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WP3

Business model agroecological characteristics of dairy value chain stakeholders in Bobo-Dioulasso



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The CGIAR Initiative Transformational Agroecology across Food, Land, and Water Systems develops and scales agroecological innovations with small-scale farmers and other food system actors in seven low- and middle-income countries. It is one of 32 initiatives of CGIAR, a global research partnership for a food-secure future, dedicated to transforming food, land, and water systems in a climate crisis.

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1 Introduction

In Burkina Faso, dairy consumption is low (around 20 kg/capita/year). However, consumption is rising and will continue to do so in the years to come as a result of population growth and rising spending power. Dairy products made from local milk are in growing demand. Consumers are increasingly looking for good quality dairy products, made from fresh milk, and available in a wide range of forms (liquid milk, yoghurts in a variety of flavours, dégué, gapal, cheese, butter, etc.). There is, however, significant competition from dairy products made from low-cost imported milk powder. As a result, dairy value chain stakeholders need to innovate at every level of the agri-food chain to meet this emerging demand over the long term.

In this area of the Initiative on Agroecology (IAE) project, operations focus on the dairy value chain and are carried out as part of an Agroecological Living Landscape (ALL). This ALL is based on Bobo-Dioulasso's multi-stakeholder Dairy Innovation Platform (DIP), which was set up in 2020 and extended to new members in 2023 so as to form an ALL. In 2023, the Dairy Innovation Platform was further consolidated into an Agroecological Living Landscape with the inclusion of new members and partners.

A major objective of the project in Burkina Faso is to co-design an Agroecological Business Model for the dairy value chain. This work is being carried out mainly as part of the IAE project's WP3 entitled '*Developing an inclusive business model and financial strategies relevant to Bobo Dioulasso's dairy value chain*'.

This document presents the Agroecological Business Model of stakeholders operating upstream in Bobo-Dioulasso's dairy value chain (agro-pastoral dairy farmers, mini-dairy farms, milk collection centres, independent collectors, processing units using local milk and processing units using milk powder) which was submitted, discussed and approved by the 'ALL' stakeholders and local dairy value chain players.

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2 Methodology

2.1 Research team's proposal for an Agroecological Business Model

The initial co-design stages of an Agroecological Business Model ('AE BM') for the dairy value chain yielded the following outputs:

- A literature review of current knowledge about Bobo Dioulasso's dairy value chain (Sib *et al.*, 2023)
- A characterisation of dairy value chain stakeholders' current business model in Bobo-Dioulasso (Sib *et al.*, 2024 b)
- A participatory cost-benefit analysis on the implementation of agroecological packages for dairy farmers, collectors and processors in Bobo-Dioulasso (Sib *et al.*, 2024 a)

Hereafter, we refer to AE BM as the industry stakeholders' current business model into which the agroecological packages studied during the aforementioned cost-benefit analysis (Sib *et al.*, 2024 b) have been integrated, as well as being tested at full scale on dairy farms (Ouattara *et al.*, 2024).

The results of the studies carried out as part of the various WP projects are also reflected in the AE BM proposal, i.e.:

- Study on the spaces for initiatives (opportunities and constraints) among dairy industry stakeholders in Bobo-Dioulasso (Vall *et al.*, 2023)
- Study on consumer preferences for milk and dairy products in the city of Bobo-Dioulasso (Fayama and Sodr , 2024)
- Inventory of initiatives promoting agroecological transition and the dairy value chain (Sib *et al.*, 2024, c)
- Preliminary study of dairy farms' agroecological performance in Bobo-Dioulasso (Orounladji *et al.*, 2024)

The proposed Agroecological Business Model for stakeholders operating upstream in Bobo-Dioulasso's dairy value chain has been informed by all these studies, as shown in Figure 1.

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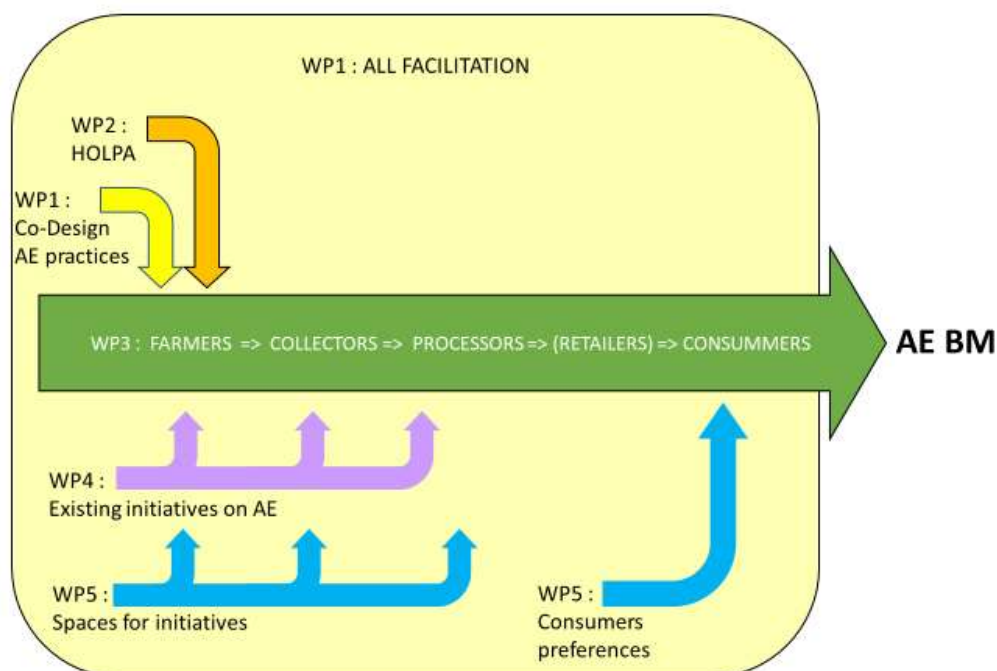


Figure 1. Input into the development of the Agroecological Business Model (AE BM) from studies carried out as part of the Initiative on Agroecology in Burkina Faso.

2.2 Agroecological Business Model validation workshop

In order to approve the AE BM, focus groups involving representatives of the various segments of Bobo Dioulasso's dairy value chain were set up on 19, 20 and 22 July 2024 in the CIRDES ('Centre International de Recherche-Développement sur l'Élevage en zone Subhumide') training room.

2.2.1 Preliminary reminders in plenary session

2.2.1.1 Review of the concept of business model

Prior to focus groups being set up for each category of dairy value chain (DVC) stakeholders, a plenary session was held to provide context and information to the various stakeholders regarding i) the purpose of a Business Model (BM) and its relevance to the various parts of the DVC, and ii) the Business Model Canvas and its various components.

Business Model: In a corporate context, a business model is a conceptual structure that defines how a company creates, delivers and captures value. It describes a company's value creation approach by identifying its revenue streams, costs, target customers and value proposition.

Business Model Canvas: The Business Model Canvas is a strategic management and business start-up tool for developing new business models or documenting existing ones. It is a visual diagram (Table 1) with

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details about a company's value proposition, infrastructure, customers and finances. Developed by Osterwalder and Pigneur (2010), the Canvas is widely used by start-ups and established companies seeking to understand, design and integrate their business models. It consists of 9 sections which need to be completed.

- 1) **Value Proposition:** Description of the products or services that meet the needs or solve the problems of the target customer segments.
- 2) **Key Partners:** External entities that contribute to the value proposition and overall operation of the business model.
- 3) **Key Activities:** Critical steps a company must take to operate successfully and deliver its value proposition.
- 4) **Customer Relationships:** This refers to how a company interacts with its customers through the various stages of the customer journey in order to build and maintain relationships.
- 5) **Customer Segments:** These are the different groups of people or businesses that the company aims to reach and serve.
- 6) **Key Resources:** Assets required to deliver the value proposition, such as human resources, physical resources, intellectual property, etc.
- 7) **Distribution Channels:** Ways in which a company reaches and interacts with its customers to deliver its value proposition.
- 8) **Cost Structure:** Expenses incurred while running the business model, including fixed and variable costs.
- 9) **Revenue Streams:** Sources of income derived from the value propositions offered to customers.

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Table 1. Business Model Canvas for Bobo Dioulasso's dairy value chain (Burkina Faso)

<u>Key Partners</u> Who are our partners (upstream)? Which resources are we acquiring from partners? Which key activities do our partners perform?	<u>Key Activities</u> What key activities do we need for our value proposition? Our distribution channels? Our customer relationships? Our revenue streams?	<u>Value Proposition</u> Which customer needs are we satisfying? How does our proposal effectively meet our customers' needs?	<u>Customer Relationships</u> In what ways are we ahead of the competition? How can we protect ourselves from this competition?	<u>Customer Segments</u> Which customers is our solution designed for (list them)?
	<u>Key Resources</u> What key resources do we need for our value proposition? Our distribution channels? Our customer relationships? Our revenue streams?		<u>Distribution Channels</u> Through which communication and distribution channels do you reach your customers? What are the highlights of your customer relationships?	
<u>Cost Structure</u> Which key resources and activities are most expensive?		<u>Revenue Streams</u> Where does the revenue from our business come from? Who pays for our products? What added value do we generate? Which offer do our customers currently pay for?		

2.2.1.2 Review of the three agroecological packages

Agroecological package for milk production

- Quality fodder as a major substitute for livestock feed (FODD)
- Organic manure as a major substitute for mineral fertilisers (OM)
- Sound management of crop and livestock co-products (CPROD)
- Balanced rations for dairy cows at an acceptable cost (RATION)
- Use of medicinal plants as substitutes for veterinary drugs (when effective) (MEDPL)
- Optimum management of livestock and natural resources (MGT)

Agroecological package for milk collection

- Services to farmers
 - Service 1: The MCC is a forum for dialogue between farmers and collectors (DIAL)

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- Service 2: Advice on agroecological management of dairy farms (techno-economic) (ADVICE)
- Service 3: Input and credit support to farmers (CREDIT)
- Services to processors
 - Service 1: Milk quality control (QUAL)
 - Service 2: Guaranteed delivery in terms of quantity and quality (GUARANT)
 - Service 3: Ease of access to credit, inputs and equipment between farmers and processors (CREDIT)

Agroecological package for milk processing

- Traditional dairy products from local produce (TRADPROD): Gapal, Plain yoghurt, Sweetened yoghurt, Skimmed yoghurt, Pasteurised milk, Cottage cheese, Dêguê with small millet, Dêguê with corn, Cream yoghurt, Milk drink, Sour milk, Cream, Peul cheese (Wagashi), Butter.
- Innovative dairy products (INNOVPROD): Date yoghurt, Theodo yoghurt, Kinkeliba yoghurt, Moringa yoghurt, Coconut yoghurt, Pineapple yoghurt, Horchata yoghurt, Néré yoghurt, Mango yoghurt, Banana yoghurt, Zaigainai yoghurt (Balanites).
- Milk-based cosmetics (COSPROD): Milk-based ointment, Milk soap, Milk oil.

2.2.2 Group work

Over the course of the three-day workshop, six Focus Group Discussions (FGDs) were held, each comprising 4 to 13 participants (Table 2).

