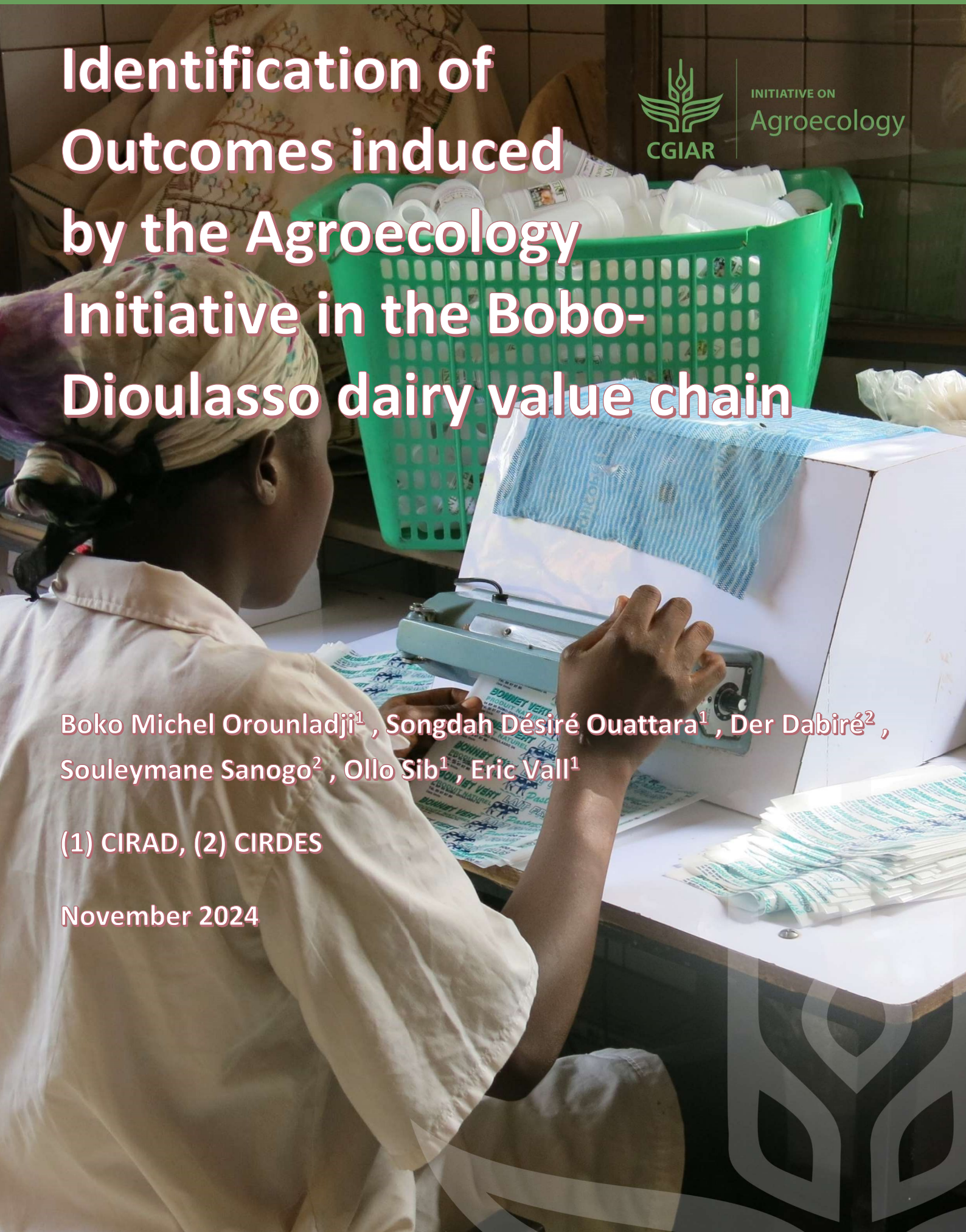
Identification of Outcomes induced by the Agroecology Initiative in the Bobo-Dioulasso dairy value chain



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(1) CIRAD, (2) CIRDES

November 2024

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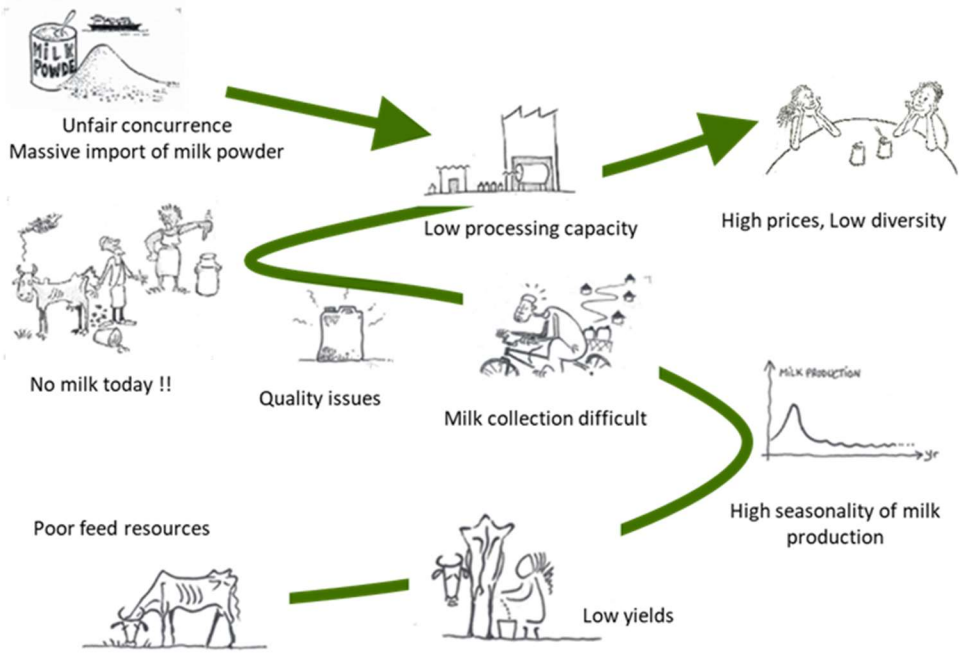
1. Introduction

In Burkina Faso, consumption of dairy products is low (around 20 kg/capita/year). However, consumption will rise in the coming years due to population growth and growing purchasing power. There is an emerging demand for dairy products made from local milk. More and more consumers want to consume good-quality dairy products made from fresh milk, diversified (liquid milk, yoghurts in different flavors, dêguê, gapal, cheese, butter, etc.), at an affordable price. However, competition with dairy products made from low-cost imported milk powder is fierce. This is why dairy value chain players need to innovate at all levels of the agri-food chain to meet the challenges they face (Figure 1) and to respond sustainably to this emerging demand.

