm (YHMEF), Women Employed on the Farm (WEF), Family Members Employed on the Farm (FMEF), and Abbreviated Women's Empowerment in Agriculture Index (A-WEAI). Colors indicate correlation strength and direction (red = negative, blue = positive). *Significant ($p < 0.05$), **Very significant ($p < 0.01$), ***Highly significant ($p < 0.001$).

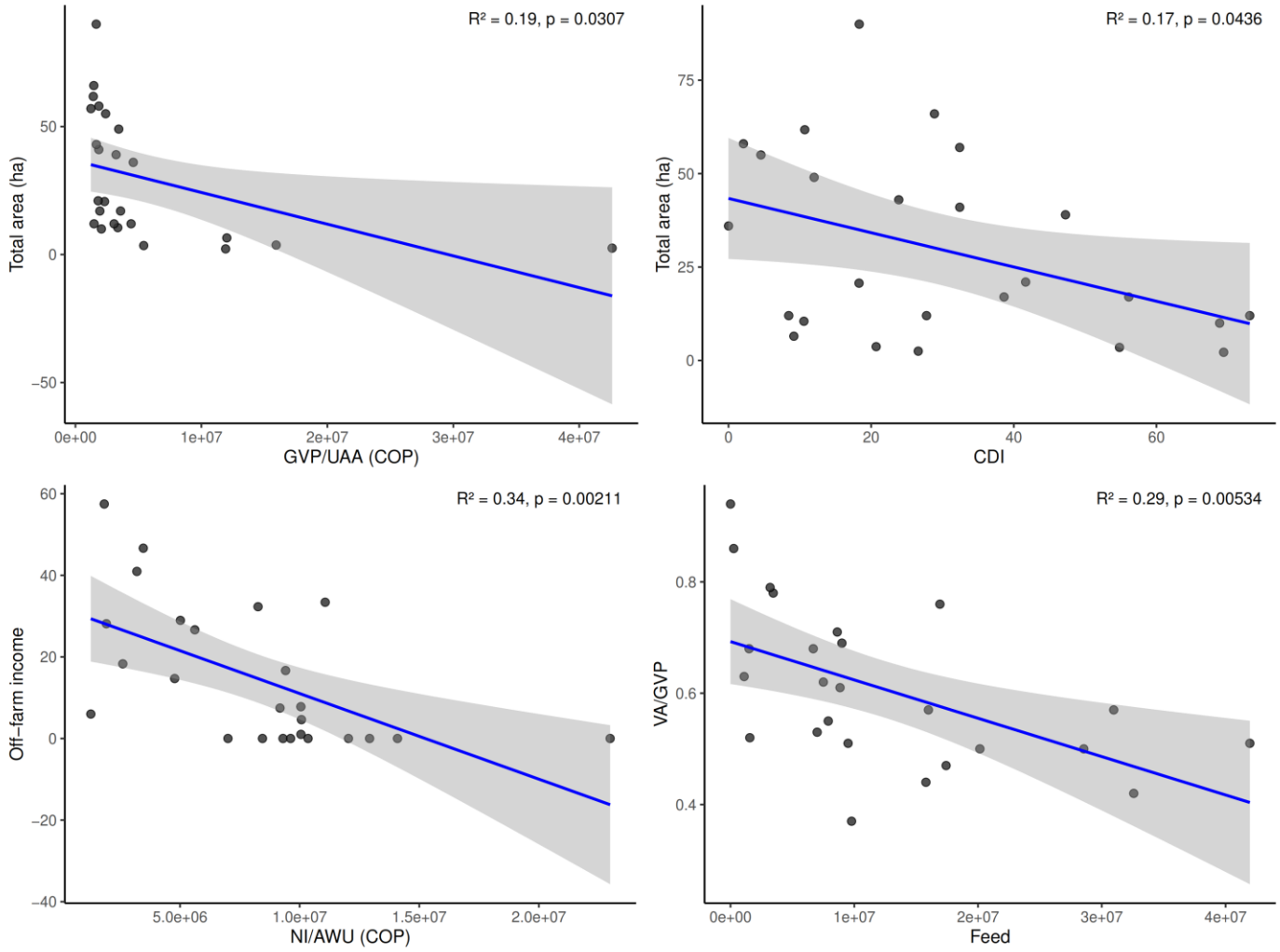

Figure S5. Linear regressions between structural farm characteristics and economic and environmental indicators in the Andean–Amazon transition zone, Caquetá, Colombia. The plots show the relationships of farm size (Total area, ha) with productivity per hectare (GVP/UAA, COP) and crop diversity (CDI), off-farm income (%) with net on-farm income per agricultural work unit (NI/AWU, COP), and feed expenditure (COP) with productive autonomy (VA/GVP). Regression lines were fitted using ordinary least-squares models. Coefficients of determination (R^2) and *p*-values are indicated for each model ($n = 25$).

Supplementary tables

Table S1. Variables used for the characterization of production systems.

Type of variable	Variable	Unit	Description
Land use	Crops	Proportion (%)	Proportion of the farm area dedicated to crops relative to the total farm area
	Pastures	Proportion (%)	Proportion of the farm area allocated to pastures relative to the total farm area
	Secondary forest	Proportion (%)	Proportion of the farm area covered by secondary forests relative to the total farm area
	Old-growth forests	Proportion (%)	Proportion of the farm area covered by old-growth forests relative to the total farm area
	Other areas	Proportion (%)	Proportion of the farm area allocated to other areas (wetlands, lakes, lagoons, etc.) relative to the total farm area
	Total area	Hectare (ha)	Total farm area
Gross Value of Production (GVP)*	GVP Livestock	Proportion (%)	Share of the gross value of livestock production (COP) relative to the total gross value of all farm production activities (COP)
	GVP Aquaculture	Proportion (%)	Share of the gross value of aquaculture production (COP) relative to the total gross value of all farm production activities (COP)
	GVP Poultry	Proportion (%)	Share of the gross value of poultry production (COP) relative to the total gross value of all farm production activities (COP)
	GVP Pig farming	Proportion (%)	Share of the gross value of pig production (COP) relative to the total gross value of all farm production activities (COP)
	GVP Other animals	Proportion (%)	Share of the gross value of other animal production (COP) relative to the total gross value of all farm production activities (COP)
	GVP Copoazú cultivation	Proportion (%)	Share of the gross value of copoazú crop production (COP) relative to the total gross value of all farm production activities (COP)
	GVP Cacao cultivation	Proportion (%)	Share of the gross value of cacao crop production (COP) relative to the total gross value of all farm production activities (COP)
	GVP Forest species	Proportion (%)	Share of the gross value of forest species production (COP) relative to the total gross value of all farm production activities (COP)
	GVP Other crops	Proportion (%)	Share of the gross value of other crops production (COP) relative to the total gross value of all farm production activities (COP)
Inputs*	Seeds	COP	Expenditure on seeds (COP)
	Fertilizers	COP	Expenditure on fertilizers (COP)
	Pesticides	COP	Expenditure on pesticides (COP)
	Feed	COP	Expenditure on feed (COP)
	Veterinary services	COP	Expenditure on veterinary services (COP)

	Machinery, equipment, and maintenance	COP	Expenditure on machinery, equipment, and maintenance (COP)
	Fuel	COP	Expenditure on fuel (COP)
	Energy	COP	Expenditure on energy (COP)
Labor*	Off-farm income	Proportion (%)	Ratio between the total off-farm income of the household (COP) and the total household income (off-farm + gross value of production) (COP)
	Family labor	Proportion (%)	Ratio between the number of family members working on the farm and the total number of people working on the farm

* Estimates from the most recent production year.