Table 2. Focus Group schedule

Occupational groups	Focus Group Discussions	Number of participants	Facilitators and Secretaries
Farmers	Agro-pastoral dairy farmers	13	Boko Michel OROUNLADJI, Hati KONATE and Ollou SIB
	Mini (semi-intensive) dairy farms	4	Songdah Désiré OUATTARA, Souleymane SANOGO and Issouf TRAORE
Collectors	Milk Collection Centre	11	Songdah Désiré OUATTARA, Souleymane SANOGO and Issouf TRAORE
	Independent milk collectors	6	Boko Michel OROUNLADJI, Hati KONATE and Ollou SIB
Processors	Mini-dairies using mainly local milk	13	Boko Michel OROUNLADJI, Hati KONATE and Ollou SIB
	Mini-dairies using milk powder	9	Songdah Désiré OUATTARA, Souleymane SANOGO and Issouf TRAORE

2.2.2.1 Validating the integration of the agroecological package into the business model

Elements added by the researchers to the current business models (highlighted in yellow in the BM Canvas) were discussed and, where necessary, reformulated, supplemented and validated by the participants. Additional elements were highlighted in green.

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2.2.2.2 Identifying key stakeholders required for a successful integration of the agroecological package

Stakeholders needed to successfully integrate the agroecological package were identified in the BM Canvas.

2.2.2.3 Ex-ante assessment of the package's impact on the 13 elements of agroecology

The agroecological characteristics of the six current business models were identified and intensity-rated by experts (i.e. IAE researchers) with reference to the 13 elements of agroecology described by Wezel *et al.* (2020).

To this end, we used a simple grid (During the workshop, the facilitators first asked participants to validate the scoring of all six current business models' agroecological characteristics as put forward by the researchers, either by assigning new scores or by keeping those previously assigned. Participants then assigned a score to the AE BM based on the score assigned to the current BM. Applying this work to the 13 principles of agroecology led to the production of 13-branch radar charts (1 branch per agroecological principle), enabling us to visually compare the scope of current BMs with AE BMs with regard to the 13 principles of agroecology for each category of stakeholder (Figure 2).

Table 3) in which each main line refers to one of the 13 AE elements and where each AE characteristic associated with a principle is briefly described and then rated according to its intensity level on the following scale: + low, ++ moderate; +++ high; ++++ very high, or - not agroecological.

During the workshop, the facilitators first asked participants to validate the scoring of all six current business models' agroecological characteristics as put forward by the researchers, either by assigning new scores or by keeping those previously assigned. Participants then assigned a score to the AE BM based on the score assigned to the current BM. Applying this work to the 13 principles of agroecology led to the production of 13-branch radar charts (1 branch per agroecological principle), enabling us to visually compare the scope of current BMs with AE BMs with regard to the 13 principles of agroecology for each category of stakeholder (Figure 2).

Table 3. Business Model agroecological characterisation grid

Elements of agroecology	BM's agroecological characteristics	-	+	++	+++	Current BM score	AE BM score
1. Recycling			X			1	2
2. Input Reduction				X		2	3
3. Soil Health		X				-1	0
4. Animal Health							
5. Biodiversity							
6. Agroecosystem Synergies							
7. Economic Diversification							
8. Co-Creation of Knowledge							
9. Social Values and Diets							
10. Fairness in Trade							
11. Connectivity between Stakeholders							

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12. Land and Resource Governance						
13. Participation						

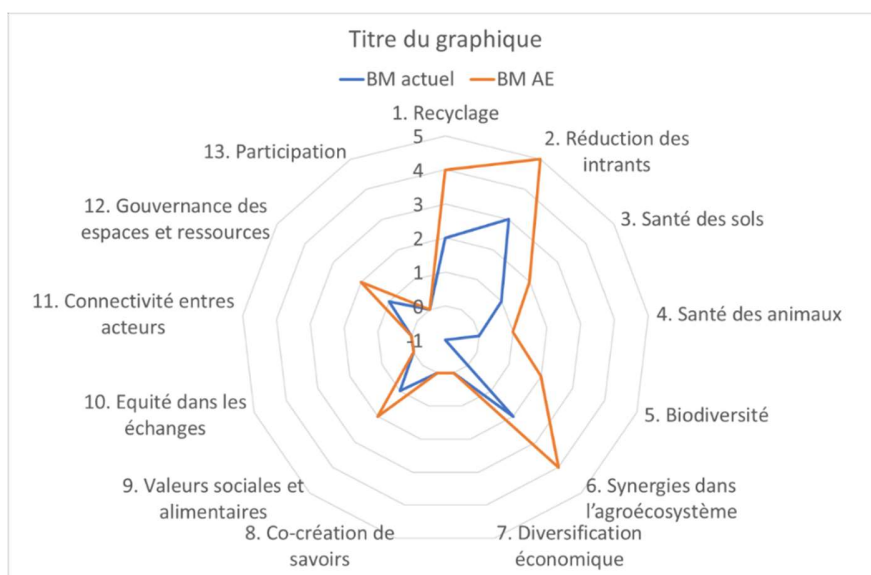


Figure 2. Example of a radar chart comparing both Business Models (current BM and AE BM) with regard to the 13 principles of agroecology



Figure3: Focus Group Discussions

2.2.2.4 Evidences of “Agency & behavior change science” considered in the AE Business model

Finally, we have reported in the appendix (Annex 1, Annex 2, Annex 3) how the findings of the “science of agency and behavior change” implemented in our case study (study of the space for initiatives of

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actors of the dairy value chain; Vall et al., 2023) is actually considered in the agroecological business model presented in this report.

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3 Results

3.1 Dairy farmers

3.1.1 Agro-pastoralists

3.1.1.1 Presentation of the AE BM for agro-pastoralists

Implementing the agroecological package for milk production should induce changes in the components of agro-pastoralists' current BM, with the exception of the 'Customer Segments' component (Table 4).

Table 4. Agroecological Business Model (AE BM) for agro-pastoral dairy farmers (elements provided by the AE BM shown in yellow and green, elements provided during Focus Groups shown in green)

<p>Key Partners Agro-pastoralist community (supply of breeding bulls and females, plus various services: animal health, etc.) Private veterinarians Livestock feed and fodder suppliers (including crop residues) Collection centres (training) Dairy processors Livestock and Agriculture Department (mills, forage seeds) DIP IPROLAIT Chamber of Commerce Research (seeds, etc.) Local authorities Livestock farmers' organisations (APESS, FEB, etc.) NGOs Customary authorities Agricultural farmers (supply of crop co-products, forage crops) Projects (PRECEL, PDPS, PRECAM)</p>	<p>Key Activities Production, self-consumption and sale of cow's milk Livestock farming (main activity) Sale of organic manure Seed production (rare)</p> <p>Key Resources Rural land Spontaneous pastures Crop residues Forage seeds Forage crops Materials/equipment (sheds, hay barns, fencing...) Supplementary livestock feed Training (Balanced rations, co-product management, mass selection, etc.) Local zebu breeds (sedentary dairy nucleus) Family labour and shepherd Traditional skills (selection of dairy cows from the herd, herding animals to pasture) Use of medicinal plants as substitutes for veterinary products Cattle tracks Organic manure Surface water (ponds, rivers, sumps, boreholes, etc.)</p>	<p>Value Proposition To produce and sell a large quantity of quality milk (thanks to agroecological practices) from a known source to customers at local markets and to mini-dairies in Bobo-Dioulasso, mainly in the rainy and cool dry seasons, in order to meet household needs</p>	<p>Customer Relationships Tradition and expertise Lower production cost Promoting the benefits of local milk Local initiatives and policies promoting local consumption Competition: imported milk powder</p> <p>Distribution Channels Direct sales to markets and private individuals (women) Farm-gate sales to collectors Delivery to collection centre Occasional direct sale to a dairy Direct on-farm sale to consumers</p> <p>Highlights: Hauts-Bassins Milk Marketing Days (MMDs) Monthly meetings with MCCs Meetings with DPUs at the start of the rainy season ALL meeting</p>	<p>Customer Segments Door-to-door customers and markets Independent collectors Collection centres Mini-dairies (less common)</p>
<p>Cost Structure Acquisition of dairy cows and breeding bulls Cost of quality livestock feed and fodder Training costs (rationing, crop and livestock co-product management, etc.) Standard veterinary care Water procurement Workforce Cost of materials/equipment (hay barns, fencing, sheds, boreholes, etc.) Cost of land</p>		<p>Revenue Streams Milk buyers: Market and door-to-door customers, Independent collectors, Collection centres, Mini-dairies (less common) Sale of male calves and cull females Sale of animal dung Sale of forage seeds (less common)</p>		

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3.1.1.2 Key stakeholders in the success of the AE BM for agro-pastoralists

The key stakeholders in the success of the AE BM for agro-pastoralists are primarily: (i) fodder producers; (ii) seed producers; (iii) development and research projects; and (iv) dairy processors.

3.1.1.3 Impact of the AE package on the 13 elements of agroecology

The AE package for milk production has had a positive impact on 11 of the 13 agroecology principles for agro-pastoralists (

Table 5). Participants felt that the AE package would have the following impact:

- 1) Highly positive on the following three principles: Recycling and Input Reduction (+8/current BM), and Soil Health (+5/current BM);
- 2) Moderately positive on the following 8 principles: Economic Diversification, Co-Creation of Knowledge, Social Values and Diets, Connectivity between Stakeholders, and Participation (+3/current BM); Fairness in Trade, Animal Health, and Biodiversity (+1/current BM);
- 3) None or negative for the following two principles: Agroecosystem Synergies (+0/current BM), and Land and Resource Governance (-2/current BM).

The lack of any expected impact on the principle of Agroecosystem Synergy is somewhat surprising.

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Table 5. Agroecological characteristics of agro-pastoralists' current Business Model (Current BM) and agroecological Business Model (AE BM)

Elements of agroecology	Agroecological characteristics	BM	-	+	++	+++	++++	Current BM score	AE BM score		
1. Recycling	Crop co-products recycled as fodder	C		1				4	12		
		AE					4				
	Crop and livestock co-products recycled as OM on farms	C		1						4	12
		AE					4				
Livestock co-products recycled as OM on local land	C				2		4	12			
	AE								4		
2. Input Reduction	Use of livestock feed in the dry season	C	-1							-2	6
		AE							4		
	Standard veterinary care	C	-1					-2	6		
		AE			2						
3. Soil Health	Organic fertilisation of farmland	C			2					3	8
		AE					4				
	Soil preservation and protection	C		1				3	8		
		AE					4				
4. Animal Health	Standard veterinary care	C	-1							2	3
		AE	-1								
	Traditional veterinary care	C				3		2	3		
		AE					4				
5. Biodiversity	Promoting local breeds	C				3				2	3
		AE					4				
	Use of pastures and surface waters	C	-1					2	3		
		AE	-1								
6. Agroecosystem Synergies	Interactions between crops, livestock and trees	C					4			4	4
		AE					4				
7. Economic Diversification	Livestock sales, milk sales, organic manure sales	C		1				1	4		
		AE					4				
8. Co-Creation of Knowledge	Promoting local expertise in pastoral livestock farming	C		1				1	4		
		AE					4				
9. Social Values and Diets	Production and sale of quality milk	C		1				1	4		
		AE					4				
10. Fairness in Trade	Women's place and role in the household and dairy economy	C			2			2	4		
		AE					4				
11. Connectivity between Stakeholders	Diverse customer base (private individuals, MCCs, collectors, mini-dairies)	C		1				1	4		
		AE					4				
12. Land and Resource Governance	Involvement in agro-sylvo-pastoral (ASP) resource management	C					4	4	2		
		AE			2						
13. Participation	Involvement in livestock farmers' organisations, local authorities and NGOs	C		1				1	4		
		AE					4				
Total								24	62		

The radar chart showing agro-pastoralists' current BM and AE BM in relation to the 13 AE principles revealed that implementing the AE package had intensified the agroecological nature of these stakeholders' current BM, particularly with regard to the principles of Recycling, Input Reduction and Soil Health (Figure 4).