Figure 1. Challenges faced by the actors of the Bobo-Dioulasso dairy value chain



This is the context in which the Agroecology Initiative (AEI) operates in Burkina Faso. The activities of the AE Initiative are focused on the Dairy Value Chain (DVC), and are conducted with all its stakeholders (dairy farmers, collectors and processors), who since 2020 have organized themselves into a Diry Innovation Platform (DIP ; Plateforme d'Innovation Laitière in french). In 2023, the DIP was consolidated into an Agroecological Living Landscape (ALL) with the addition of new members and partners (Sib et al., 2023).

The ultimate goal of the ALL is "to increase the share of local milk in dairy products manufactured by Bobo-Dioulasso dairy processors, through innovations at farm level, in milk collection and processing, and in DVC governance". Within the framework of AEI's WP3 activities, the ultimate objective is to support ALL stakeholders in co-designing an Agroecological Business Model for the DVC, integrating far-reaching technical and organizational innovations based on the key principles of agroecology in order to guarantee the sustainability and resilience of the value chain (Sib et al., 2024a).

To achieve this objective, the AEI will help to support ALL actors in an agroecological transition based on five types of change (innovations) at different levels of the food system (Figure 2) :

- At the farm level, milk production can be sustainably increased through farm-livestock integration in dairy production units (production of quality fodder and recycling of by-products into fodder and manure).
- At the collection level: support milk collection centers in diversifying their services in order to increase the quantity and quality of regular milk collection.
- At processing level: support processors in diversifying their production to meet emerging consumer demand.
- At the governance level of the dairy value chain: improve inclusiveness in value chain governance to support the development of all DVC stakeholders.

- At ALL level: improving ALL governance

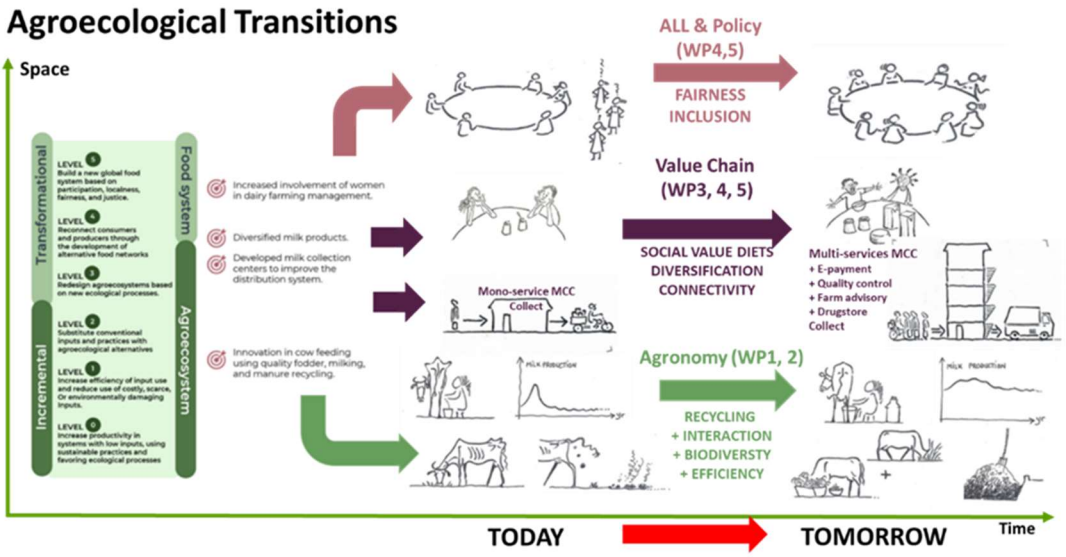


Figure 2. Agro-ecological transition targeted by ALL in Burkina Faso

In 2023 and 2024, activities have been completed in all five AEI work packages (Figure 3), with the aim of co-designing an Agroecological Business Model for the local dairy value chain (Ouattara et al., 2024).

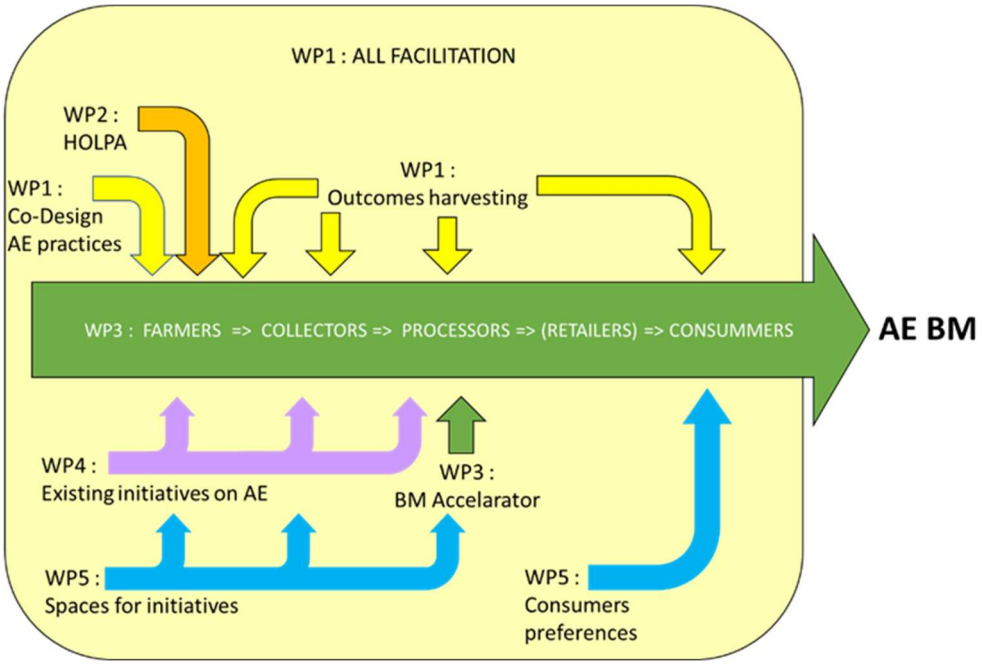


Figure 3. How the AEI WPs feed the co-construction of an agroecological Business Model for the Bobo-Dioulasso milk sector

This report presents the inventory of changes (outcomes) induced by the AEI's activities at the level of stakeholders upstream of the Bobo-Dioulasso milk value chain (dairy farmers, collectors, processors), which was carried out during participatory outcome identification workshops (known as IDEO workshops in french) from November 04 to 07, 2024 in the training room of the Centre International de Recherche Développement sur l'Elevage en Zone Subhumide (CIRDES).

2. Objective and participants in IDEO workshops

2.1. Objective of IDEO workshops

The IDEO workshops aimed to identify the tangible changes (outcomes) and their attributes (types of change, actors involved, extent of change, contribution of the AEI to the change, etc.) induced by the AEI's activities.