Table S2. Socio-productive characterization (mean ± standard error) of four farm typologies in the Andean–Amazon transition zone, Caquetá, Colombia.

Type of variable	Variable	LCLF	MLF	FCF	MFF
Land use	Crops (%)	8.16±2.75	5.53±1.72	8.91±2.05	69.13±12.94
	Pastures (%)	68.93±8.43	65.04±5.45	64.19±6.97	5.05±2.54
	Secondary forest (%)	5.65±2.62	13.06±4.59	15.99±5.44	13.97±8.33
	Old-growth forests (%)	14.52±5.19	11.41±3.77	8.01±2.66	10.94±7.80
	Other areas (%)	2.73±1.12	4.97±1.44	2.90±1.50	0.91±0.21
	Total area (ha)	57.95±9.19	29.24±11.11	26.57±6.66	8.94±2.74
Gross Value of Production (GVP)	GVP Livestock (%)	69.53±6.06	28.86±4.34	72.14±5.06	0.00±0.00
	GVP Aquaculture (%)	6.74±3.49	21.83±12.39	1.75±0.91	0.77±0.64
	GVP Poultry (%)	6.87±2.82	21.39±10.86	9.14±2.66	32.66±6.16
	GVP Pig farming (%)	4.71±3.49	22.46±13.11	3.07±2.11	17.71±10.88
	GVP Other animals (%)	0.64±0.45	0.00±0.00	0.88±0.76	2.14±1.05
	GVP Copoazú cultivation (%)	0.00±0.00	0.00±0.00	0.21±0.07	3.30±1.46
	GVP Cacao cultivation (%)	2.62±2.38	0.00±0.00	5.06±3.61	0.48±0.19
	GVP Forest species (%)	0.46±0.17	0.76±0.22	0.63±0.18	13.96±8.16
	GVP Other crops (%)	8.43±3.69	4.70±1.41	7.12±1.80	28.98±12.12
Inputs	Seeds (COP)	1,960,400±578,215	245,000±105,000	360,200±135,044	0.00±0.00
	Fertilizers (COP)	1,260,000±427,317	200,000±91,000	86,200±52,783	56,000±15,708
	Pesticides (COP)	4,092,000±1,151,491	1,159,500±594,905	1,246,900±315,200	237,400±73,168
	Feed (COP)	12,066,400±2,518,031	26,874,800±4,819,830	9,364,800±2,995,792	3,571,200±1,959,058
	Veterinary services (COP)	8,179,200±1,598,612	2,754,800±294,046	2,110,600±406,629	157,000±59,110
	Machinery, equipment, and maintenance (COP)	2,020,000±536,097	604,000±201,534	818,500±242,308	132,000±29,394
	Fuel (COP)	1,754,800±231,082	1,055,200±183,487	889,200±175,544	392,400±99,981
	Energy (COP)	384,000±108,333	580,000±72,938	199,200±73,587	266,400±81,246
Labor	Off-farm income (%)	5.99±2.76	0.20±0.12	17.26±6.01	33.48±4.94
	Family labor (%)	83.52±4.44	90.19±3.53	95.64±1.15	100.00±0.00

Large Crop-Livestock Farms (LCLF), Mixed Livestock Farms (MLF), Family Cattle Farms (FCF), and Mixed Family Farms (MFF). COP = Colombian Pesos.

Table S3. Correlation matrix among the 10 elements of agroecology in farms the Colombian Andean–Amazon Transition Zone.

	Div	Syn	Eff	Rec	Res	CFT	CKS	HSV	CSE
Syn	0.79***								
Eff	0.65***	0.70***							
Rec	0.75***	0.69***	0.64***						
Res	0.63***	0.40*	0.43*	0.61**					
CFT	0.67***	0.63***	0.67***	0.60**	0.30				
CKS	0.34	0.33	0.53**	0.33	0.37	0.36			
HSV	0.23	0.16	0.29	0.33	0.24	0.19	0.56**		
CSE	0.66***	0.52**	0.54**	0.64***	0.54**	0.47*	0.59**	0.48*	
RG	0.27	0.33	0.53**	0.23	0.25	0.36	0.70***	0.70***	0.56**

Diversity (Div), Synergies (Syn), Efficiency (Eff), Recycling (Rec), Resilience (Res), Culture and Food Traditions (CFT), Co-creation and Knowledge Sharing (CKS), Human and Social Values (HSV), Circular and Solidarity Economy (CSE), and Responsible Governance (RG). *Significant ($p < 0.05$), **Highly significant ($p < 0.01$), ***Very highly significant ($p < 0.001$).

Table S4. Correlation matrix between the 10 elements of agroecology and the overall agroecological transition (CAET) for the different identified farm types.

Farm typology	Div	Syn	Eff	Rec	Res	CFT	CKS	HSV	CSE	RG
LCLF	0.67	0.36	0.97**	0.87	0.90	0.74	0.67	0.36	0.58	0.45
MLF	0.87	0.60	0.72	0.97**	0.67	0.58	0.46	0.70	0.40	0.47
FCF	0.60	0.79**	0.91***	0.58	0.42	0.74*	0.61	0.29	0.68*	0.84**
MFF	0.82	0.67	0.95*	0.22	0.82	0.29	0.72	0.70	0.97**	0.82
Total	0.78***	0.75***	0.83***	0.75***	0.63***	0.68***	0.72***	0.56**	0.81***	0.70***

Large Crop-Livestock Farms (LCLF), Mixed Livestock Farms (MLF), Family Cattle Farms (FCF), and Mixed Family Farms (MFF). Diversity (Div), Synergies (Syn), Efficiency (Eff), Recycling (Rec), Resilience (Res), Culture and Food Traditions (CFT), Co-creation and Knowledge Sharing (CKS), Human and Social Values (HSV), Circular and Solidarity Economy (CSE), and Responsible Governance (RG). *Significant ($p < 0.05$), **Highly significant ($p < 0.01$), ***Very highly significant ($p < 0.001$).

Questionnaires

Questionnaire S1. Step 0. Survey for the Basic Characterization of the Household and the Farm.