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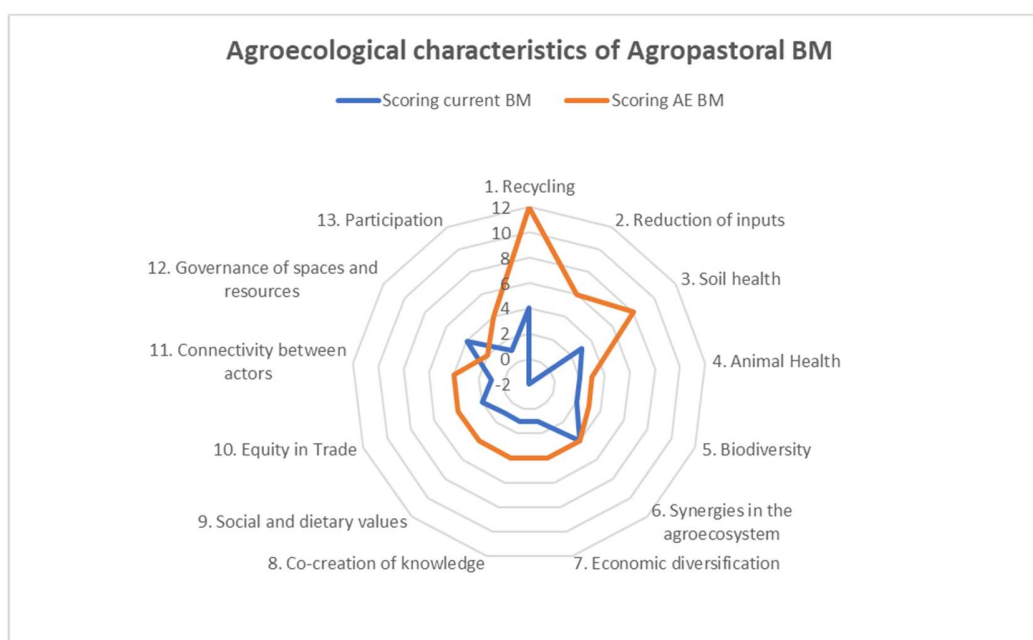


Figure 4. Radar chart showing agro-pastoralists' current Business Model (Current BM) and agroecological Business Model (AE BM) with regard to the 13 principles of agroecology

3.1.1.4 Negative impact of implementing the AE package for milk production at agro-pastoralist level on young people and women

FGD participants feel that implementing the AE package for milk production among agro-pastoralists will have no negative impact on young people and women (Table 6). When asked whether implementing the agroecological package could have a negative impact on young people and women, the majority of participants (100%) said it would not.

Table 6: Negative impact of implementing the agroecological (AE) package for milk production at agro-pastoralist level on young people and women

AE package for milk production	Negative impact on young people		Negative impact on women	
	Yes (%)	No (%)	Yes (%)	No (%)
Quality fodder as a major substitute for livestock feed (FODD)		100		100
Organic manure as a major substitute for mineral fertilisers (OM)		100		100
Sound management of crop and livestock co-products (CPROD)		100		100
Balanced rations for dairy cows at an acceptable cost (RATION)		100		100
Use of medicinal plants as substitutes for veterinary drugs (when effective) (MEDPL)		100		100
Optimum management of livestock and natural resources (MGT)		100		100

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3.1.2 Mini-dairy farms

3.1.2.1 Presentation of the AE BM for mini-farms

Implementing the agroecological package for milk production should induce changes in the components of mini-dairy farms' current BM, with the exception of the 'Key Activities' and 'Revenue Streams' components (Table 7).

Table 7. Agroecological Business Model (AE BM) for mini (semi-intensive) dairy farms (elements provided by the AE BM shown in yellow and green, elements provided during Focus Groups shown in green)

<p>Key Partners Livestock feed and fodder suppliers Private veterinarians Artificial insemination service providers Livestock and Agriculture Department Basic dairy farming equipment suppliers (Private livestock consultants) DIP SCOOPs</p>	<p>Key Activities Profitable year-round milk production and sales</p>	<p>Value Proposition To produce and sell quality milk that can be traced back to Bobo Dioulasso's mini-dairies (thanks to agroecological production practices) all year round, with volumes kept as constant as possible.</p>	<p>Customer Relationships Regular milk supply Proximity to dairies Professionalisation (concern for customer satisfaction) Local marketing based on the benefits of local milk Local initiatives and policies promoting local consumption After-sales services Transparency in commercial transactions</p> <p>Competition: Imported milk powder</p>	<p>Customer Segments Mini-dairies primarily Direct consumers, MCCs Religious missionaries</p>
<p>Research bodies Local authorities NGOs Dairy processing units Projects Agricultural farmers (supply of crop co-products, forage crops) Forage seed producers Compost suppliers Resource persons (knowledge of veterinary pharmacopoeia)</p>	<p>Key Resources Peri-urban (urban) land Livestock buildings and equipment Quality livestock feed and fodder in abundance Forage seeds Forage crops Sheds, hay barns... Balanced rations Organic manure Crop residues (Spontaneous pastures) Borehole water supplies all year round Animals crossed with exotic dairy breeds Salaried workforce Skills learnt in training centres Use of medicinal plants as substitutes for veterinary products Rationing equipment (mills, choppers, rationing applications and data sheets)</p>		<p>Distribution Channels Direct delivery to dairies (farms located in peri-urban areas, therefore close to processors) Direct sale to consumers (home milk processing) Milk collection centres</p> <p>Highlights: HB MMDs, Trade fairs Regular meetings with DPUs (at the start of the rainy season and the hot dry season) to discuss milk prices and delivery terms ALL meetings</p>	
<p>Cost Structure Set-up costs: land, pens and buildings, miscellaneous equipment, dairy nucleus Running costs: borehole, vehicle (electricity, diesel), labour; AI or purchase of breeding bulls; quality livestock feed and fodder (all year round) Rationing tool (training) Crop and livestock co-products management tool Standard veterinary care and veterinary pharmacopoeia Staff wages and incentives Taxes</p>		<p>Revenue Streams Milk buyers: Mini-dairies, private individuals/consumers Sale of male calves and cull females, and sale of organic manure (market gardeners, etc.) Grants and project support</p>		

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3.1.2.2 Key stakeholders in the success of the AE BM for mini-farms

The key stakeholders in the success of the AE BM for mini-farms are primarily: (i) fodder producers; (ii) seed producers; (iii) compost suppliers; and (iv) pharmacopoeia knowledge holders.

3.1.2.3 Impact of the AE package on the 13 elements of agroecology

The AE package for milk production has had a positive impact on 12 of the 13 agroecology principles for mini-dairy farms (

Table 8). Participants felt that the AE package would have the following impact:

- 1) Highly positive on the following two principles: Input Reduction (+6/current BM), and Animal Health (+4/current BM);
- 2) Moderately positive on the following 10 principles: Recycling (+3/current BM); Social Values and Diets, Land and Resource Governance, and Participation (+2/current BM); Soil Health, Agroecosystem Synergies, Economic Diversification, Co-Creation of Knowledge, Fairness in Trade, and Connectivity between Stakeholders (+1/current BM);
- 3) None for the Biodiversity principle.

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Table 8. Agroecological characteristics of mini (semi-intensive) dairy farms' current Business Model (Current BM) and agroecological Business Model (AE BM)

Elements of agroecology	Agroecological characteristics	BM	-	+	++	+++	++++	Current BM score	AE BM score
1. Recycling	Crop co-products recycled as fodder	C			2			5	8
		AE				3			
	Crop and livestock co-products recycled as OM on farms	C			2				
		AE					4		
Livestock co-products recycled as OM on local land	C		1						
	AE		1						
2. Input Reduction	Use of livestock feed in the dry season	C	-1					-3	3
		AE			2				
	Standard veterinary care	C	-1						
		AE			2				
Fluid and fossil fuel consumption	C	-1							
	AE	-1							
3. Soil Health	Organic fertilisation of farmland	C				3		2	3
		AE					4		
	Soil preservation and protection	C	-1						
		AE	-1						
4. Animal Health	Standard veterinary care	C	-1					0	4
		AE			2				
	Traditional veterinary care	C		1					
		AE			2				
5. Biodiversity	Promoting local breeds	C			2			3	3
		AE		1					
	Use of pastures and surface waters	C		1					
		AE			2				
6. Agroecosystem Synergies	Interactions between crops, livestock (and trees)	C			2			2	3
		AE				3			
7. Economic Diversification	Livestock sales, milk sales, organic manure sales	C				3		3	4
		AE					4		
8. Co-Creation of Knowledge	Promoting local expertise in agro-pastoral livestock farming	C				3		3	4
		AE					4		
9. Social Values and Diets	Production and sale of large quantities of quality milk	C			2			2	4
		AE					4		
10. Fairness in Trade	Women's place and role in the household and dairy economy	C		1				1	2
		AE			2				
11. Connectivity between Stakeholders	Diverse customer base (private individuals, MCCs, mini-dairies)	C			2			2	3
		AE				3			
12. Land and Resource Governance	Involvement in agro-sylvo-pastoral (ASP) resource management	C		1				1	3
		AE				3			
13. Participation	Involvement in livestock farmers' organisations, local authorities and NGOs	C			2			2	4
		AE					4		
Total								23	48

The radar chart showing mini-dairy farms' current BM and AE BM in relation to the 13 AE principles revealed that implementing the AE package had intensified the agroecological nature of these stakeholders' current BM, particularly with regard to the principles of Input Reduction and Animal Health (Figure 5).