2.2. IDEO workshop participants

The three DVC links involved in AEI activities in Burkina Faso were actively represented at the IDEO workshops (Table 1). The representatives of each link were actors who were actually involved in the actions implemented by the AE Initiative over the last 3 years (2022, 2023 and 2024).

Table 1. IDEO workshop participants and facilitators

Professional groups	Participants	Facilitators & Secretaries
Farmers		
Agropastoralists	14	Michel Orounladji & Der Dabiré
Mini-farms	05	Désiré Ouattara & Hati Konaté
Collectors		
Independent collectors	06	Michel Orounladji & Der Dabiré
Milk collection centers	06	Désiré Ouattara & Hati Konaté
Transformers		
Using local milk	12	Michel Orounladji & Der Dabiré
Using milk powder	13	Désiré Ouattara & Hati Konaté

Source: Results of the IDEO workshop, Bobo-Dioulasso, November 4-7, 2024

3. How IDEO workshops work

The workshops were divided into two parts:

- Part 1: identification of outcomes and characterization of outcome attributes by professional group (1 day per professional group, for a total of 3 days)
- Part 2: synthesis (prioritization of outcomes, critical reflection on outcomes, lessons to be learned and outlook) with the 3 professional groups meeting together (1 day)

3.1. Part 1: Identifying and characterizing outcomes

3.1.1. Introduction to the workshop

At the start of each day (for the first 3 days), the participants (by link) were briefed in plenary on the objectives of the workshop, which were to identify the tangible changes brought about by the AE Initiative's activities, and to characterize the attributes of these changes. During the workshop, participants were reminded of the vision, the 6 major objectives of the DIP (=ALL), and the types of changes we planned to contribute to realizing this vision (Figure 2). As a reminder, the DIP vision is as follows:

> “ By 2024, the Bobo-Dioulasso dairy basin will be producing, collecting and processing 18,000 liters of local milk daily.

This vision should be achieved through the following objectives:

- Increase and deseasonalize on-farm milk production
- Strengthen the technical and theoretical skills of dairy farmers
- Ensuring high milk quality
- Harmonizing milk collection prices
- Improve the milk collection, storage and distribution system between processing units
- Market a wide variety of local dairy products

3.1.2. Identification of changes made

During this sequence, participants were divided into two sub-groups according to the link to which they belonged. They were then asked to identify the changes that had occurred in their activities (milk production, collection or processing) and the governance of the Bobo-Dioulasso dairy value chain over the last 3 years (2022, 2023 and 2024).

To achieve this, the facilitators asked the participants questions to get them thinking about and identifying the changes that had occurred (see list of possible questions in the box below). As if to remove any ambiguity in the identification of changes, participants were reminded that changes are not just positive; there may be less positive changes occurring, and these too need to be discussed and described. The facilitator then wrote down each response on a post-it note and read it aloud to make sure he had understood the idea.

Questions to stimulate participants' thinking

- We've been working together on more agroecological practices to achieve the vision and major objectives of the DIP. Where have you seen changes take place?
- Who's doing what differently than before because of the work we've done together on the dairy sector?
- Think about all the types of change that may have occurred: changes in your professional practices, in relationships with your customers or suppliers, in your capabilities, in the organization of the sector, in the sector's environment (politics), in attitudes/mentalities, in behavior,
- Changes in milk production:
    - Forage production, storage and distribution
    - Cow feed management
    - Management of farm by-products to retain fodder, produce organic fertilizer and maintain soil cover.
    - In the way organic manure is produced and used
    - Other changes...
- Change in milk collection:
    - New services for farmers
    - New services for processors
    - Other types of change
- Changes in milk processing:
    - New flavored yogurts with natural extracts from local forest products
    - New milk-based products (cosmetics)
    - Other types of changes (packaging, arrangements with distributors)

3.1.3. Characterization of change attributes

The participants characterized the attributes of the changes identified in the previous sequence. To do this, the facilitators prepared a table to be filled in with the participants on large Kraft paper, displayed in front of the participants (Table 2). After entering the wording of the change in the first box, the facilitators fill in the rows of the table with the participants' answers.

Table 2. Characterization table for change attributes

Attributes of change	Change 1	Change 2	Change ...	Change n
Change description				
What type of change (see list below)?				
What are the indicators of this change?				
Who are the actors involved in this change?				
What are the reasons for this change?				
What were the main drivers of change?				
What is the scale of this change?				
How has the AEI contributed to this change?				
Are other initiatives or events also behind this change?				

Type of change :

- Professional practice
- Relations with customers or suppliers
- Capabilities
- Sector organization

- Industry environment (policy)
- Attitudes/mentality/opinion
- Behaviors

3.1.4. Prioritizing changes

This sequence aimed to establish a hierarchy of changes with the participants. After characterizing the attributes of the changes, participants were asked to assign a score of 1 to 5 cowrie shells to each change, to rank the changes from most to least important. In the end, the number of cowries for each change is counted, and the change with the most cowries is ranked first, and so on.

This sequence marked the end of the first part, which allowed us to prioritize the changes identified by the representative of the professional group.

For the second part, the moderators debriefed on the results of the first part and used these results to animate the second part.

3.2. Part 2: Critical collective reflection on outcomes

On the 4ème day, all the participants in the first part were invited to critically reflect on the changes identified and characterized by each professional group.

The objectives of this second part were as follows:

- Share and validate the changes identified and characterized by each professional group.
- Identify the most significant industry-wide changes.
- Draw lessons learned and identify ways forward to achieve the DIP vision.

3.2.1. Sharing and validating the changes identified by the three groups of professionals

Each professional group reported back to the participants in the other two groups on the changes it had identified and characterized, from most to least important. Short discussion and, if necessary, adjustments in the description of the changes. At the end of this sequence, the three professional groups agreed on all the changes.

3.2.2. Identifying the most significant changes

In order to identify the most significant changes at DVC level, the facilitators asked participants to select from each of the 3 lists of changes the 3 they were most proud of or considered most important. After a show of hands, we came up with a top 10 list of the most significant changes the dairy industry players in the Bobo-Dioulasso dairy basin are most proud of. Some of the questions used to identify these major changes are shown in the box below.

Questions to stimulate participants' thinking

- Why are these the most significant changes compared to the pre-AEI period?
- What are the changes that make us proud of what we've done, and why?

3.2.3. Lessons learned and the way forward

In order to draw lessons learned and identify ways forward , the facilitators brought all the participants together in a plenary session. Discussions revolved around the following questions:

- How can we maintain the positive changes we've identified?
- What are each of us' roles and responsibilities?
- What are the main lessons we've learned from our collaboration on agroecology over the past three years?
- What should be the way forward to realize the DIP vision?