1.- Name of the Enumerator	
2.- Country	
3.- Department	
4.- Municipality	
5.- Community (hamlet/village)	
6.- Coordinates of the dwelling	
7.- Type of production system	a) Agriculture b) Agriculture/Livestock c) Agroforestry
8.- Name of the assessed system (farm)	
9.- Altitude (m a.s.l.)	
10.- Drought months in the previous year	
11.- Total area under production (ha) and by production type	a) Crops: b) Animals/pastures: c) Old-growth Forests: d) Secondary vegetation: e) Other land covers:
12.- Producer's name + User code	
13.- Producer's contact number	

14- How many people live in the household? Indicate ages of household members.

Men (>35 years old)		
Women (>35 years old)		
Young men (15–34 years old)		
Young women (15–34 years old)		
Boys		
Girls		

15.- How many of them work in the assessed agricultural production system?

Men (>35 years old)	
Women (>35 years old)	
Young men (15–34 years old)	
Young women (15–34 years old)	
Boys	
Girls	

16.- ¿What are the productive agricultural outputs? Select as many as necessary.

Mark with an X	Productive agricultural outputs
	Crops and crop products
	Animals (including fish) and animal products
	Timber trees
	Fruit trees
	Non-timber forest products
	Other

17.- What is the main intended destination of the agricultural production?

Mark with an X	Destination	
	Sale	
	Mostly sale and a small part of self-consumption	
	Equally sale and self-consumption	
	Mostly self-consumption and a small part of sale	
	Self-consumption	

Questionnaire S2. Step 1. Survey for the Characterization of the Agroecological Transition (CAET).

Element	Index	0	1	2	3	4
DIVERSITY	Crops	Monoculture (or no crops cultivated).	A single crop covering more than 80% of the cultivated area, and/or the presence of a few scattered crop individuals (e.g., as typically observed in abandoned or degraded plots).	Two or three crops occupying a significant proportion of the farm area.	More than three crops well adapted to local and changing climatic conditions.	More than three crops and varieties adapted to local conditions, with the farm spatially diversified through associated, mixed, or intercropping practices.
	Animals (including fish and insects)	No animals are raised.	Only one species is raised.	One or two species with a significant number of individuals, complemented by one or two additional species with lower representation. At least two species must have a meaningful population size.	A substantial number of animals of different breeds and species, well adapted to local conditions.	A large number of animals of diverse breeds and species, well adapted to local and changing climatic conditions, with functional integration among themselves and within the agroecosystem.
	Trees (and other perennials)	No tree cover or other perennial plants; bare areas or areas dominated by pastures.	Less than 10% cover with forest or perennial species associated with productive systems.	At least 30% cover with forest or perennial species associated with productive systems.	Between 30% and 80% cover with forest or perennial species associated with productive systems.	More than 80% cover with forest or perennial species associated with productive systems.
	Diversity of activities, products and services	Only one productive activity (e.g., commercialization of a single crop).	Two or three productive activities (e.g., commercialization of two crops, or one crop combined with the raising of a single animal species).	More than three productive activities.	More than three productive activities complemented by at least one service (e.g., on-farm product processing, ecotourism, transport of agricultural products, training, among others).	More than three productive activities accompanied by multiple services.

Element	Index	0	1	2	3	4
SINERGIAS	Crop–livestock integration	No integration: animals depend entirely on external inputs for feeding and do not generate synergies with the agroecosystem; or no animals are present on the farm.	Low integration: animals are primarily fed with external inputs, and part of their manure is used as fertilizer.	Medium integration: animals are mainly fed with on-farm resources and/or grazing, and part of their manure is recycled as fertilizer.	High integration: animals are predominantly fed with on-farm by-products, residues, and crops. In addition to manure recycling, they provide at least one additional service.	Complete integration: animals are exclusively fed with on-farm by-products, residues, and crops. All manure is recycled as fertilizer, they provide multiple services (e.g., food, products, traction), and domesticated pollinators are integrated into the system.
	Soil–plant system management	Soil is completely bare, with no intercropping, crop rotations, or rotational grazing systems. Severe biological, chemical, or mechanical disturbance is evident.	Only a small portion of the soil is covered with residues or live cover. The majority of crops (>80%) are grown under continuous monoculture or with non-rotational grazing.	A considerable share of the soil is covered with residues or live cover. Some crops are rotated or intercropped, and rotational grazing may be partially applied.	A large proportion of the soil is protected with residues or live cover. Crops are regularly rotated, intercropped, or managed under systematic rotational grazing, reducing soil disturbance.	All soil is covered with residues or live cover. Crop rotation and intercropping are common practices, as is systematic rotational grazing. Soil disturbance is minimal or absent, with significant improvement in soil properties.
	Tree integration (agroforestry, silvopastoralism, agrosilvopastoralism)	No integration: trees and other perennials play no role in supporting human needs or agricultural/livestock production.	Low integration: a small number of trees and perennials provide only one product (e.g., fruits, timber, forage, medicinal plants, or biopesticides) or one service (e.g., shade for animals, soil fertility improvement, water retention, or erosion control).	Medium integration: a significant number of trees and perennials provide at least one product or service that supports agricultural or livestock activities.	High integration: a considerable number of trees and perennials deliver multiple products and services that benefit both crops and livestock.	Complete integration: a large number of trees and perennials provide a broad diversity of products and services, contributing integrally to the sustainability of the agricultural/livestock system.
	Connectivity between elements of the agroecosystem and the landscape	No connectivity: the agroecosystem displays high uniformity both within and around it, with no semi-natural habitats or ecological compensation areas.	Low connectivity: the agroecosystem contains some isolated elements, such as trees, shrubs, live fences, ponds, or small ecological compensation areas, but these do not generate meaningful connections.	Medium connectivity: more than 50% of elements are connected or adjacent to crops, pastures, or large ecological compensation areas, creating moderate interaction within the agroecosystem.	Significant connectivity: more than 80% of elements are interconnected across crop and/or pasture plots, or within ecological compensation areas that include trees, shrubs, natural vegetation, pastures, canals, and other features.	High connectivity: the agroecosystem forms a mosaic and diversified landscape, where numerous elements such as trees, shrubs, live fences, and ponds are distributed across crop plots, pastures, and multiple ecological compensation areas, resulting in full ecological integration.