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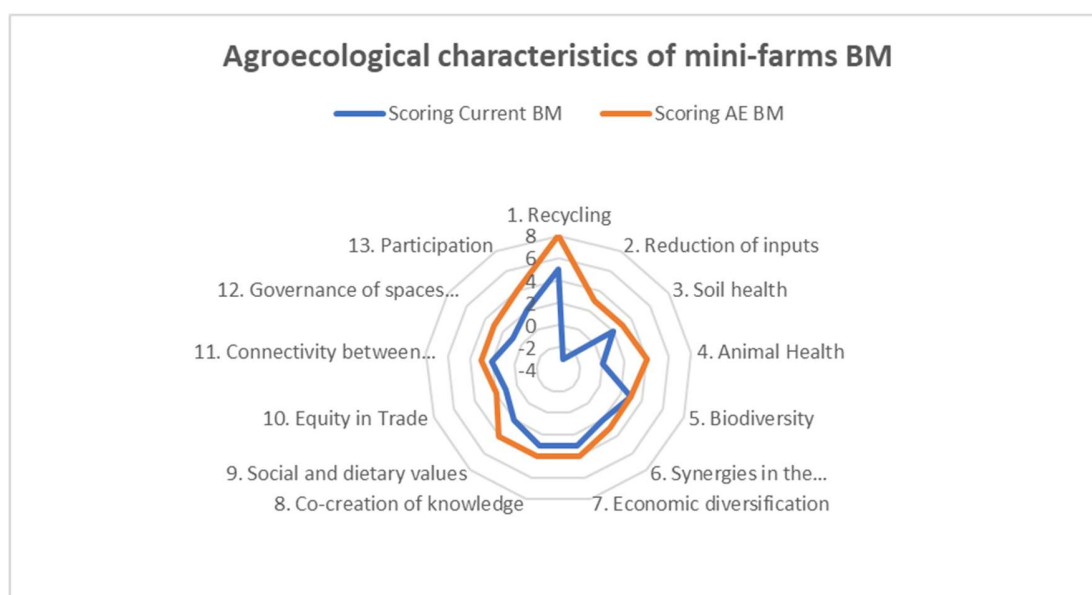


Figure 5. Radar chart showing mini-farms' current Business Model (Current BM) and agroecological Business Model (AE BM) with regard to the 13 principles of agroecology

3.1.2.4 Negative impact of implementing the AE package for milk production at mini-farm level on young people and women

FGD participants feel that implementing the AE package for milk production among mini-dairy farms will have had no negative impact on young people and women (Table 9). When asked whether implementing the agroecological package could have a negative impact on young people and women, the majority of participants (100%) said it would not.

Table 9: Negative impact of implementing the agroecological (AE) package for milk production at mini-farm level on young people and women

AE package for milk production	Negative impact on young people		Negative impact on women	
	Yes (%)	No (%)	Yes (%)	No (%)
Quality fodder as a major substitute for livestock feed (FODD)		100		100
Organic manure as a major substitute for mineral fertilisers (OM)		100		100
Sound management of crop and livestock co-products (CPROD)		100		100
Balanced rations for dairy cows at an acceptable cost (RATION)		100		100
Use of medicinal plants as substitutes for veterinary drugs (when effective) (MEDPL)		100		100
Optimum management of livestock and natural resources (MGT)		100		100

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3.2 Milk collectors

3.2.1 Independent collectors

3.2.1.1 Presentation of the AE BM for independent collectors

Implementing the agroecological package for milk collection should induce changes in the components of independent collectors' current BM, with the exception of the 'Key Activities' and 'Revenue Streams' components (Table 10).

Table 10. Agroecological Business Model (AE BM) for independent milk collectors (elements provided by the AE BM shown in yellow and green, elements provided during Focus Groups shown in green)

<p>Key Partners Agro-pastoral dairy farmers (suppliers) Farmers (negotiation of crop co-products and common land grazing for dairy farmers) DIP Dairy processing units (credit and inputs, delivery contracts) Livestock and Agriculture Department (advice) Regional Chamber of Agriculture Regional Chamber of Commerce and Crafts Department of the Environment Microfinance services Basic milk collection equipment suppliers Consumers' League Sanitation Department Customers (private individuals) Local authorities Research (advice)</p>	<p>Key Activities Daily door-to-door milk collection (from 6 am) from a loyal network of dairy farmers, sometimes ending at 11 am Distribution of collected milk to customers taking from 2 to 4 hours (mainly mini-dairies, sometimes private individuals who take priority in the dry season)</p> <p>Key Resources Motorbike or bicycle Materials/equipment (milk cans - plastic cans/recycled vegetable oil cans, funnels, sieves, etc.) Know-how (quality control using local techniques) Metal tank (for better milk preservation) Mobile phone Tracks and roads in good condition (if possible) Training (rare)</p>	<p>Value Proposition To earn a living by selling raw and healthy milk collected from agro-pastoralists to mini-dairies in Bobo-Dioulasso all year round, with volumes kept as constant as possible, and to private individuals (according to demand).</p>	<p>Customer Relationships Very low running costs (bicycle or motorbike, mobile phone, cans) Proximity to livestock farmers (supplier network) Proximity to dairies (deliveries in less than 4 hours - no cold chain) Flexible milk prices depending on market conditions Providing quality local milk Competition: Milk Collection Centres Imported milk powder</p> <p>Distribution Channels Supplier/customer network specific to each collector Mobile phone ALL meeting Highlights: HB MMDs; festive events (christenings, weddings, other religious ceremonies)</p>	<p>Customer Segments Mini-dairies Primarily individual customers Shops</p>
<p>Cost Structure Purchase, maintenance, fuel for collection/distribution vehicle (bicycle, motorbike), Equipment (cans, milk tank, funnel, sieve, lactodensimeter thermometer) Mobile phone subscription or credits, energy (gas, electricity)</p>	<p>Revenue Streams Buyers: Mini-dairies (sold at 400F/L in the rainy season and 500F/L in the dry season), Private individuals (sold at 600F/L in the rainy season and 750F/L in the dry season) Affordable quality milk (350F/L in the rainy season and 400F/L in the dry season) from agro-pastoralists</p>			

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3.2.1.2 Key stakeholders in the success of the AE BM for independent milk collectors

The key stakeholders in the success of the AE BM for independent milk collectors are primarily: (i) farmers, for crop co-products and grazing rights negotiation for dairy farmers; (ii) dairy processing units, for credit and input acquisition; (iii) Livestock and Agriculture Department, for technical advice; (iv) the regional Chamber of Agriculture, Commerce and Crafts; (v) Environmental Affairs Department; (vi) microfinance institutions; (vii) milk collection input suppliers; (viii) Sanitation Department and the Consumers' League; and (ix) research centres.

3.2.1.3 Impact of the AE package on the 13 elements of agroecology

The AE package for milk collection has had a positive impact on 8 of the 13 agroecology principles for independent collectors (Table 11). Participants felt that the AE package would have the following impact:

- 1) Highly positive on the principle of Co-Creation of Knowledge (+4/current BM);
- 2) Moderately positive on the following 7 principles: Economic Diversification, Connectivity between Stakeholders, Participation (+3/current BM); Recycling, Social Values and Diets, Fairness in Trade (+2/current BM); and Input Reduction (+1/current BM);
- 3) None for the following principles: Soil Health, Animal Health, Biodiversity, Agroecosystem Synergies, Land and Resource Governance).

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Table 11. Agroecological characteristics of independent milk collectors' current Business Model (Current BM) and agroecological Business Model (AE BM)

Elements of agroecology	Agroecological characteristics	BM	-	+	++	+++	++++	Current BM score	AE BM score
1. Recycling	Oil cans into milk cans	C		1				1	3
		AE				3			
2. Input Reduction	Vehicles with no fuel consumption (bicycles)	C				3		4	5
		AE		1					
	Vehicles with low fuel consumption (motorbikes, tricycles)	C		1					
		AE					4		
3. Soil Health	X						0	0	
4. Animal Health	X						0	0	
5. Biodiversity	X						0	0	
6. Agroecosystem Synergies	X						0	0	
7. Economic Diversification	Business centred on milk collection (therefore not diversified)	C		1				1	4
		AE				4			
8. Co-Creation of Knowledge	Knowledge of supplier and customer networks	C			2			4	8
		AE				4			
	Knowledge about milk collection without refrigeration systems	C			2				
		AE				4			
9. Social Values and Diets	Promoting a local resource: milk	C			2			2	4
		AE				4			
10. Fairness in Trade	Informal status (workers with little or no protection if something goes wrong)	C		1				1	3
		AE				3			
11. Connectivity between Stakeholders	Strong connection with suppliers and buyers	C		1				1	4
		AE				4			
12. Land and Resource Governance	X							0	0
13. Participation	Involvement in collective initiatives regarding the dairy industry	C		1				1	4
		AE				4			
Total								15	35

The radar chart showing independent milk collectors' current BM and AE BM in relation to the 13 AE principles revealed that implementing the AE package should intensify the agroecological nature of these stakeholders' current BM, particularly with regard to the principle of Co-Creation of Knowledge (Figure 6).

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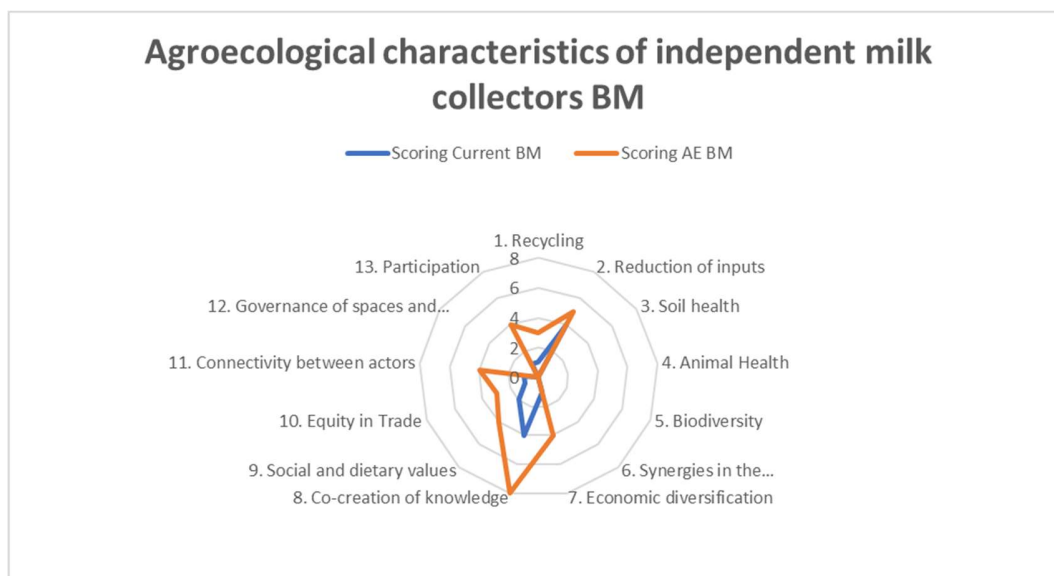


Figure 6. Radar chart showing independent milk collectors' current Business Model (Current BM) and agroecological Business Model (AE BM) with regard to the 13 principles of agroecology

3.2.1.4 Negative impact of implementing the AE package for milk collection at independent collector level on young people and women

FGD participants feel that implementing the AE package for milk collection among independent milk collectors will have had no negative impact on young people and women (Table 12). When asked whether implementing the agroecological package could have a negative impact on young people and women, all participants (100%) said it would not.

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Table 12: Negative impact of implementing the agroecological (AE) package for milk collection at independent collector level on young people and women

AE package for milk collection		Negative impact on young people		Negative impact on women	
		Yes (%)	No (%)	Yes (%)	No (%)
Services to farmers	Service 1: The MCC is a forum for dialogue between farmers and collectors (DIAL)	x	x	x	x
	Service 2: Advice on agroecological management of dairy farms (techno-economic) (ADVICE)		100		100
	Service 3: Input and credit support to farmers (CREDIT)		100		100
Services to processors	Service 1: Milk quality control (QUAL)		100		100
	Service 2: Guaranteed delivery in terms of quantity and quality (GUARANT)		100		100
	Service 3: Ease of access to credit, inputs and equipment between farmers and processors (CREDIT)		100		100

Key: x = stakeholders not associated with the package

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3.2.2 Milk Collection Centres

3.2.2.1 Presentation of the AE BM for Milk Collection Centres

Implementing the agroecological package for milk collection should induce changes in the components of Milk Collection Centres' current BM, with the exception of the 'Value Proposition' and 'Customer Relationships' components (Table 13).