3.3. Data processing and analysis

At the end of the IDEO workshops, the facilitators and secretaries entered all the information from the post-its into the Excel spreadsheet. A radar chart was created for each professional sub-group (agro-pastoralists, mini-farms, independent milk collectors, milk collection centers, local milk processors and milk powder processors) based on the validated changes and their

score. The score for each change is calculated by dividing the number of cowrie shells collected for that change by the number of participants in the professional sub-group.

4. Results

4.1. Identifying and characterizing changes

4.1.1. Identifying and characterizing of changes by Agropastoralists

Agropastoralists identified eleven (11) changes generated by the AE Initiative (Figure 4). After scoring, the top 4 changes are: (i) increased area sown for fodder production; (ii) better collaboration with processors through ALL animation; (iii) increased awareness for good management of farm co-products; and (iv) better selection of cows for milk production. The attributes of these four main changes are presented in Table 3. The authors make available the Excel file containing the full description of the attributes of all the changes identified.

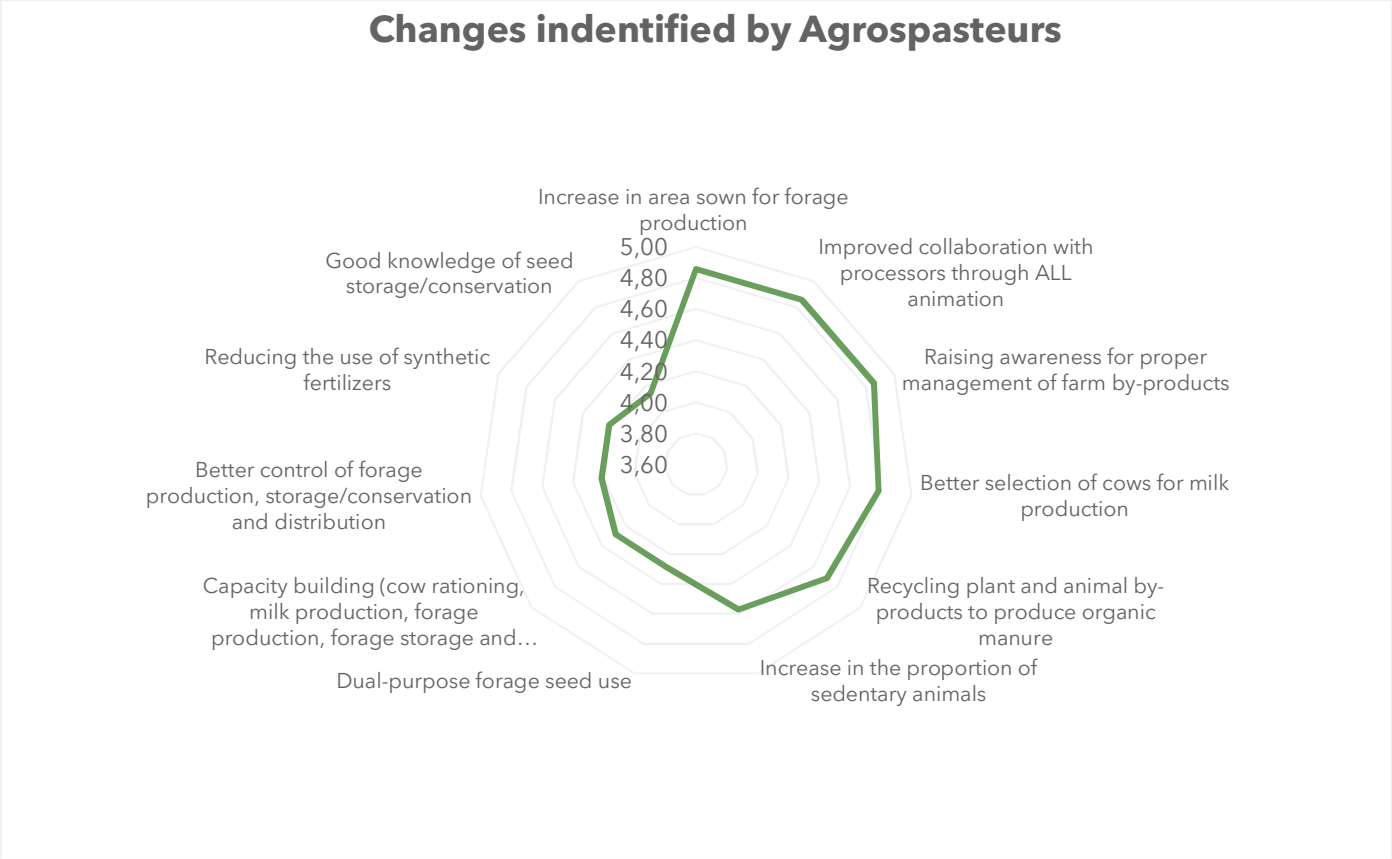


Figure 4. Changes indentified by Agropastoralists

Table 3. Attributes of the main changes identified by Agropastoralists

	Change 1	Change 2	Change 3	Change 4
Change description	Increase in area sown for forage production	Improved collaboration with processors through ALL animation	Raising awareness for proper management of farm by-products	Better selection of cows for milk production
What type of change	Professional practice	Sector organization	Attitudes/mentality/opinion	Professional practice
What are the indicators of this change?	Quantity of forage stored; quantity of milk produced; area of forage crops; different types of forage available	Existence of MCCs (farmers' meeting places)	Existence of manure pits; manure sharing (field and home manure pits)	Quantity of milk produced per cow; Types of co-products or ingredients used to ration cows
Who are the players affected by this change?	Farmers; livestock breeders; traders; milk collectors; women's groups	Agropastoralists; processors; DIP members; Researchers (CIRAD, CIRDES, INERA)	Farmers, breeders	Breeders
What are the reasons for this change?	No space for grazing; galloping demography; farmer-herder conflicts	Support from DRARAH; support from cooperatives	Training; meetings; consultancy support	Training; advisory support; farm monitoring
What were the main drivers of change?	Research support (CIRDES, CIRAD, INERA); motivation to increase milk production	DIP support; ALL animation	Support from DIP; support from researchers (CIRAD, CIRDES, INERA)	Support from researchers (CIRAD, CIRDES, INERA)
What is the scale of this change?	Large scale	Average size	Large scale	Low amplitude
How has the AEI contributed to this change?	Support for forage seeds; Support and advice on technical itineraries	Workshop organization	Awareness-raising; advisory support	Consulting support
Are other initiatives or events also behind this change?	PRECAM (equipment support, farmer-breeder conflict management training, cow milking, financial education)	PAPSA	None	None

Source: Results of the IDEO workshop, Bobo-Dioulasso, November 4-7, 2024

For these Agropastoralists, implementing the AEI has also begun to produce preliminary impacts (see page 27). These impacts and their scores are as follows: (i) increase in fodder yields (4.86); (ii) increase in profits (4.86); (iii) increase in the number of dairy farmers (4.71); (iv) reduction in expenditure on livestock feed (4.57); (v) improvement in the quality of organic manure produced (4.57) and (vi) increase in workload (4.5).