Element	Index	0	1	2	3	4
SYNERGIES	Use of external inputs	All inputs are purchased from the market.	The vast majority (>80%) of inputs are purchased externally.	Approximately half of the inputs are produced within the farm or agroecosystem, or obtained through exchange with other community members.	Most inputs (>80%) are produced within the farm or agroecosystem, or exchanged with other community members.	All inputs are self-produced within the farm or agroecosystem, or secured through exchanges with other community members.
	Ecological management of soil fertility	Synthetic fertilizers are applied regularly across all crops and/or pastures. In cases of lack of access, no fertilizers are used and no alternative management practices are implemented.	Synthetic fertilizers are applied regularly (>50% of applications) in most crops. Some organic practices, such as the use of manure or compost, are applied in a complementary manner in certain crops and/or pastures.	Synthetic fertilizers are used only in a few specific crops (<50%), while the remaining crops and/or pastures are managed with organic practices.	Synthetic fertilizers are applied in a very limited way (<20% of applications). Organic practices predominate and are the standard in soil fertility management.	No synthetic fertilizers are used. Soil fertility is managed exclusively through a wide range of organic practices.
	Ecological management of pests and diseases	Chemical pesticides and veterinary drugs are used regularly for pest and disease management, without implementing any alternative system.	Chemical pesticides and veterinary drugs are applied only in a specific crop or animal. Some biological substances and organic practices are used sporadically in more than 50% of applications.	Pests and diseases are managed mainly through organic practices, while chemical pesticides are applied only in very specific and limited cases.	No chemical pesticides or veterinary drugs are used. Pest and disease management relies predominantly on biological substances.	No chemical pesticides or veterinary drugs are used. Pests and diseases are managed exclusively through a combination of biological substances and a wide range of preventive measures.
	Productivity and household needs	Household needs are not met, neither in terms of food nor other essential items.	Production covers only the household's food needs, without generating surpluses for additional income.	Production covers household food needs, and surpluses generate income to acquire essential goods, though insufficient for savings.	Production satisfies household food needs, and surpluses provide sufficient income to acquire essential goods and enable occasional savings.	All household needs are fully met, both in food and in income to purchase essential goods and maintain regular savings.

Element	Index	0	1	2	3	4
RECYCLING	Recycling of biomass and nutrients	Residues and by-products are not recycled; they are left to decompose, burned, or buried. Large amounts of waste are disposed of unsustainably through dumping, burning, or burial.	Only a small part of residues and by-products is recycled. For example, some crop residues are used as animal feed, manure is applied as fertilizer, or compost is made from household waste. However, most waste is still dumped, burned, or buried.	More than half of the residues and by-products are recycled, although some waste is still dumped or burned.	The majority (>80%) of residues and by-products are recycled. Only a small portion of waste is eliminated through dumping or burning.	All residues and by-products are fully recycled. No waste is dumped, burned, or buried.
	Water conservation and saving	No facilities or techniques for water harvesting or saving are implemented.	A single type of facility exists for water harvesting (e.g., rainwater collection) or for water saving (e.g., drip irrigation or storage tanks).	One facility for water harvesting or saving is complemented by a practice to limit water use (e.g., irrigation scheduling, live cover, or water reservoirs).	One facility for water harvesting or saving is accompanied by several practices that contribute to reducing water use.	Multiple facilities for water harvesting or saving are available, combined with diverse practices to optimize and limit water consumption.
	Management of seeds and breeds	All seeds and/or zoogenetic resources (e.g., young animals, semen, eggs, larvae, genetic material) are acquired exclusively from the market.	More than 80% of seeds and zoogenetic resources are purchased from the market, with little or no self-production or exchange.	Approximately half of the seeds and zoogenetic resources come from self-production or exchanges with other farmers, while the other half are purchased from the market. In the case of breeding, about half is carried out in collaboration with neighboring farms.	The majority (>80%) of seeds and zoogenetic resources are self-produced or obtained through exchange. Only a small proportion (<20%) is purchased from the market.	All seeds and zoogenetic resources come from self-production, exchange with other farmers, or collective management, ensuring sufficient renewal and diversity within production systems.
	Renewable energy (use and production)	No renewable energy is used or produced.	Most of the energy used is purchased from the market, while a small proportion comes from self-produced sources such as solar, animal traction, wind, hydraulic turbines, Pelton wheels, biogas, or firewood.	Approximately half of the energy used is self-produced, while the other half is purchased from the market.	A significant share of the energy used comes from renewable sources, with negligible reliance on fossil fuels and other non-renewable sources.	All energy used is renewable or self-produced. The household is fully self-sufficient in energy supply, which is guaranteed at all times. The use of fossil fuels is practically nonexistent.

Element	Index	0	1	2	3	4
RESILIENCE	Stability of production and capacity to withstand perturbations	Constant decrease of income over time, with very high fluctuations in production from year to year and no capacity to recover after shocks or disturbances.	Decreasing trend of income and production over time (with the same amount of inputs), with significant fluctuations and low capacity to recover after shocks.	Moderate stability of income and production over time (with the same amount of inputs), with some fluctuations and medium capacity to recover after shocks.	High stability of income and production over time (with the same amount of inputs), with few fluctuations and good capacity to recover after shocks.	Very high stability of income and production over time, with minimal year-to-year fluctuations and excellent capacity to withstand shocks and recover rapidly after disturbances.
	Mechanisms to reduce vulnerability (with gender perspective)	No access to credit, insurance, or community support mechanisms.	The community provides very limited support, with very low capacity to help after crises. In addition, access to credit and insurance is complicated or practically non-existent.	The community offers some support, but its capacity to help after crises is limited. Access to credit is available but difficult to obtain, and insurance is rare and does not fully cover risks.	The community provides significant support to both men and women, although its capacity to help after crises remains limited. Access to credit is available and insurance provides partial coverage for risks or specific products.	The community provides strong support to both men and women, with high capacity to assist after crises. Access to credit is almost guaranteed and insurance covers most of the production and associated risks.
	Environmental resilience and adaptive capacity to climate change	The local environment is highly vulnerable to climate shocks, and the system has a very limited capacity to adapt to climate change.	The local environment experiences frequent climate shocks, and the system has a low capacity to adapt to climate change.	The local environment may face climate shocks, but the system has a moderate capacity to adapt to climate change.	The local environment may experience occasional climate shocks, but the system has a high capacity to adapt effectively to climate change.	The local environment is supported by a strong natural capital base, climate shocks are infrequent, and the system has an excellent capacity to adapt to climate change.
	Diversity	This index corresponds to the average score of the sub-indices under the element Diversity.				
	Indebtedness	Debt levels far exceed the producer's income.	Debt amounts to more than half of the income and poses significant difficulties for repayment.	Debt represents approximately half of the producer's income.	Debt is minimal and does not represent a concern for the producer.	The producer has no debt.