Table 13. Agroecological Business Model (AE BM) for Milk Collection Centres (elements provided by the AE BM shown in yellow and green, elements provided during Focus Groups shown in green)

<p>Key Partners Agro-pastoral dairy farmers and their SCOOPs DIP DIPARAH (veterinarians, zootechnicians, etc.) NGOs and projects (PDPS, PRAPS 2, CRA, PRCAM, PATEC) Local authorities (Prefecture, Town Council, Governorate, High Commission, Commission, village chiefdom: land allocation, conflict resolution) IPROLAIT Mini-dairies</p>	<p>Key Activities Daily milk reception (and minimum quality control) Daily milk distribution to mini-dairies with MCC's (or main collector's) tricycle/motorbike Consultation framework (awareness campaigns, training courses, meetings with livestock farmers) Service centre providing various services to farmers (seed, livestock feed, veterinary products)</p>	<p>Value Proposition Milk collection points (10 operational) spread throughout the Hauts Bassins region close to farmers (and in all seasons), with milk quality control (at least visual; 6 MCCs equipped with milk quality control kits) and daily supply of fresh milk to mini-dairies in Bobo-Dioulasso according to their volume, frequency and quality criteria.</p>	<p>Customer Relationships MCCs close to suppliers (agro-pastoralists and SCOOPs) MCCs supported by government departments (+NGOs and projects) Providing a space for consultation and capacity-building for DIP stakeholders Loyal network of suppliers and customers Competition: Independent collectors (who sometimes pay a higher price for milk than MCCs) Imported milk powder</p>	<p>Customer Segments Bobo-Dioulasso's mini-dairies using local milk (around 15) Households</p>
<p>Research institutions (CIRDES, INERA, CIRAD, Universities) MFIs (credit)</p>	<p>Key Resources MCC land and buildings MCC or MCC staff vehicle (refrigerated tricycle/motorbike) Livestock feed, forage seeds (for farmers supplying MCCs) Solar and milk preconditioning equipment Cans /milk tanks, measuring scoop, funnel Filters/Quality control kit</p>		<p>Distribution Channels DIP's milk allocation system for processors Online sales Highlights: HB MMDs ALL meeting</p>	
<p>Cost Structure MCC construction and equipment from 'project funds' (land, buildings, tricycle/motorbike, miscellaneous equipment) Rolling stock maintenance and insurance MCC staff (incentive on collected milk: main collector, secretary, treasurer, caretaker) MCC maintenance (cleaner paid 15,000F/month) Service centre within the MCC (seed bank, livestock feed bank, veterinary prophylaxis product bank)</p>		<p>Revenue Streams Installation projects. Margin between selling price to dairies (400 F/L in the rainy season and 500 F/L in the dry season) and purchase price from farmers (350 F/L in the rainy season and 400 F/L in the dry season), i.e. around 50 to 100 F/L. Sale of seeds, livestock feed and veterinary prophylaxis products</p>		

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3.2.2.2 Key stakeholders in the success of the AE BM for Milk Collection Centres

The key stakeholders in the success of the AE BM for Milk Collection Centres are primarily microfinance institutions.

3.2.2.3 Impact of the AE package on the 13 elements of agroecology

The AE package for milk collection has had a positive impact on 7 of the 13 agroecology principles for Milk Collection Centres (Table 14). Participants felt that the AE package would have the following impact:

- 1) Highly positive on the following three principles: Economic Diversification (+6/current BM), Input Reduction and Co-Creation of Knowledge (+4/current BM);
- 2) Moderately positive on the following 4 principles: Participation (+3/current BM); Fairness in Trade and Connectivity between Stakeholders (+2/current BM); Social Values and Diets (+1/current BM);
- 3) None for the following 6 principles: Recycling, Soil Health, Animal Health, Biodiversity, Agroecosystem Synergies, Land and Resource Governance.

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Table 14: Agroecological characteristics of Milk Collection Centres' current Business Model (Current BM) and agroecological Business Model (AE BM)

Elements of agroecology	Agroecological characteristics	BM	-	+	++	+++	++++	Current BM score	AE BM score
1. Recycling	X							0	0
2. Input Reduction	Vehicles with low fuel consumption (motorbikes, tricycles)	C	-1					-1	3
		AE				3			
3. Soil Health	X							0	0
4. Animal Health	X							0	0
5. Biodiversity	X							0	0
6. Agroecosystem Synergies	X							0	0
7. Economic Diversification	Milk collection (sale of livestock feed and seeds)	C		1				4	10
		AE				3			
	Space for consultation between stakeholders (non-monetised service)	C			2				
		AE					4		
Visual inspection of milk quality	C		1						
	AE				3				
8. Co-Creation of Knowledge	Knowledge of supplier and customer networks	C			2			3	7
		AE					4		
	Knowledge about milk quality and preservation	C		1					
		AE				3			
9. Social Values and Diets	Promoting a local resource: milk	C				3		3	4
		AE					4		
10. Fairness in Trade	Consultation among MCC members	C		1				1	3
		AE				3			
11. Connectivity between Stakeholders	Connection with suppliers and buyers	C		1				1	3
		AE				3			
12. Land and Resource Governance	X							0	0
13. Participation	Involvement in collective initiatives regarding the dairy industry	C		1				1	4
		AE					4		
Total								12	34

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The radar chart showing Milk Collection Centres' current BM and AE BM in relation to the 13 AE principles revealed that implementing the AE package should intensify the agroecological nature of these stakeholders' current BM with regard to the principles of Economic Diversification, Input Reduction and Co-Creation of Knowledge (Erreur ! Référence non valide pour un signet.).

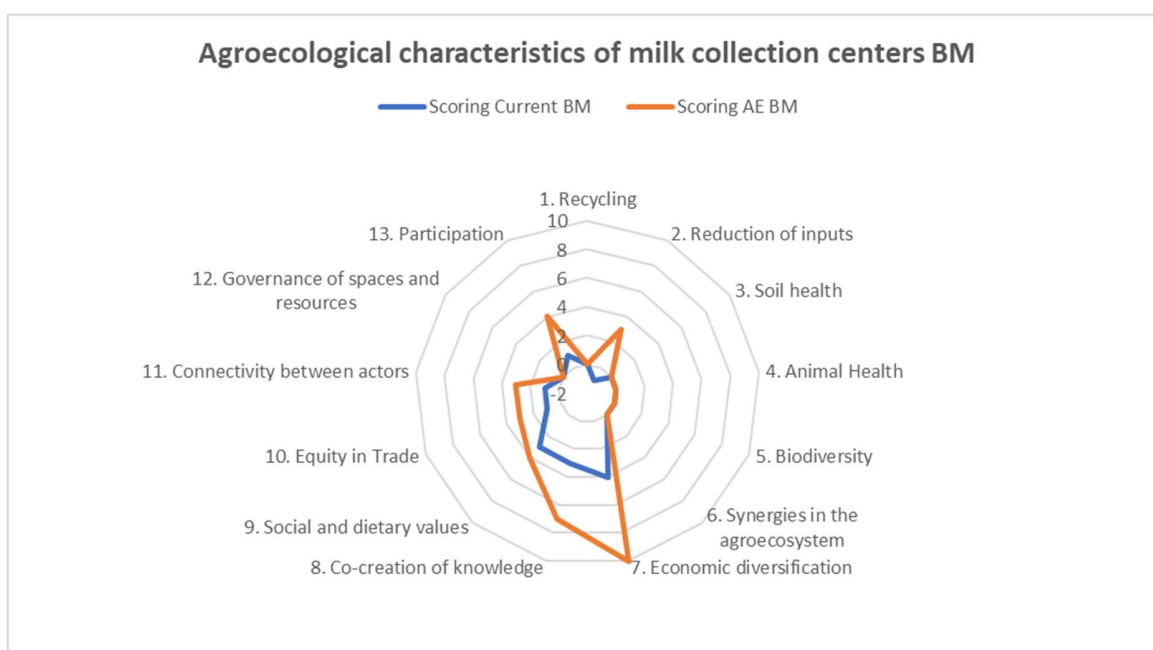


Figure 7. Radar chart showing Milk Collection Centres' current Business Model (Current BM) and agroecological Business Model (AE BM) with regard to the 13 principles of agroecology

3.2.2.4 Negative impact of implementing the AE package for milk collection at Milk Collection Centre level on young people and women

FGD participants feel that implementing the AE package for milk collection among Milk Collection Centres will have had no negative impact on young people and women (Table 15). When asked whether implementing the agroecological package could have a negative impact on young people and women, all participants (100%) said it would not.

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Table 15: Negative impact of implementing the agroecological (AE) package for milk collection at Milk Collection Centre level on young people and women

AE package for milk collection		Negative impact on young people		Negative impact on women	
		Yes (%)	No (%)	Yes (%)	No (%)
Services to farmers	Service 1: The MCC is a forum for dialogue between farmers and collectors (DIAL)		100		100
	Service 2: Advice on agroecological management of dairy farms (techno-economic) (ADVICE)		100		100
	Service 3: Input and credit support to farmers (CREDIT)		100		100
Services to processors	Service 1: Milk quality control (QUAL)		100		100
	Service 2: Guaranteed delivery in terms of quantity and quality (GUARANT)		100		100
	Service 3: Ease of access to credit, inputs and equipment between farmers and processors (CREDIT)		100		100

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3.3 Dairy processors

3.3.1 Mini-dairies using local milk

3.3.1.1 Presentation of the AE BM for mini-dairies using local milk

Implementing the agroecological package for milk processing should induce changes in the components of the current BM for mini-dairies using mainly local milk, with the exception of the 'Value Proposition' component (Table 16).