4.1.2. Identification and characterization of changes by Mini-farms

At Mini-farm level, discussions identified eleven (11) changes induced by the AE Initiative (Figure 5). For this professional sub-group, diversification of fodder production tops the list, followed by greater use of crop residues for animal feed and compost production. This is followed by the production of high-quality organic manure and an increase in the area sown for forage production. The attributes of the four main changes are presented in Table 1. The authors provide readers with an Excel file containing the full description of the attributes of all the changes identified.

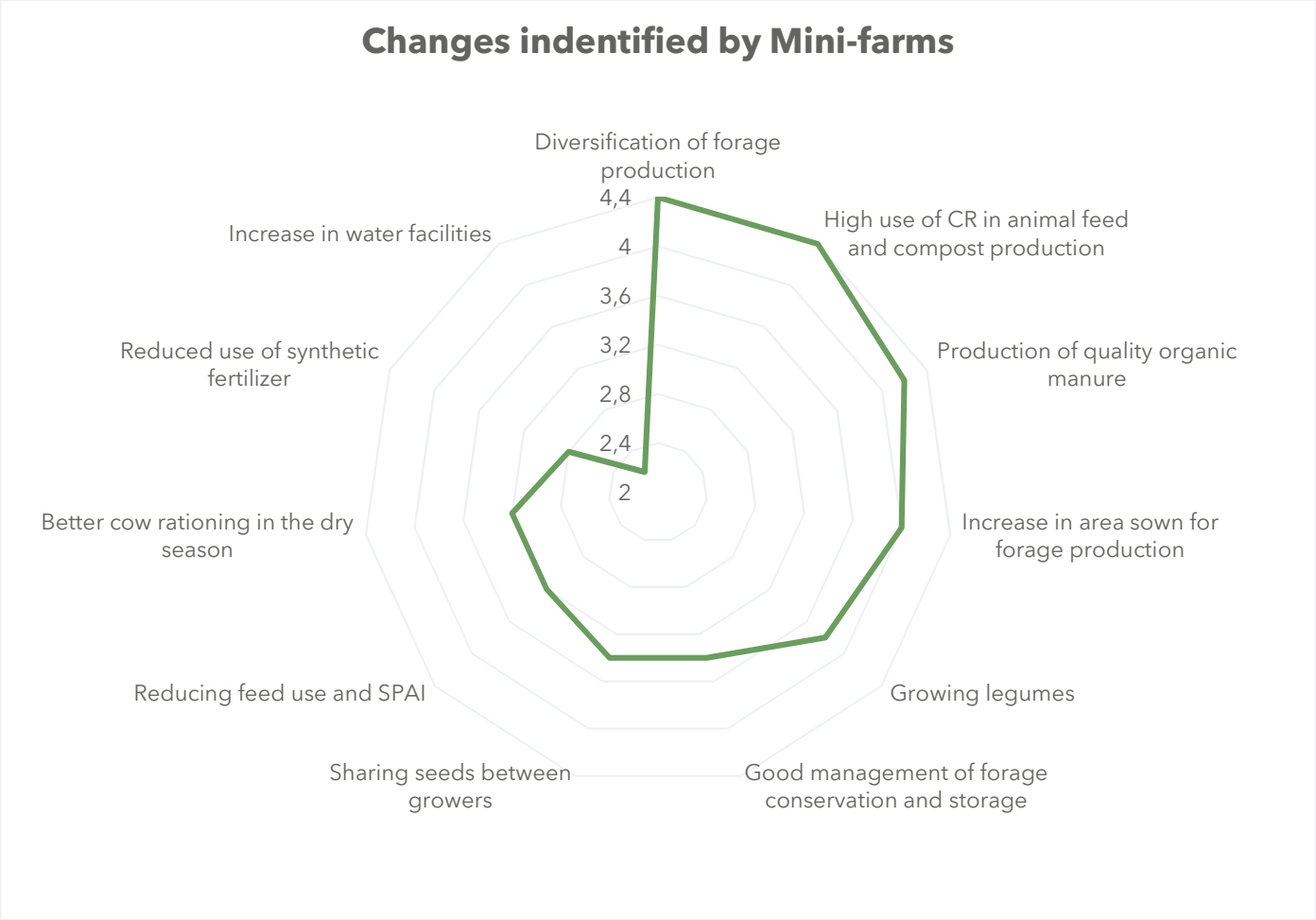


Figure 5. Changes Identified by Mini-farms

Table 4. Attributes of the main changes identified by the Mini-farms

	Change 1	Change 2	Change 3	Change 4
Change description	Diversification of forage production	High use of crop-residues for animal feed and forage production	Production of quality manure	Increase in area sown for forage production
What type of change	Professional practice Capacity	Professional practice Behavior	Professional practice Behavior	Professional practice Capacity
What are the indicators of this change?	Number of species and types of forage crops grown	Increase in the manure produced and the quantity of crop-residues mobilized	Yields and crop development	Area of forage crops, quantity of stored forage and yield
Who are the players involved in this change?	Farmers; the farm's workforce; the DIP; CIRDES; INERA; CIRAD; AEI	Farmers; the farm's workforce	Farmers; the farm's workforce; CIRDES; INERA; AEI	Farmers, the farm's workforce
What are the reasons for this change?	Improving the quantity and quality of forage available in dry season	High feed costs and poor soils	Improving soil fertility with manure	Capacity building in fodder production; acquisition of dual-purpose fodder crop seed; difficulties in finding fodder in the dry season.
What were the main drivers of change?	Farmers ; DIP ; CIRDES ; INERA ; CIRAD ; AEI	Farmers ; DIP ; CIRDES ; INERA ; CIRAD ; AEI	Farmers; DIP ; CIRDES ; INERA ; CIRAD ; AEI	Farmers; DIP ; CIRDES ; INERA ; CIRAD ; AEI ; and soil fertilization with FO
What is the scale of this change?	Moderate change, as not all growers have implemented all FDP crops	Strong change, as all farmers use crop-residuess	Strong change, because out of 10 farmers only 2 or 3 do not produce manure	The change is very strong, as almost all dairy farmers have increased their forage production.
How has the AE Initiative contributed to this change?	Seed supply and training on technical itineraries	Capacity building in the use of crop-residues. Strong contribution	Capacity building in manure production and input support for manure pit construction	Capacity building in forage production, seed supply and monitoring of forage production activities
Are other initiatives or events also behind this change?	No	No	No	No

Source: Results of the IDEO workshop, Bobo-Dioulasso, November 4-7, 2024

The preliminary impacts induced by the AE Initiative at the level of the mini-farms, from the most important to the least important according to their score, are: (i) increased workload at all levels (4.6); (ii) improved soil fertility over a longer period (4.2); (iii) increased fodder yields (4.0); (iv) improved quantity and quality of milk produced in the dry season (4.0); (v) enriched plots (3.8) and (vi) overweight cows (3.2). See also page 27.