Element	Index	0	1	2	3	4
HUMAN AND SOCIAL VALUES	Women's empowerment	Women have no participation in decision-making, neither within the household nor in the community. No organizations exist for women's empowerment.	Women have some voice in household decisions but not in the community. Women's associations may exist, though their functioning is limited or inefficient.	Women influence decisions both in the household and in the community, but do not make final decisions nor have full access to resources. Some women's associations exist but are not fully functional.	Women actively participate in decision-making processes, although their access to resources is still partial. Women's associations are present and used, but not fully leveraged.	Women are fully empowered, with active participation in decision-making and complete access to resources. Functional and operational women's associations exist within the community.
	Labour (productive conditions and social inequalities)	Agricultural production is managed by agribusinesses, with a marked social and economic gap between landowners and workers. Working conditions are precarious, with low wages and high exposure to risks.	Working conditions are harsh; workers receive average wages according to the local context and face potential risks.	Agricultural production is mainly led by family farmers, but producers have limited access to capital and decision-making processes. Workers have only the minimum labor conditions.	Agricultural production is managed by family farmers, where both men and women have access to capital and participate in decision-making processes. Working conditions are decent and dignified for workers.	Agricultural production is labor-intensive and managed by family farmers with full access to capital and gender-equitable participation in decision-making. There is social and economic proximity between farmers and workers, and labor conditions are dignified, with fair remuneration and stability.
	Youth empowerment and emigration	Young people see no future in agriculture and are eager to emigrate if given the opportunity.	The majority of young people consider agriculture too difficult, and many would like to emigrate if they could.	Despite difficult working conditions, most young people do not wish to emigrate. They prefer to improve their livelihoods and the conditions of their community.	The majority of young people, both men and women, are satisfied with agricultural work and do not wish to emigrate, even if they had the opportunity.	Young people (both men and women) see their future in agriculture, with enthusiasm to continue and improve their parents' activity. They participate in decision-making and are actively involved in the co-creation and sharing of knowledge.
	Animal welfare [if applicable]	Animals suffer from hunger, thirst, stress, and diseases throughout the year. They are slaughtered without measures to avoid unnecessary pain (not in a certified slaughterhouse) and lack adequate spaces or conditions for their welfare.	Animals suffer from hunger and thirst periodically or seasonally, in addition to stress or diseases, and are slaughtered without minimizing unnecessary pain.	Animals do not suffer from hunger or thirst, but they experience stress, are prone to diseases, and may endure pain during slaughter.	Animals do not suffer from hunger, thirst, or diseases, although they may experience some stress, especially at the time of slaughter.	Animals do not suffer from stress, hunger, thirst, pain, or diseases and are slaughtered under measures that guarantee the absence of unnecessary suffering.

Element	Index	0	1	2	3	4
CULTURE AND FOOD TRADITIONS	Appropriate diet and nutrition awareness	The household eats at least twice a day, with a limited diet based on carbohydrates and cereals acquired externally, reflecting food insecurity.	The household eats three times a day, with a diet based on carbohydrates, cereals, grains, and a limited source of protein, all acquired externally. Dietary diversity remains low.	The household eats three times a day, with a diet that includes carbohydrates, cereals, proteins, grains, and vegetables. Around 20% of the food is harvested on the farm.	The household eats three times a day, with a diversified diet that includes a variety of carbohydrates, cereals, proteins, grains, vegetables, and fruits. About 50% of the food comes from the farm.	The household eats three times a day, with a healthy and diversified diet including cereals, proteins, carbohydrates, vegetables, and fruits. Around 80% of the food is sustainably harvested from the farm.
	Traditional identity and awareness (peasant/indigenous)	No local or traditional (peasant or indigenous) identity is perceived.	Very limited awareness of local or traditional identity.	Local or traditional identity is partially recognized, restricted to certain aspects or household members.	Good knowledge of and respect for local or traditional identity, as well as for traditions and rituals in general.	Local or traditional identity is deeply valued and protected, with high respect for traditions and/or rituals.
	Use of local varieties/breeds and traditional knowledge in food preparation	No local varieties or breeds are used, nor is traditional knowledge applied in food preparation.	Most of the varieties or breeds consumed are exotic or introduced, and traditional knowledge and practices are used only in a limited way for food preparation.	Both local and exotic/introduced varieties or breeds are produced and consumed. Traditional knowledge and practices are identified but not always applied in food preparation.	The majority of food consumed comes from local varieties or breeds, and traditional knowledge and practices are regularly implemented in food preparation.	A wide diversity of local varieties or breeds is produced and consumed. Traditional knowledge and practices are fully identified, applied, and officially recognized in formal contexts and specific events.

Element	Index	0	1	2	3	4
CO-CREATION AND SHARING OF KNOWLEDGE	Platforms for horizontal co-creation and transfer of knowledge and good practices	No platforms are available for the co-creation and transfer of knowledge targeting producers.	At least one platform for co-creation and transfer of knowledge exists, but its functioning is poor and/or not applied in practice.	At least one platform for co-creation and transfer of knowledge exists and functions, but its scope does not specifically include the dissemination of agroecological knowledge.	One or more functioning platforms exist for the co-creation and transfer of knowledge, used to share information on agroecology, with inclusion of women.	Several well-established platforms are fully operational for the co-creation and transfer of knowledge, widely accessible and disseminated within the community, including women.
	Access to agroecological knowledge and producers' interest in agroecology	Producers have no access to agroecological knowledge, and the principles of agroecology are completely unknown to them.	The principles of agroecology are largely unknown to producers and/or there is little confidence in initiating a transition towards agroecological practices.	Producers are familiar with some agroecological principles and show interest in spreading innovations, promoting knowledge exchange within and between communities, including	Agroecology is widely known and producers are motivated to implement innovations. This facilitates knowledge sharing within and between communities and actively includes younger	Access to agroecological knowledge is widespread among both men and women. Producers have a deep understanding of agroecological principles, are eager to apply them, and actively promote knowledge sharing within and between communities,

				younger generations.	generations, including women.	involving younger generations.
	Participation of producers in networks and grassroots organizations	Producers are isolated, have no or very limited relations with their local community, and do not participate in meetings or grassroots organizations. No knowledge exchange takes place.	Producers maintain sporadic relations with their local community and rarely participate in meetings or grassroots organizations. Knowledge exchange is minimal.	Producers have moderate relations with their local community and occasionally participate in events of their grassroots organizations. There is good knowledge exchange, including women's participation.	Producers are well connected with their local community and frequently participate in events of their grassroots organizations, fostering good knowledge exchange and promoting women's inclusion.	Producers, with equal participation of men and women, are highly interconnected and supportive, showing strong commitment and active participation in all events of their local community and grassroots organizations. Knowledge exchange is broad, well received, and strongly supported.