Table 16: Agroecological Business Model (AE BM) for mini-dairies using mainly local milk (elements provided by the AE BM shown in yellow and green, elements provided during Focus Groups shown in green)

<u>Key Partners</u>	<u>Key Activities</u>	<u>Value Proposition</u>	<u>Customer Relationships</u>	<u>Customer Segments</u>
Independent milk collectors Milk Collection Centres Dairy farmers delivering their produce directly to dairies (mini-farms) Suppliers of raw materials and consumables (sugar, flavourings, ferments, packaging, gas, water, containers...) Microfinance services World Food Programme (WFP) DIP Local authorities Consumers' League NEEMA Cooperative, UMPL/B, IPROLAIT Government bodies: Chamber of Commerce and Industry, Livestock and Agriculture Department, Sanitation Department, Regional Chamber of Agriculture NGOs and projects (PRAPS, PRECEL, PDPS) Research bodies (IRSAT, CIRAD, ICS, INERA) Retailers (shops, kiosks, grocery stores) Equipment suppliers (testers, packaging equipment)	Milk processing into dairy products based on local milk: mainly pasteurised liquid milk and yoghurts, yoghurt with honey, cheese, cosmetics, butter, dried dèguè, fresh milk cake, cereal and tuber biscuit with milk, cream, sour milk and innovative dairy products using ingredients from non-timber forest products (e.g. djim djim), orange-fleshed sweet potato dèguè with milk, Djobal (milk + small millet), Mozzarella cake, cheesy butter, shea butter biscuit with milk <u>Key Resources</u> Buildings and milk processing equipment Inputs (raw milk, sugar, flavourings, energy, water, honey, containers) Non-timber forest products (date, kinkeliba, moringa, monkey bread/theodo, sweet potato, Detarium microcarpa (tamacoumba), etc.)	Milk processing and distribution of dairy products made from local milk to meet demand from customers wishing to consume such products for a variety of reasons (taste, nutritional value, eating habits, civic engagement...)	Supportive processor network (distribution system for collected milk between DPUs, and uniform milk purchase price) Meeting emerging demand for local milk-based products from Burkina Faso Quality of products made from local milk Thorough pre-market testing of dairy product quality Awareness campaigns (advertising) Policies promoting local consumption in Burkina Faso Competition: dairies using milk powder (cheaper products) - and/or complementarity (different demand segment)	Dairy distributors (kiosks, shops, supermarkets, grocery stores) Consumers buying directly from dairies (all categories) Consumers enjoying products made from local milk (civil servants...) Population buying raw milk and/or cream for traditional rituals
			<u>Distribution Channels</u> Loyal network of distributors (shops, grocery stores, supermarkets, school canteens, crossroads, strategic locations) Government contracts (gendarmierie) Online sales (social networks) Direct sales if outlet provided by dairy Sales in the sub-region Sales on gold panning sites	

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	Expertise in local milk processing and micro-business management (skilled workforce) Working capital		Street trading Sales at events (weddings, christenings, coffee breaks, etc.) Highlights: HB MMDs, Trade fairs
Cost Structure Mini-dairy set-up costs (land, buildings, milk processing equipment) Raw materials and consumables (raw milk, sugar, flavourings, NTFPs , packaging); Energy and fluids (electricity, gas, water, fuel) Staff wages Taxes and duties Certification costs		Revenue Streams Dairy distributors (kiosks, shops, supermarkets, etc.) (Direct sales when the dairy has its own outlet) Online sales/ordering of dairy products Milk-based cosmetics New and innovative dairy products Sub-regional sales Sales on gold panning sites and in villages	

3.3.1.2 Key stakeholders in the success of the AE BM for mini-dairies using local milk

The key stakeholders in the success of the AE BM for mini-dairies using mainly local milk are primarily: (i) microfinance institutions; (ii) NGOs; (iii) local authorities ; (iv) the Consumers' League and (v) the Regional Chamber of Agriculture.

3.3.1.3 Impact of the AE package on the 13 elements of agroecology

The AE package for milk processing has had a positive impact on 8 of the 13 agroecology principles for mini-dairies using mainly local milk (Table 17). Participants felt that the AE package would have the following impact:

- 1) Highly positive on the principle of Input Reduction (+4/current BM);
- 2) Moderately positive on the following 7 principles: Co-Creation of Knowledge, Social Values and Diets (+3/current BM); Economic Diversification, Connectivity between Stakeholders, and Participation (+2/current BM); Recycling, and Fairness in Trade (+1/current BM);
- 3) None for the following 5 principles: Soil Health, Animal Health, Biodiversity, Agroecosystem Synergies, Land and Resource Governance.

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Table 17: Agroecological characteristics of the current Business Model (Current BM) and agroecological Business Model (AE BM) for mini-dairies using mainly local milk

Elements of agroecology	Agroecological characteristics	BM	-	+	++	+++	++++	Current BM score	AE BM score
1. Recycling	Recycling whey and other effluents	C		1				1	2
		AE			2				
2. Input Reduction	Use of gas, electricity and water	C	-1					-2	2
		AE				3			
	Occasional use of milk powder (in the event of local milk shortages)	C	-1						
	AE	-1							
3. Soil Health	X							0	0
4. Animal Health	X							0	0
5. Biodiversity	X							0	0
6. Agroecosystem Synergies	X							0	0
7. Economic Diversification	Dairy product diversification (depending on DPUs)	C		1				1	3
		AE				3			
8. Co-Creation of Knowledge	Expertise in processing milk into traditional dairy products and innovative recipes	C		1				1	4
		AE					4		
9. Social Values and Diets	Traditional dairy products (dégué, gapal...) and occasional innovations offered to consumers	C		1				1	4
		AE					4		
10. Fairness in Trade	Informal status of dairy staff	C		1				1	2
		AE			2				
11. Connectivity between Stakeholders	Connection with collectors, collection centres, livestock farmers' organisations, government bodies, NGOs...	C		1				1	3
		AE				3			
12. Land and Resource Governance	X							0	0
13. Participation	Supportive processor network (distribution system for collected milk between DPUs, and uniform milk purchase price)	C		1				1	3
		AE				3			
Total								5	23

The radar chart showing the current BM and AE BM for mini-dairies using mainly local milk in relation to the 13 AE principles revealed that implementing the AE package should intensify the agroecological nature of these stakeholders' current BM, particularly with regard to the principle of Input Reduction (Figure 8).

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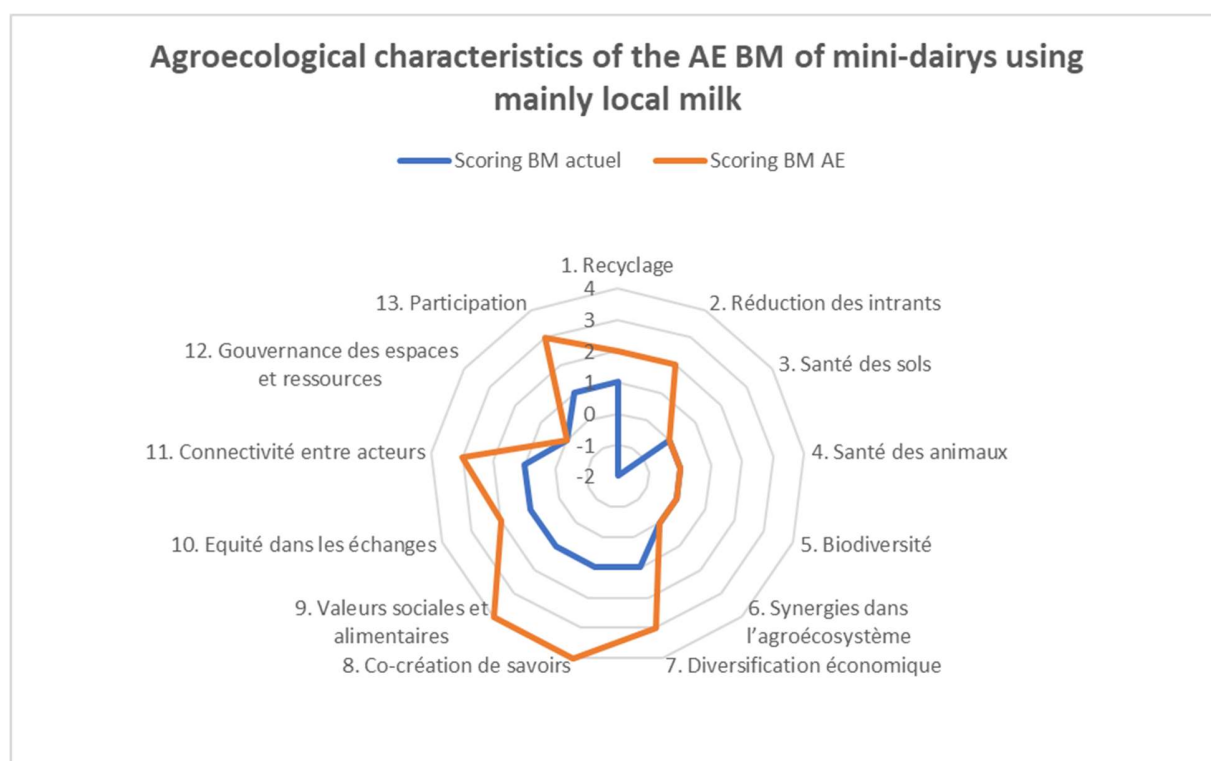


Figure 8. Radar chart showing the current Business Model (Current BM) and agroecological Business Model (AE BM) for mini-dairies using mainly local milk with regard to the 13 principles of agroecology

3.3.1.4 Negative impact of implementing the AE package for milk processing among mini-dairies using mainly local milk on young people and women

Implementing the AE package for milk processing among mini-dairies using mainly local milk had no negative impact on young people and women (Table 18). When asked whether implementing the agroecological package could have a negative impact on young people and women, all participants (100%) said it would not.

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Table 18: Negative impact of implementing the agroecological (AE) package for milk processing among mini-dairies using mainly local milk on young people and women

AE package for milk processing	Negative impact on young people		Negative impact on women	
	Yes (%)	No (%)	Yes (%)	No (%)
Traditional dairy products from local produce (TRADPROD): Gapal, Plain yoghurt, Sweetened yoghurt, Skimmed yoghurt, Pasteurised milk, Cottage cheese, Dêguê with small millet, Dêguê with corn, Cream yoghurt, Milk drink, Sour milk, Cream, Peul cheese (Wagashi), Butter		100		100
Innovative dairy products (INNOVPROD): Date yoghurt, Theodo yoghurt, Kinkeliba yoghurt, Moringa yoghurt, Coconut yoghurt, Pineapple yoghurt, Horchata yoghurt, Néré yoghurt, Mango yoghurt, Banana yoghurt, Zaigainai yoghurt (Balanites)		100		100
Milk-based cosmetics (COSPROD): Milk-based ointment, Milk soap, Milk oil		100		100

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3.3.2 Mini-dairies using milk powder

3.3.2.1 Presentation of the AE BM for mini-dairies using milk powder

Implementing the agroecological package for milk processing should induce changes in the components of the current BM for mini-dairies using milk powder, with the exception of the 'Key Activities', 'Key Resources', 'Customer Relationships' and 'Revenue Streams' components (Table 19).

Table 19: Agroecological Business Model (AE BM) for mini-dairies using milk powder (elements provided by the AE BM shown in yellow and green, elements provided during Focus Groups shown in green)

<p>Key Partners Milk powder suppliers Suppliers of other raw materials and consumables (sugar, flavourings, ferments, packaging, gas, water, etc.) Government bodies: Chamber of Commerce and Industry, Sanitation Department NEEMA Cooperative Research</p>	<p>Key Activities Processing of milk powder-based dairy products: mainly yoghurts</p>	<p>Value Proposition Processing and distribution of milk powder-based dairy products (with some diversity), providing good margins thanks to cheaper raw material (milk powder)</p>	<p>Customer Relationships Low production costs (cheap raw material) Easy acquisition (regularity) and processing of main raw material Low skill requirements and fewer risks than with local milk Products made from milk powder are better known and easier to preserve Competition: dairies using local milk (or complementarity)</p>	<p>Customer Segments Dairy distributors (kiosks, shops, supermarkets, grocery stores, cake shops) Consumers buying directly from dairies (all types) Consumers with no interest in milk provenance Army camps and fire brigades</p>
<p>Cost Structure Mini-dairy set-up costs (land, buildings, milk powder processing equipment) Raw materials and consumables (milk powder, ferments, sugar, flavourings, packaging, etc.); Energy and fluids (electricity, gas, water, fuel) Staff wages Transport (product purchase and delivery) Taxes</p>	<p>Revenue Streams Dairy distributors (kiosks, shops, supermarkets, grocery stores, restaurants, etc.) Ceremonies (weddings, christenings, funerals), gold panning sites (Direct sales when the dairy has its own outlet)</p>			
<p>Key Resources Buildings and milk processing equipment Inputs (milk powder, ferments, sugar, flavourings, energy, water, containers, etc.) Expertise in micro-business management</p>	<p>Distribution Channels Loyal network of distributors (shops, grocery stores, supermarkets, restaurants, kiosks) Neighbouring village markets (outskirts of Bobo-Dioulasso), gold panning sites Direct sales if outlet provided by dairy Online sales Highlights: HB MMDs</p>			

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3.3.2.2 Key stakeholders in the success of the AE BM for mini-dairies using milk powder

The key stakeholders in the success of the AE BM for mini-dairies using milk powder are primarily research centres.