4.1.3. Identifying and characterizing of changes by Independent collectors

The Independent collectors identified five (05) changes (Figure 6). The changes identified are as follows: (i) arrangement between collectors and processors; (ii) strengthening of collaboration between all actors of the dairy value chain; (iii) collaboration with DIP for milk tank supplies; (iv) awareness of the advantages of local milk and (v) increase in the quantity of local milk collected. The attributes of the four main changes are presented in Table 1. The authors make available to readers the Excel file containing the full description of the attributes of all the changes identified.

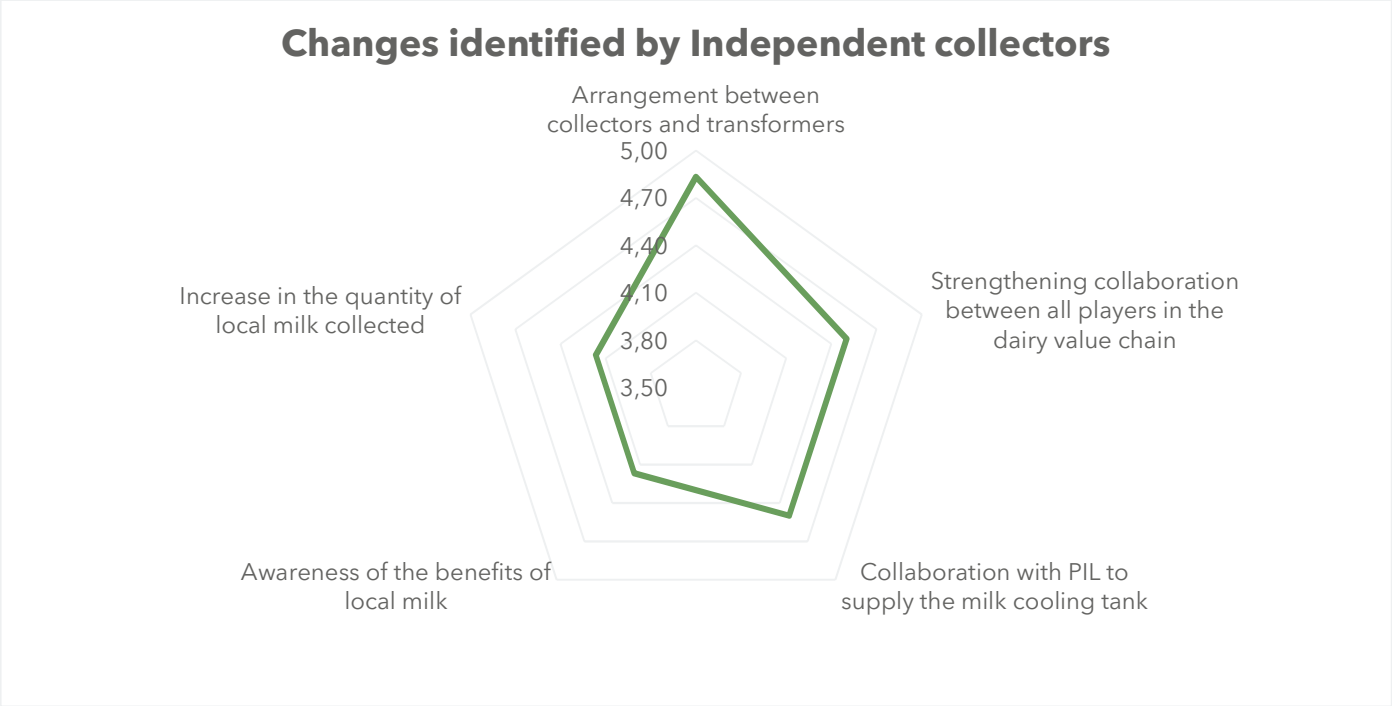


Figure 6. Changes identified by Independent collectors

Table 5. Attributes of the main changes identified by Independent collectors

	Change 1	Change 2	Change 3	Change 4
Change description	Arrangement between collectors and transformers	Strengthening collaboration between all actors of the dairy value chain	Collaboration with DIP to supply the milk cooling tank	Awareness of the benefits of local milk
What type of change	Relations with customers or suppliers	Customer and supplier relations	Sector organization	Attitudes/mentality/opinion
What are the indicators of this change?	Verbal/written conventions	Number of telephone calls between players; number of exchange sessions between players; number of informal agreements (price and quantity of local milk).	Number of meetings with DIP to share experiences; number of new customers discovered thanks to DIP; quantity of milk sold to DIP.	Volume of local milk collected and sold; number of meetings/workshops on local milk; selling price of local milk; number of customers.
Who are the players involved in this change?	Collectors; processors; consumers	Collectors, farmers, processors, consumers	Farmers; collectors; processors; DIP board members	Men; women; consumers; processors; collectors; farmers
What are the reasons for this change?	Informal agreements on price/quantity; easy marketing/sale of local milk, savings on packaging (sachets) and time spent on sales.	Mutual respect for commitments, need to work well to get money	Advisory support for project stakeholders; advisory support for government structures	Setting up cooperatives; diversifying dairy products from local milk; changing eating habits in favor of local milk.
What were the main drivers of change?	Market diversification	Permanent availability of local milk, respect for commitments, more or less equitable sharing of benefits	Customer base	All cooperatives; project support (training, meetings, etc.); DIP support, Burkina Faso government support
What is the scale of this change?	Low amplitude	Large scale due to increased profits	Average size (but growing)	Large scale due to higher volumes of local milk sold per day
How has the AE Initiative contributed to this change?	Consulting support	Capacity building; advisory support	Support	Training, advice on milk collection, conservation and storage, hygiene
Are other initiatives or events also behind this change?	PAPSA; Ministery of Agriculture of Burkina Faso	IRSAT; PDPS; DRARAH; DPARAH	IRSAT; PDPS; DRARAH; DPARAH	PRECAM ; PAPSA ; PRAPS ; PADELB

Source: Results of the IDEO workshop, Bobo-Dioulasso, November 4-7, 2024

The workshop also identified a number of preliminary impacts induced by the implementation of AEI activities among Independent collectors (see page 27). These initial impacts and their respective scores are as follows: (i) increase in processors' capacity to purchase local milk (5.0); (ii) expansion of the outlet market (4.83); (iii) increase in collection capacity (4.83); (iv) improvement in local milk quality (4.83); (v) increase in processor workforce (4.67); (vi) availability of local milk in all seasons (4.50); (vii) increase in workload (4.50) and (viii) increase in purchase and sale prices of local milk (4.17).