Element	Index	0	1	2	3	4
CIRCULAR AND SOLIDARITY ECONOMY	Products and services commercialized locally	No products or services are commercialized in the local market, either due to insufficient surplus production or the absence of a local market.	Local markets exist, but only a small share of products or services is commercialized locally, while most are destined for other markets or not commercialized at all.	Local markets are established and some products or services begin to be commercialized locally, though they do not yet represent a significant proportion of total production.	The majority of products and services produced are commercialized in the local market, contributing significantly to the local economy.	All products and services are commercialized locally, strengthening economic self-sufficiency and community development.
	Producer networks, consumer relations, and presence of intermediaries	No producer networks for agricultural commercialization exist. There is no direct relationship with consumers, and intermediaries control the entire commercialization process.	Producer networks exist but function poorly. Consumer relations are limited, and intermediaries manage most of the commercialization process.	Producer networks are operational and include women. Some direct relationship with consumers exists, although intermediaries still manage part of the commercialization process.	Producer networks are functional and actively include women. They maintain a direct relationship with consumers, although intermediaries still intervene in part of the process.	Producer networks are well established, fully operational, and feature equal participation of women. There is a strong and stable relationship with consumers, with no need for intermediaries.
	Local food system	The community depends entirely on external sources for food supply, agricultural inputs, commercialization, and processing. There is no circular economy or solidarity within the community.	Most food and agricultural inputs are purchased outside the community, and products are processed and commercialized externally. There is very little exchange of goods and services among local producers, with minimal complementarity.	Approximately half of the food and agricultural inputs come from external sources, while products are processed locally. Some goods and services are exchanged among producers through solidarity schemes.	A good balance exists between food and input supply from local and external sources. Products are processed locally, and there is a regular level of solidarity-based exchange of goods and services among local producers, fostering a circular economy.	The community is almost completely self-sufficient in agricultural and food production. There is a high level of complementarity, circular economy, and solidarity, with significant exchange of products and services among local producers.

Element	Index	0	1	2	3	4
RESPONSIBLE GOVERNANCE	Empowerment and social justice of producers	Producers' rights are not respected. They lack bargaining power and do not have the means to improve their livelihoods or develop their skills. They receive no support to overcome community challenges.	Producers' rights are recognized but not always respected. They have little bargaining power and limited resources to improve their livelihoods or develop skills.	Producers' rights, for both men and women, are recognized and respected. Although bargaining power is low, they are occasionally encouraged to improve their livelihoods and develop skills.	Producers' rights are recognized and respected for both men and women. They have the capacity and resources to improve their livelihoods and are sometimes encouraged to develop their skills.	Producers' rights are fully recognized and respected for both men and women. They are empowered, have the resources and capacity to improve their livelihoods, continuously develop their skills, and are encouraged to address community challenges.
	Producers' organizations and associations	Cooperation among producers is nonexistent, opaque, or influenced by corrupt practices. No organizations exist that fairly distribute benefits or provide meaningful support to producers.	A producer organization exists but plays only a limited role, restricted to providing market access, without fostering values of cooperation or solidarity among its members.	A producer organization provides market access and additional services such as capacity development, information, and some incentives. Although it fosters some social values, its overall impact remains limited.	A transparent producer organization promotes gender equality, ensuring equitable access to markets and other services for both men and women alike.	Several well-structured and operational organizations ensure equitable access to markets and diverse services, strengthen cooperation, promote community values, and guarantee equal participation of men and women.
	Producers' participation in the governance of land and natural resources	Producers are completely excluded from the governance of land and natural resources, with no possibility of participating in decision-making. Gender equity is not respected.	Producers have only nominal participation in the governance of land and natural resources, facing serious limitations to influence decisions. Gender equity is partially respected.	Mechanisms exist that allow producers to participate in the governance of land and natural resources, although their functionality is limited. Gender equity is mostly respected, but with areas for improvement.	Producers actively participate in the governance of land and natural resources, with the capacity to influence decisions. Gender equity is respected in most cases.	Governance of land and natural resources is inclusive and equitable. Producers participate actively and meaningfully, and their needs are recognized and respected, ensuring a gender perspective throughout the decision-making process.

Questionnaire S3. Step 2. Survey for the Evaluation of Agroecological Performance.

Some sections of this step will request information on expenditures, revenues, or prices.

Please specify the currency in which these values will be expressed: _____

AGRICULTURAL BIODIVERSITY, INCOME AND PRODUCTIVITY

This part of the survey can be conducted through a farm walk or a combination of farm walk and household survey.

- OUTPUT AND INCOME

(Take as reference the last year of productive activity)

Crops and fruit trees

Production and sale of ANNUAL CROPS (maize, beans, sorghum, others), HORTICULTURAL PRODUCTS (tomato, cabbage, peppers, others), FRUIT TREES (oranges, mangoes, avocados, mandarins, guavas, others), MEDICINAL PLANTS (lemongrass, aloe vera, others), and OTHER items produced on the farm that are sold.

List the 20 most important crops or fruit trees. For each of them, specify:

Name of the crop species or type of crop	Total production (kg)	Quantity sold (kg)	Price at the gate (currency/kg)*	Quantity given for free (gift, present) (kg)	Land under production (ha)	Number of varieties/species produced

* "Price at the gate" refers to the farm-gate price, i.e. the sale price at the farm before any processing.

Vegetable and Forest Products

Production and sale of VEGETABLE PRODUCTS (all items processed on the farm, e.g., flour or flowers) and FOREST PRODUCTS (firewood, medicinal plants, etc.).

List the 20 most important vegetable or forest tree products. For each of them, specify:

Name of the vegetable or forest tree product	Unit of measure for this product (Kg; L; Number of; Other)*	Total production*	Quantity sold*	Price at the gate*	Quantity given for free

* Please specify the production and sale units (e.g., quintals, pounds, kg, bunches; if in bags, indicate the bag weight).

Natural Vegetation, Trees and Pollinators

Productive area covered by natural or diverse vegetation (natural pastures, grasslands, wildflower strips, stone or wood heaps, trees or hedgerows, natural ponds or wetlands, etc.). Consider communal land.

Mark only one:

	Abundant: more than 25% of the system is covered with natural or diverse vegetation
	Significant: at least 20% of the system is covered with natural or diverse vegetation
	Small: less than 10% of the system is covered with natural or diverse vegetation
	Absent: the area covered with natural or diverse vegetation is negligible

Beekeeping

Mark only one:

	Yes, bees are raised within the agroecosystem
	No, bees are not raised but are widespread within the agroecosystem
	No, bees are not raised and are rare within the agroecosystem

Presence of pollinators and other beneficial animals within the agroecosystem

Mark only one:

	Abundant
	Significant
	Little
	Absent

Animals

¿How do you feed your animals?

Mark only one:

	Mostly with feed
	Both with feed and on pasture
	Only on pasture

¿How many different animal species do you raise?

List the 20 most important animal types. For each of them, specify:

Name of the animal species*	Total number of animals of this species currently raised on the farm	Total number of animals of this species born during the last 12 months	Total number of animals of this species that died of natural causes during the last 12 months	Number of different breeds within this species	Number of animals sold	Average farm-gate price (currency/animal)	Number of animals given for free	Number of animals for self-consumption during the last 12 months

* Including domestic animals

Animal Products

¿How many different animal products do you produce?

List the 20 most important animal products. For each of them, specify:

Name of the animal product	Unit of measure for this product (Kg; L; Number of; Other)*	Total quantity produced*	Quantity sold*	Farm-gate price*	Quantity given for free*

* Please specify the production and sale units (e.g., quintals, pounds, kg, bunches; if in bags, indicate the bag weight).