3.3.2.3 Impact of the AE package on the 13 elements of agroecology

The AE package for milk processing has had a positive impact on 7 of the 13 agroecology principles for mini-dairies using milk powder (**Table 20**). Participants felt that the AE package would have the following impact:

- 1) Highly positive on the following three principles: Input Reduction, Fairness in Trade, Participation (+4/current BM);
- 2) Moderately positive on the following 4 principles: Economic Diversification, Co-Creation of Knowledge, Social Values and Diets (+3/current BM); Connectivity between Stakeholders (+2/current BM);
- 3) None for the following 6 principles: Recycling, Soil Health, Animal Health, Biodiversity, Agroecosystem Synergies, Land and Resource Governance.

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Table 20: Agroecological characteristics of the current Business Model (Current BM) and agroecological Business Model (AE BM) for mini-dairies using milk powder

Elements of agroecology	Agroecological characteristics	BM	-	+	++	+++	++++	Current BM score	AE BM score
1. Recycling	Recycling whey and other effluents	C	-1					-1	-1
		AE	-1						
2. Input Reduction	Use of gas, electricity and water	C	-1					-3	1
		AE	-1						
	Systematic use of milk powder	C	-1						
		AE	-1						
	Use of flavourings	C	-1						
		AE				3			
3. Soil Health	X						0	0	
4. Animal Health	X						0	0	
5. Biodiversity	X						0	0	
6. Agroecosystem Synergies	X						0	0	
7. Economic Diversification	Dairy product diversification	C	-1					-1	2
		AE			2				
8. Co-Creation of Knowledge	Expertise in processing milk powder into dairy products	C	-1					-1	2
		AE			2				
9. Social Values and Diets	Little variety in dairy products: milk, yoghurt with artificial flavourings	C	-1					-1	2
		AE			2				
10. Fairness in Trade	Informal status of dairy staff	C	-1					-1	3
		AE				3			
11. Connectivity between Stakeholders	Limited connection with downstream stakeholders (distributors)	C		1				1	3
		AE				3			
12. Land and Resource Governance	X							0	0
13. Participation	Limited to downstream stakeholders (distribution)	C	-1					-1	3
		AE				3			
Total								-8	15

The radar chart showing the current BM and AE BM for mini-dairies using milk powder in relation to the 13 AE principles revealed that implementing the AE package had intensify the agroecological nature of these stakeholders' current BM, particularly with regard to the principles of Fairness in Trade, Connectivity between Stakeholders, and Participation (Figure 9).

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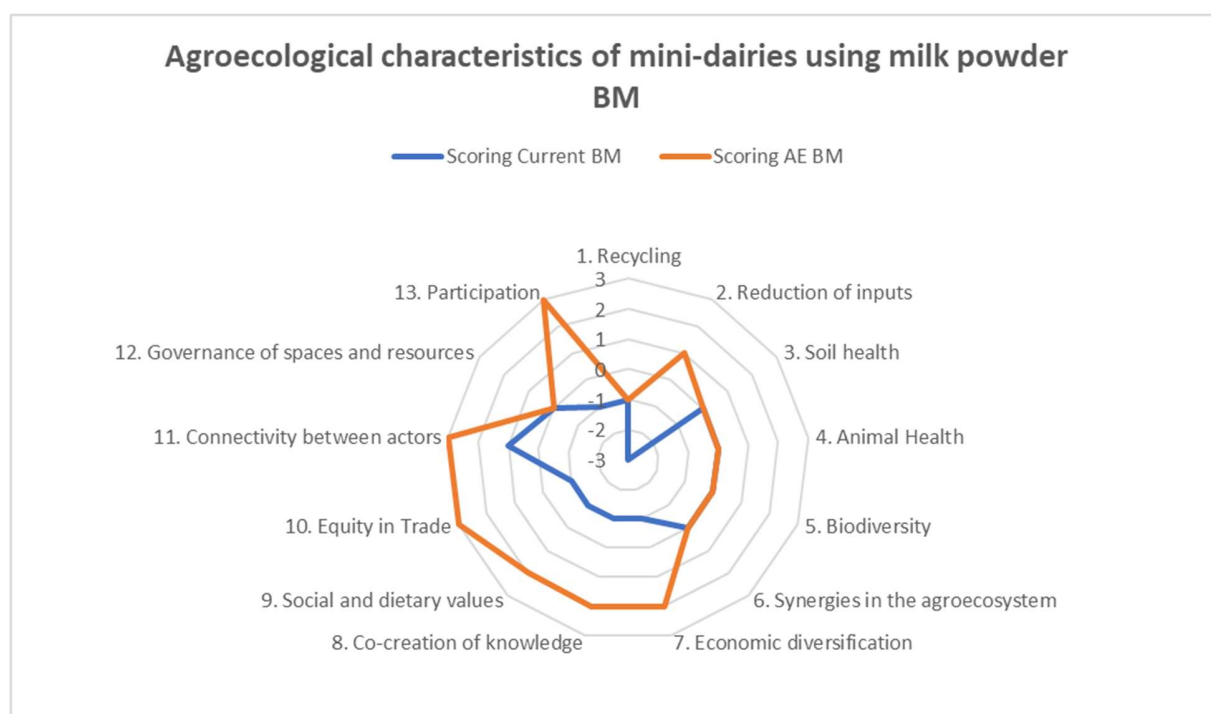


Figure 9. Radar chart showing the current Business Model (Current BM) and agroecological Business Model (AE BM) for mini-dairies using milk powder with regard to the 13 principles of agroecology

3.3.2.4 Negative impact of implementing the AE package for milk processing among mini-dairies using milk powder

Implementing the AE package for milk processing among mini-dairies using milk powder had no negative impact on young people and women (Table 21). When asked whether implementing the agroecological package could have a negative impact on young people and women, all participants (100%) said it would not.

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Table 21: Negative impact of implementing the agroecological (AE) package for milk processing among mini-dairies using milk powder on young people and women

AE package for milk processing	Negative impact on young people		Negative impact on women	
	Yes (%)	No (%)	Yes (%)	No (%)
Traditional dairy products from local produce (TRADPROD): Gapal, Plain yoghurt, Sweetened yoghurt, Skimmed yoghurt, Pasteurised milk, Cottage cheese, Dêguê with small millet, Dêguê with corn, Cream yoghurt, Milk drink, Sour milk, Cream, Peul cheese (Wagashi), Butter		100		100
Innovative dairy products (INNOVPROD): Date yoghurt, Theodo yoghurt, Kinkeliba yoghurt, Moringa yoghurt, Coconut yoghurt, Pineapple yoghurt, Horchata yoghurt, Néré yoghurt, Mango yoghurt, Banana yoghurt, Zaigainai yoghurt (Balanites)		100		100
Milk-based cosmetics (COSPROD): Milk-based ointment, Milk soap, Milk oil	x	x	x	x

Key: x = stakeholders not associated with the package

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4 Conclusion

Through a series of co-design workshops, we were able to draw up the Agroecological Business Models for stakeholders operating upstream in Bobo-Dioulasso's dairy value chain.

Implementing all three agroecological packages relating to each stakeholder should have a positive impact on the agroecological characteristics of current BMs with regard to the 13 principles of agroecology (Erreur ! Source du renvoi introuvable.)

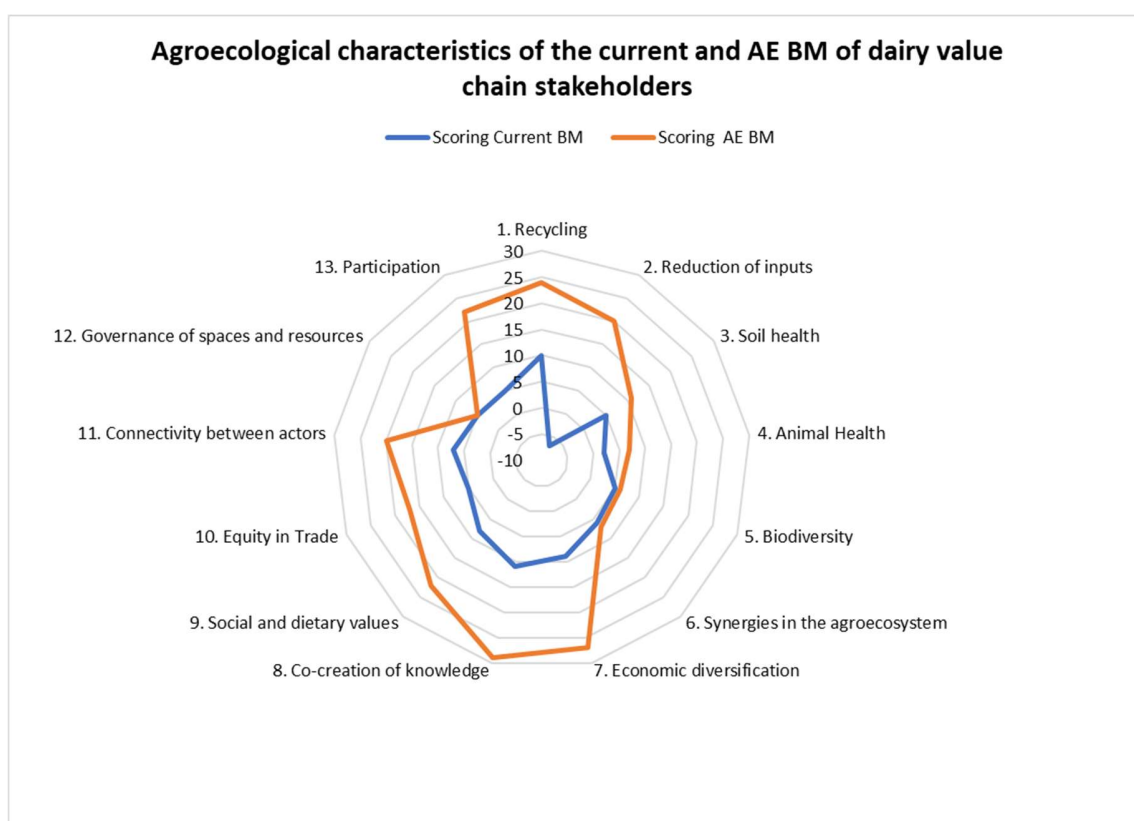


Figure 10. Radar chart showing dairy value chain stakeholders' current and AE BMs with regard to the 13 principles of agroecology

The agroecological principle most positively impacted by the implementation of agroecological packages for all stakeholders is Input Reduction (+27 points/current BM).