4.1.4. Identification and characterization of changes by Milk collection centers

A total of ten (10) changes were identified at the Milk collection centers (Figure 7). In descending order of importance to these actors, the top four changes are: (i) acquisition of milk quality control equipment; (ii) increase in the quantity of milk collected; (iii) price per liter of milk known between all actors; and (iv) introduction of contracts between all actors of the dairy value chain. The attributes of the four main changes are presented in Table 6. The authors make available the Excel file containing the full description of the attributes of all the changes identified.

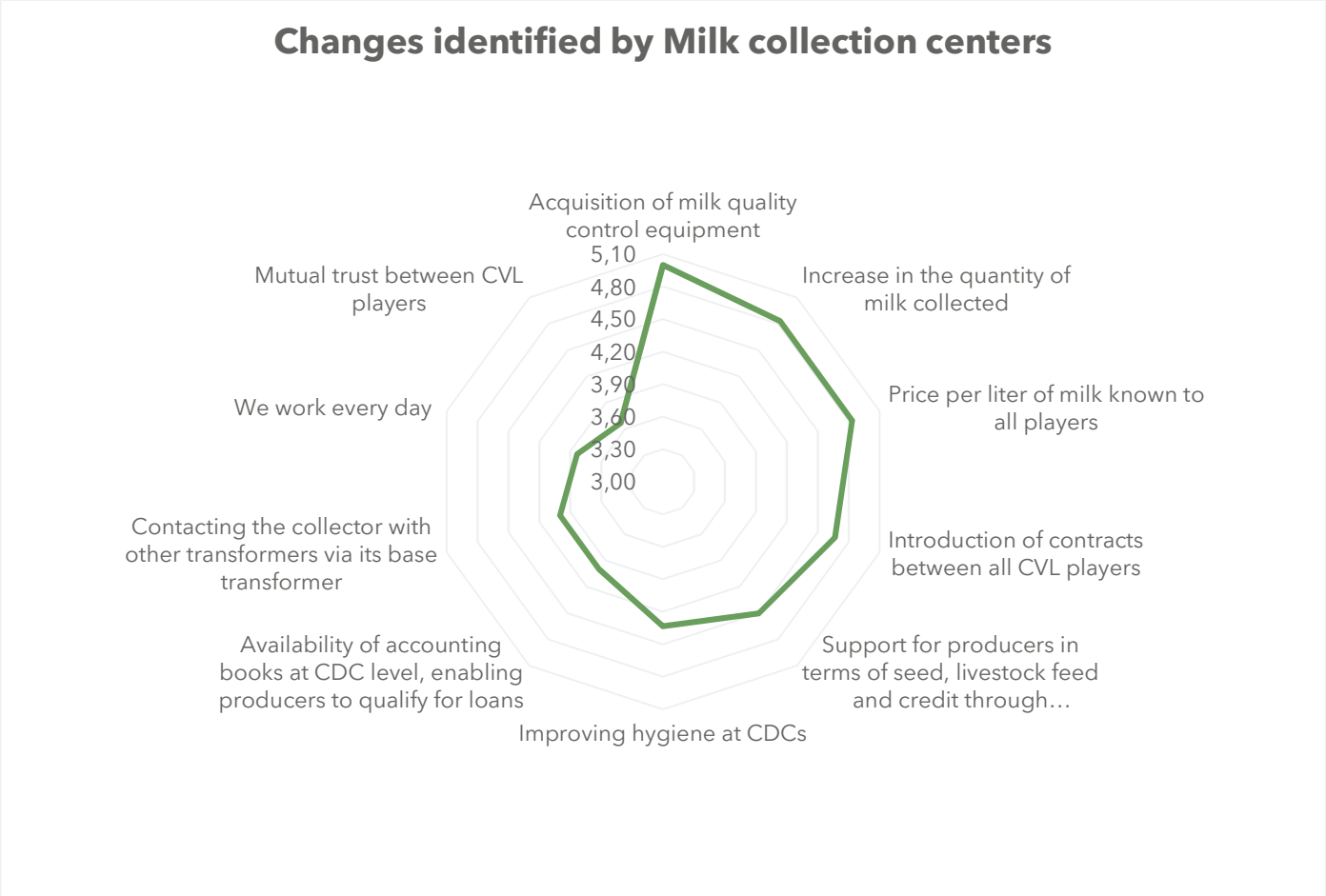


Figure 7. Changes identified by Milk collection centers

Table 6. Attributes of the main changes identified by the Milk collection centers

	Change 1	Change 2	Change 3	Change 4
Change description	Acquisition of milk quality control equipment	Increase in the quantity of milk collected	Price per liter of milk known to all actors of the DVC	Introduction of contracts between all DVC actors
What type of change	Capacity	Capacity	Sector organization Customer and supplier relations	Customer and supplier relations Sector organization
What are the indicators of this change?	The number of milk quality control facilities	Quantity of milk collected and delivered; number of dairy farmers; accounting records	The price per liter of milk is known to all and included in contracts	Each player has a physical contract
Who are the players affected by this change?	Farmers; collectors; processors; consumers; traders of milk quality control equipment	Farmers; projects; research; consumers; processors and MCCs	Farmers; collectors; processors	Farmers; collectors; processors
What are the reasons for this change?	Ensuring the quality of milk collected and improving our relations (building trust) with DVC stakeholders	Increase in the number of dairy farmers; improved production by breeders and high demand for milk	Capacity building: the MCC is a forum for dialogue with farmers and processors	Ensuring trust between DVC actors; rigor and better organization
What were the main drivers of change?	MCC; projects	MCC; farmers; consumers; processors; INERA; CIRDES; AEI and other projects	DVC players; capacity building	Capacity building; SCOOP; MCC; projects
What is the scale of this change?	Very strong change, as all MCCs have acquired equipment	In the Haut Bassins region	All DIP's MCCs are affected	Very strong change, as all MCCs have contracts with processors and farmers
How has the AE Initiative contributed to this change?	Capacity building	Supporting farmers in forage production and cow rationing	Capacity building	Capacity building support for forage seeds
Are other initiatives or events also behind this change?	PRECAM; AGRODEV	PRECAM; AGRODEV; CIRDES; INERA; APESS	PAPEA; INERA	PRECAM; PADELPE; AGRODEV

Source: Results of the IDEO workshop, Bobo-Dioulasso, November 4-7, 2024

The AEI has also induced preliminary impacts on Milk collection centers (MCCs), the most significant of which are listed below in descending order of score: (i) increase in the number of dairy farmers joining MCCs (4.67); (ii) increase in MCC revenues (4.33); (iii) earlier availability of milk at MCCs (4.0); and (iv) increase in workload (3.83). See also page 27.