Other activities/services related to agricultural production within the farm

¿How many other activities/services are you engaged in?

List the 20 most important activities/services related to agricultural production within the farm. For each of them, specify:

Name of the activity/service produced or provided	Total income

Other activities/services performed outside the farm

List the 20 most important activities/services performed outside the farm. For each of them, specify:

Name of the activity/service produced or provided*	Person	Time dedicated	Total income

* Example: labor sales (day wages, cooking, contracts), trading, land renting, other businesses, etc.

- EXPENDITURES FOR INPUTS

Take as reference the LAST YEAR of productive activity. Please express this value in the previously specified currency.

Total expenditures for FOOD for self-consumption: _____
Total expenditures for SEEDS: _____
Total expenditures for FERTILIZERS: _____
Total expenditures for FEED: _____
Total expenditures for VETERINARY SERVICES: _____
Total expenditures for LIVESTOCK PURCHASES: _____

¿How many external workers did you engage in agricultural production of the assessed system?

Total expenditures for FARM MANAGER: _____
Total expenditures for WOMEN day laborers: _____
Total expenditures for MEN day laborers: _____
Cost per day of day laborer: _____
Cost per month of farm manager: _____

Energy, Machinery and Maintenance

Take into account only ORDINARY EXPENSES during the last 12 months.

Total expenditures for MACHINERY/EQUIPMENT and MAINTENANCE: _____
(Please express this value in the previously specified currency)

¿How many different machines/equipment do you own?

List the 20 most important machines/equipment. For each of them, specify:

Name of the machinery/equipment	Quantity owned	Purchase price (per unit)	Years in use*	Planned years of further use (on average)

* Consider only large machinery

Total expenditures for FUEL: _____
Total expenditures for ENERGY: _____
Total expenditures for TRANSPORTATION: _____
Total expenditures for OTHER SERVICES (water, telephone, etc.): _____

- FINANCIAL INFORMATION

Take as reference the LAST YEAR of productive activity. Please express this value in the previously specified currency.

Total TAXES paid: _____
Total SUBSIDIES received: _____
Total INTEREST ON LOANS paid: _____
Total COST FOR RENTING LAND: _____

The essential share of household income comes from: (*Mark only one option*)

	Mainly from agricultural production
	Both from agricultural production and other external sources of income
	Mainly from external sources of income

Qualitative perception of income and expenditures

Take as reference the LAST YEAR of productive activity.

How do you compare your income compared to three years ago? (*Mark only one option*)

More income	
Same income	
Less income	

EXTRAORDINARY EXPENSES you had to pay during the last 12 months: _____

EXPOSURE TO PESTICIDES

Consider the LAST 12 MONTHS as the reference period.

¿How many different chemical pesticides have you used in the last 12 months of productive activity?

Consider all types of pesticides, including herbicides, insecticides, fungicides, and other similar substances.

List the 10 most important chemical pesticides used. For each of them, specify:

Name of the pesticide	Level of toxicity	Quantity of product used (l or g)	Area treated with the pesticide (ha)	¿On which crop?	¿For which pest?

When selecting the level of toxicity for each pesticide, please refer to the following table:

	CATEGORIES	SIGNAL WORD	ORAL LD50 (mg/kg)	DERMAL LC50 (mg/kg)	INHALATION LD50 (mg/L)
I	Extremely/Highly toxic	DANGER POISON / DANGER	0 a 50	0 a 200	0 a 0.2
II	Moderately toxic	WARNING	50 a 500	200 a 2000	0.2 a 2.0
III	Slightly toxic	CAUTION	500-5000	2000-20000	2.0 a 20

Total expenditure for chemical pesticides: _____

¿How many different organic pesticides have you used in the last 12 months of productive activity?

Consider all types of organic pesticides, including herbicides, insecticides, fungicides, and other similar (organic) substances.

List the 10 most important organic pesticides used. For each of them, specify:

Name of the organic pesticide	Source: ¿self-produced or purchased?	Quantity used (l or g)	Area treated with the pesticide (ha)

Total expenditure for organic pesticides: _____

Mitigation strategies when applying

Select as many as necessary:

	Mask
	Body protection (glasses, gloves, etc.)
	Special protection for women and children
	Visible danger signs after spraying
	Community informed of the danger
	Safe disposal of empty containers after use
	Other:
	None of these

Ecological management of pests

Select the techniques systematically applied within the assessed system.

Select as many as necessary:

	Cultural control (more resistant varieties are chosen for production; plants and fruits showing signs of disease are removed manually; crops are grown in crop rotation and intercropping schemes, etc.)
	Biological control
	Physical (mechanical) control
	Plantation of natural repelling plants
	Use of cover crops to increase biological interactions
	Favor the reproduction of beneficial organisms for biological control
	Favor biodiversity and spatial diversity within the agroecosystem
	Other:
	None of these

¿Which type of pesticides are more important for your production?

Mark only one option:

	Pesticide use is negligible (neither chemical nor organic), ecological management is more important
	Organic pesticides are more important
	Neither organic, nor chemical, nor ecological management
	Chemical and organic pesticides have the same importance
	Chemical pesticides are more important

¿Do you use antibiotics on your livestock?

Mark only one option:

	I do not use antibiotics at all
	For treatment of diseases only
	For prevention of diseases
	For both prevention of diseases and growth promotion
	For growth promotion

YOUTH EMPLOYMENT AND EMIGRATION

¿How many young members (15–34 years old) are there in the assessed system (including those who have emigrated and those currently living outside it)?

Specify for each of them:

Name of the youngster	Sex of the youngster	¿Has this youngster already emigrated for lack of employment? (YES/NO)	¿What is the occupation of the youngster?*	¿Would this youngster like to be a farmer in the future? (YES/NO)	¿This youngster does not want to work in agriculture and would emigrate if given the opportunity? (YES/NO)

* If the answer to this last question was "no," please specify the occupation option:

a- Working in agricultural production within the assessed system

b- Working in agricultural production within the system and also employed outside the system
c- Employed outside the assessed system
d- Working in agricultural production within the system and also enrolled in formal education
e- Enrolled in formal education
f- Not working nor studying
g- Working on his/her own farm

WOMEN'S EMPOWERMENT

Survey to be conducted only with the main woman in the household, without the presence of a man, and in a safe environment.

To view this section, please specify the number of women (both youth and non-youth) in the household in the dedicated fields in Step 0.

¿Is the woman answering with the presence of a man?

Yes	No

If yes: ¿Has the man refused to leave despite being aware of this?

Yes	No

- Education level

Select as many as needed.