Moderately impacted agroecological principles are as follows: Economic Diversification, Co-Creation of Knowledge, Participation, Recycling, Social Values and Diets, Connectivity between Stakeholders, and Fairness in Trade (between +12 and +18 points/current BM).

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Finally, the principles barely or not impacted by the implementation of the AE BM are as follows: Soil Health, Animal Health, Biodiversity, Agroecosystem Synergies, Land and Resource Governance.

For dairy farmers, Recycling will be the agroecological principle most positively impacted by the implementation of the AE BM among agro-pastoralists. For mini-farms, it will be the Input Reduction principle. The least positively impacted principles are Land & Resource Governance and Fairness in Trade for agropastoralists and mini-farms respectively.

For milk collectors, Co-Creation of Knowledge will be the agroecological principle most positively impacted by the implementation of the AE BM among independent collectors. For collection centres, it will be the Economic Diversification principle. The least positively impacted principles are those relating to the agrosystem (Soil Health, Animal Health, Biodiversity, Agrosystem Synergy) and natural resource management (Land and Resource Governance).

Among dairy processors, the Input Reduction principle will be the one most positively impacted by the implementation of the AE BM, as with collectors. Among processors, the principles more specifically related to the agrosystem and the management of collective natural resources will be barely, if at all, impacted by the implementation of the AE BM (Soil Health, Animal Health, Biodiversity, Agrosystem Synergy, Land and Resource Governance).

Finally, it appears that the implementation of all the agroecological packages will have no negative impact on either young people or women. In many respects, this demonstrates the value of these agroecological packages in contributing to the agroecological transition and to achieving sustainable development goals.

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6 Appendix

Annex 1: Dairy farmers: Opportunities & Constraints experienced by the DVC stakeholders identified during the study “spaces for initiative spaces” included in the agroecological business model

Elements of the AE Business model at farm level	Agro-pastoralist - men	Agro-pastoralist-women	Mini-famrs
High-quality forage as a strong substitute for livestock feed	<p>Opportunities Organic manure (OM) production helps to reduce the need for mineral fertilisers Forage crops help to reduce livestock feed purchases Reforestation and protection of specific tree species help to improve soil health Knowledge of grazing areas</p> <p>Constraints Obstruction of grazing tracks</p>	<p>Opportunities Cutting of rangeland grass to feed livestock Forage crop growing in the dry season</p> <p>Constraints Lack of grazing areas, especially in the rainy season because of fields Limited period during which forage resources can be exploited (shortage)</p>	<p>Opportunities Capacity building on forage production techniques Distribution / Provision of forage seeds Improving access to land in order to ramp up forage production</p> <p>Constraints High cost of livestock inputs</p>
Manure as a strong substitute for mineral fertilizers	<p>Opportunities OM exchanges with neighbouring farmers Field corralling of livestock improves soil health OM improves soil fertility</p> <p>Constraints Lack of infrastructure and equipment for OM transport and CR storage Difficulty in producing large quantities of OM Use of organic manure generates significant weed growth in fields</p>	<p>Opportunities Use of manure to improve soil quality</p> <p>Constraints Arduousness of manure recycling work Lack of expertise in quality organic manure production (manure pit) Lack of equipment for manure recycling (especially for insecticide production)</p>	<p>Opportunities High demand for livestock by-products (manure) Use of organic manure instead of mineral fertilisers</p> <p>Constraints Lengthy OM mineralisation process for soil health improvement</p>
Integrated management of plant and animal co-products	<p>Opportunities Legume crops help to improve soil health Livestock farmers' sedentary lifestyle (reduced mobility) Milk supply, OM disposal, corralling contracts, crop residue (CR) trades => wealth Corralling and soil rotation help to reduce the use of fertilisers Crop residues for animals</p> <p>Constraints X</p>	<p>Opportunities X</p> <p>Constraints x</p>	<p>Opportunities X</p> <p>Constraints x</p>
Balanced diets for dairy cows at an acceptable cost	<p>Opportunities X</p> <p>Constraints X</p>	<p>Opportunities X</p> <p>Constraints x</p>	<p>Opportunities Use of natural products in livestock feed (more Moringa, etc.)</p> <p>Constraints Lack of skilled local HR to provide training on improved livestock management Poor access to suitable inputs for improved breeds</p>
Use of medicinal plants as substitutes for veterinary drugs (when effective)	<p>Opportunities To improve animal health, we focus on quality feed and sound disease prevention Use of bark to produce decoctions for livestock</p> <p>Constraints Loss of traditional skills in plant-based animal care Unavailability and shortage of veterinary staff</p>	<p>Opportunities X</p> <p>Constraints High cost of veterinary products Lack of expertise in the use of natural products to improve animal health</p>	<p>Opportunities</p> <p>Constraints Little use made of endogenous knowledge in livestock feed development and health monitoring</p>
Optimal management of livestock and natural resources	<p>Opportunities Animal habitat improvement Training courses in cow housing and animal health</p> <p>Constraints Competition over natural resource management</p>	<p>Opportunities X</p> <p>Constraints Lack of expertise in building modern barns</p>	<p>Opportunities Training (livestock management, feed, health monitoring) leading to increased milk production</p> <p>Constraints x</p>

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Annex 2: Milk collectors: Opportunities & Constraints experienced by the DVC stakeholders identified during the study “spaces for initiative spaces” included in the agroecological business model

Elements of the AE Business model at farm level	Independent milk collectors	Milk collection centers
Services to farmers		
Service 1: the Milk Collection Center (MCC) is a forum for dialogue between farmers and collectors	<p>Opportunities Information exchange meetings held between all dairy industry stakeholders</p> <p>Constraints Difficulty in bringing together all the industry players Difficulty in agreeing on a single point during meetings Failure to meet commitments (order deadlines)</p>	<p>Opportunities Trust between stakeholders Gatherings (platform meetings, cooperatives) help to strengthen ties between stakeholders Dialogue between dairy industry stakeholders Training courses and meetings often contribute to problem solving</p> <p>Constraints Mistrust and dishonesty among stakeholders</p>
Service 2: advice on agroecological management of dairy farms (technical-economic)	<p>Opportunities X</p> <p>Constraints X</p>	<p>Opportunities Training courses that can help to improve milk collection strategies Training on selecting more productive cows within herds Training on hygiene, milking and milk transport Presence of cooperatives offering training opportunities Information, seed and experience sharing with neighbours</p> <p>Constraints Lack of residue recycling training courses Lack of residue recycling equipment Lack of funding for training projects</p>
Service 3: input and credit support for farmers	<p>Opportunities X</p> <p>Constraints No access to funding as we are not an association Low purchasing power for factors of production (collection and storage equipment)</p>	<p>Opportunities Fair sharing of some donations</p> <p>Constraints Lack of funding and credit for business diversification</p>
Services to farmers		
Service 1: milk quality control	<p>Opportunities Good quality of local milk</p> <p>Constraints Poor quality of milk collected Addition of water to milk to meet orders Difficulty in preserving fresh milk</p>	<p>Opportunities Advice or training on milk collection Improved collection management</p> <p>Constraints Lack of collection equipment Insufficient number of training courses aimed at milk collectors</p>
Service 2: guaranteed delivery in terms of quantity and quality	<p>Opportunities Honesty in our dealings with local dairy industry stakeholders Honouring contracts with customers (timings, milk quantities) Labelling milk and milk derivatives (product type, origin, date...)</p> <p>Constraints Addition of water to milk to meet orders Lack of marketing skills Difficulty in setting a universal price per litre of milk</p>	<p>Opportunities Introduction of formal contracts with dairies Advice or training on milk collection and milk price regulation by government</p> <p>Constraints Failure to meet obligations, and hypocrisy of some people Mistrust and dishonesty among stakeholders</p>
Service 3: Facilitation of credit, inputs and equipment between farmers and processors	<p>Opportunities Feed and water trough production from used cans</p> <p>Constraints No access to funding as we are not an association</p>	<p>Opportunities PADEL-B/PASPA projects to procure tricycles (government) We receive project grants for the purchase of vehicles and collection equipment</p> <p>Constraints Lack of collection equipment Lack of funding and credit for business diversification</p>

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Annex 3: Dairy processors: Opportunities & Constraints experienced by the DVC stakeholders identified during the study “spaces for initiative spaces” included in the agroecological business model

Elements of the AE Business model at farm level	Processors using mainly local milk	
<p>Traditional dairy products: Galal, plain yoghurt, sweetened yoghurt, skimmed yoghurt, pasteurized milk, cottage cheese, Dêguê with small millet, Dêguê with corn, cream yoghurt, milk drink, curdled milk, cream, Peul cheese (Wagashi), butter.</p>	<p>Opportunities Local milk itself is an opportunity (highly nutritious, source of income, diversification into by-products, lower imports, contribution to GDP, job creation for women and young people) Product quality helps to strengthen proximity and consumer confidence Use of appropriate techniques helps to reduce inputs (DPU experience) Training courses (hygiene, preservation, processing into various products) Label and packaging design to promote local milk</p> <p>Constraints Local milk supply (production) far below demand High price of local milk compared to milk powder No kiosks dedicated to the sale of dairy products made from local milk Lack of suitable packaging for marketing Labels providing little information on the composition of dairy products (difficulty in distinguishing local milk from other products) Lack of billboards for local milk promotion</p>	<p>Opportunities On-site availability of processing equipment and machinery Training in product diversification Presence of automated packaging equipment Training courses in processing techniques Use of mint as a substitute in galal and dèguê flavouring</p> <p>Constraints High cost and unavailability of local milk Lack of training courses in milk powder processing Difficulty in processing local milk High input costs for milk powder processing Varying quality of milk powder</p>
<p>Yoghurt made with fresh milk and flavoured with natural extracts of local forest products: Néré, Mango, Theodo, Kinkeliba, Moringa, Coconut, Pineapple, Horchata Mango, Banana, Zaigainai Balanites)</p>	<p>Opportunities Combination of natural (often organic) products with local milk Use of natural products to improve quality (néré, monkey bread, banana, honey, grapes, etc.) Label and packaging design to promote local milk Consumer preferences driving product diversification Training courses (hygiene, preservation, processing into various products)</p> <p>Constraints Local milk supply (production) far below demand High price of local milk compared to milk powder No kiosks dedicated to the sale of dairy products made from local milk Lack of adequate processing equipment and machinery Insufficient technical expertise in local milk processing Insufficient training on diversifying products made from local milk Lack of suitable packaging for marketing Lack of billboards for local milk promotion</p>	<p>Opportunities Training in product diversification Training courses in processing techniques</p> <p>Constraints High cost and unavailability of local milk</p>
<p>Milk-based cosmetics: Milk ointment, Milk soap, Milk oil.</p>	<p>Opportunities Combination of natural (often organic) products with local milk Label and packaging design to promote local milk Consumer preferences driving product diversification Training courses (hygiene, preservation, processing into various products)</p> <p>Constraints Local milk supply (production) far below demand High price of local milk compared to milk powder No kiosks dedicated to the sale of dairy products made from local milk Lack of adequate processing equipment and machinery Insufficient technical expertise in local milk processing Insufficient training on diversifying products made from local milk Lack of suitable packaging for marketing Lack of billboards for local milk promotion</p>	<p>Opportunities Training in product diversification Training courses in processing techniques</p> <p>Constraints High cost and unavailability of local milk</p>