	Men	Women
Cannot read or write		
Able to read and write		
Elementary		
High school		
University		

- Time burden

(Leave blank if a category is missing)

Activity	Men	Women
Number of hours spent working on AGRICULTURAL PRODUCTION within the assessed system		
Number of hours spent on FOOD PREPARATION and other DOMESTIC WORKS		
Number of hours spent on OTHER PRACTICAL ACTIVITIES (outside agricultural production)		

- Decision-making

¿Do women make decisions about what to produce? Do women make decisions about what to do with the outputs produced (such as control over income and whether to consume at home)?

Mark only one per category:

	MY-SELF	MY HUS-BAND	BOTH OF US	SOMEONE ELSE
¿Who is the owner of the CROPS and SEEDS?				
¿When decisions are taken about CROP PRODUCTION, who normally makes these decisions?				
¿Who is the owner of the ANIMALS?				
¿When decisions are taken about ANIMAL PRODUCTION, who normally makes these decisions?				
¿Who is the owner of the ASSETS for other economic activities within the household?				
¿When decisions are taken about other economic activities within the household, who normally makes these decisions?				
¿Who is the owner of the MAJOR HOUSEHOLD ASSETS (house, machinery, etc.)?				
¿When decisions are taken about MAJOR HOUSEHOLD ASSETS, who normally makes these decisions?				
¿Who is the owner of the MINOR HOUSEHOLD ASSETS (small tools, garden, etc.)?				
¿When decisions are taken about MINOR HOUSEHOLD ASSETS, who normally makes these decisions?				

- Decision-making about INCOME

Mark only one per category:

	Did not contribute or contributed in few decisions	Contributed in some decisions	Contributed in most decisions	Not applicable*
¿To what extent did you contribute to the decisions about the use of the INCOME generated by CROP PRODUCTION?				
¿To what extent did you contribute to the decisions about the use of the INCOME generated by ANIMAL PRODUCTION?				
¿To what extent did you contribute to the decisions about the use of the INCOME generated by OTHER ECONOMIC ACTIVITIES?				

* Check "Not applicable" if no crops are produced, or if there are no animals, or if there are no other economic activities.

- Perception of decision-making

Mark only one per category:

	I think that I cannot make any decision	Only small decisions	Some decisions	In great part / totally	Not applicable*
If you wanted, ¿do you feel that you can make decisions about CROP PRODUCTION?					
If you wanted, ¿do you feel that you can make decisions about ANIMAL HUSBANDRY?					

If you wanted, ¿do you feel that you can make decisions about OTHER ECONOMIC ACTIVITIES?					
If you wanted, ¿do you feel that you can make decisions about MAJOR HOUSEHOLD EXPENDITURES?					
If you wanted, ¿do you feel that you can make decisions about MINOR HOUSEHOLD EXPENDITURES?					

* Check "Not applicable" if no crops are produced, or if there are no animals, or if there are no other economic activities.

- Access to Credit

Mark only one per category:

	Women	Men
Possible in official and secure channels (bank or similar)		
Possible in non-official channels		
Not possible. Access to credit is too difficult or too risky		

- Leadership

Men and women face different barriers to participation. Within the country/context, ¿are both men and women in the household included and able to participate in agroecology projects?

	¿Does this group exist in your community?	¿How often do you participate in the activities and meetings organized by this group (if it exists in your community)?			
	YES/NO	Never/Almost never	Sometimes	Most of the time	Always
Women's associations and organizations					
Rural production cooperatives					
Social movements					
Unions of rural workers					
Political groups linked to a party					
Religious groups					
Training organized for capacity development					
Others					

- MINIMUM DIETARY DIVERSITY FOR WOMEN

This section should preferably be conducted with a woman aged 15–49 years old. If there are no family members meeting these criteria, the survey may continue with the household member already being interviewed.

Select what you ate or drank in the last 24 hours. Please include all foods and drinks, any snacks or small meals, as well as any main meals. Remember to include all foods you may have eaten while preparing meals or preparing food for others.

Mark only one per category:

Food groups	Yes, I ate it in the last 24 hours	No, I did not eat it in the last 24 hours
GRAINS, WHITE ROOTS and TUBERS (bread, rice, pasta, flour, white potatoes, white yams, cassava/manioc/yucca, taro, etc.)		
LEGUMES and SEEDS (beans, peas, lentils, chickpeas, soybeans)		
NUTS and SEEDS (tree nuts, peanuts/groundnuts or certain seeds, or nut/seed "butters" or pastes)		
DAIRY PRODUCTS (milk, cheese, yoghurt or other dairy products, but NOT butter, ice cream, cream, or sour cream)		
MEAT, POULTRY, FISH (beef, pork, lamb, goat, chicken, fish, seafood, animal organs)		
EGGS from poultry or any other bird		
DARK GREEN LEAFY VEGETABLES (any medium-to-dark green leafy vegetables, including wild/foraged leaves)		
DARK YELLOW or ORANGE FRUITS and VEGETABLES (mango, papaya, pumpkin, carrots, squash, orange sweet potatoes)		
OTHER VEGETABLES (cucumber, eggplant, mushroom, onion, tomato, etc.)		
OTHER FRUITS (avocado, apple, pineapple, etc.)		

SOIL HEALTH

For the soil assessment, choose an area of the productive land that best reflects the average status of its soils.

Mark every category with a score between 1 and 5 according to the following examples:

Indicators	Established value	Characteristics	Score (1 to 5)
Soil structure	1	Loose, powdery soil without visible aggregates	
	3	Few aggregates that break with little pressure	
	5	Well-formed aggregates – difficult to break	
Soil compaction	1	Compacted soil, flag bends readily	
	3	Thin compacted layer, some restrictions to a penetrating wire	
	5	No compaction, flag can penetrate completely into the soil	
Soil depth	1	Exposed subsoil	
	3	Thin superficial soil	
	5	Superficial soil (> 10 cm)	
Status of residues	1	Slowly decomposing organic residues	
	3	Presence of last year's decomposing residues	
	5	Residues in various stages of decomposition, most residues well-decomposed	
Color, odor and organic matter	1	Pale, chemical odor, and no presence of humus	
	3	Light brown, odorless, and some presence of humus	
	5	Dark brown, fresh odor, and abundant humus	
Water retention (moisture level after irrigation or rain)	1	Dry soil, does not retain water	
	3	Limited moisture level available for a short time	
	5	Reasonable moisture level for a reasonable period of time	
Soil cover	1	Bare soil	

	3	Less than 50% soil covered by residues or live cover	
	5	More than 50% soil covered by residues or live cover	
Erosion	1	Severe erosion, presence of small gullies	
	3	Evident, but low erosion signs	
	5	No visible signs of erosion	
Presence of invertebrates	1	No signs of invertebrate presence or activity	
	3	A few earthworms and arthropods present	
	5	Abundant presence of invertebrate organisms	
Microbiological activity	1	Very little effervescence after application of hydrogen	
	3	Light to medium effervescence	
	5	Abundant effervescence	