4.1.5. Identifying and characterizing of changes by Dairy processors using local milk

Dairy processors using local milk identified five (05) changes brought about by the AE Initiative (Figure 8). In decreasing order of importance, they are: (i) the strong prioritization of natural flavors over synthetic flavors; (ii) the increased diversification of products made from local milk; (iii) the creation of new packaging; (iv) the change in mentality and behavior; and (v) the strengthening of collaboration between the various players in the milk value chain. The attributes of the four main changes are presented in Table 7. The authors make available the Excel file containing the full description of the attributes of all the changes identified.

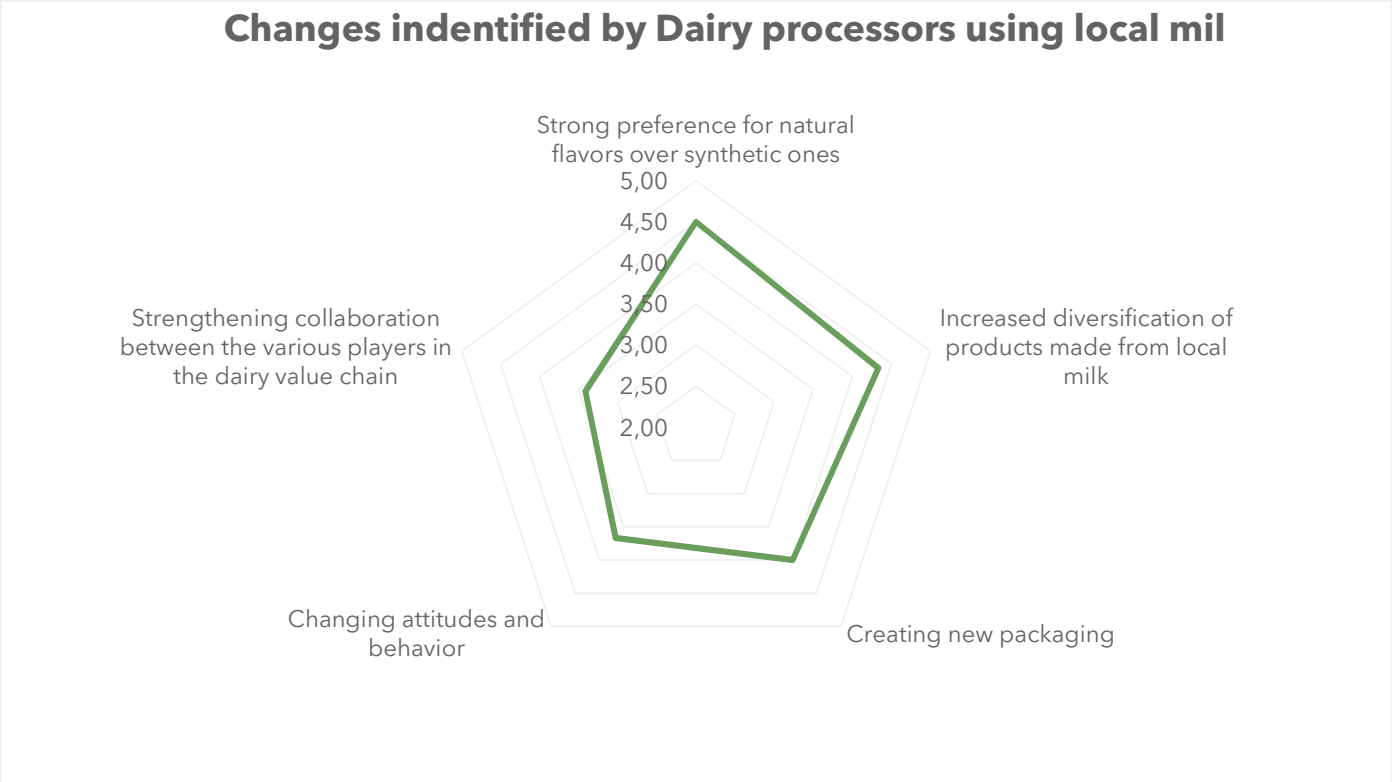


Figure 8. Changes identified by Dairy processors using local milk

Table 7. Attributes of the main changes identified by Dairy processors using local milk

	Change 1	Change 2	Change 3	Change 4
Change description	Strong preference for natural flavors over synthetic ones	Increased diversification of products made from local milk	Creating new packaging	Changing attitudes and behavior
What type of change	Professional practice	Professional practice	Professional practice	Attitudes/mentality/opinion
What are the indicators of this change?	Taste of innovative dairy products; number of types of natural flavors; number of customers consuming products made with natural flavors	Number of types of innovative products brought to market; number of customers requesting various products	Number of different types of packaging; less product loss	Product diversity; number of jobs created; benefits generated
Who are the players affected by this change?	Processors; consumers; retailers	Consumers; processors; students; support services	Transformers; consumers	Transformers; consumers
What are the reasons for this change?	To better promote "local consumption"; increase customer base; increase profits; change mentality	To satisfy consumer demand; to increase customer base; nutrients in innovative products	Creating new products; limiting product losses; attracting new customers	Innovations; improved collaboration between different players
What were the main drivers of change?	Support and advice from researchers; support from DIP	Training; support from partners (CIRAD, CIRDES, INERA); individual and collective dedication of players; strong interest in consuming local products.	Support and advice from researchers; support from DIP	Support and advice; changing consumer attitudes (nutrient-rich local milk)
What is the scale of this change?	Large scale due to consumer enthusiasm for innovative products	Large scale	Average size	Large scale
How has the AE Initiative contributed to this change?	Training courses; exchange trips	Facilitating participation in exchanges of experience between different players	Contribution to improving knowledge of agroecology	Organization of players; formalization of ALL; training courses
Are other initiatives or events also behind this change?	Ministry of ARAH ; Africa-Milk ; IPROLAIT	Organization of Agroecology Days	Africa-Milk; PADELB; Ministry of ARAH; technical services	Africa-Milk; PRAPS; PDPS; Ministry of ARAH; technical services

Source: Results of the IDEO workshop, Bobo-Dioulasso, November 4-7, 2024

Not surprisingly, the Agroecology Initiative has also induced initial impacts among Dairy processors using local milk, which were highlighted during the workshop. These initial impacts were as follows: (i) improved quality of local milk (3.92); (ii) increased demand for local milk and its by-products (3.75); (iii) increased number of customers and their loyalty (3.50); (iv) increased profits (3.33); (v) easier access to local milk (3.17) and (vi) increased sales market (2.83). See page 27.

4.1.6. Identification and characterization of changes by Dairy processors using powder milk

Dairy processors using milk powder identified five (05) changes (Figure 9). The changes identified are as follows: (i) improved packaging; (ii) change of mentality; (iii) beginning to use local milk; (iv) diversification of dairy products and (v) use of natural flavours. The attributes of the four main changes are presented in Table 8. The authors make available to readers the Excel file containing the full description of the attributes of all the changes identified.

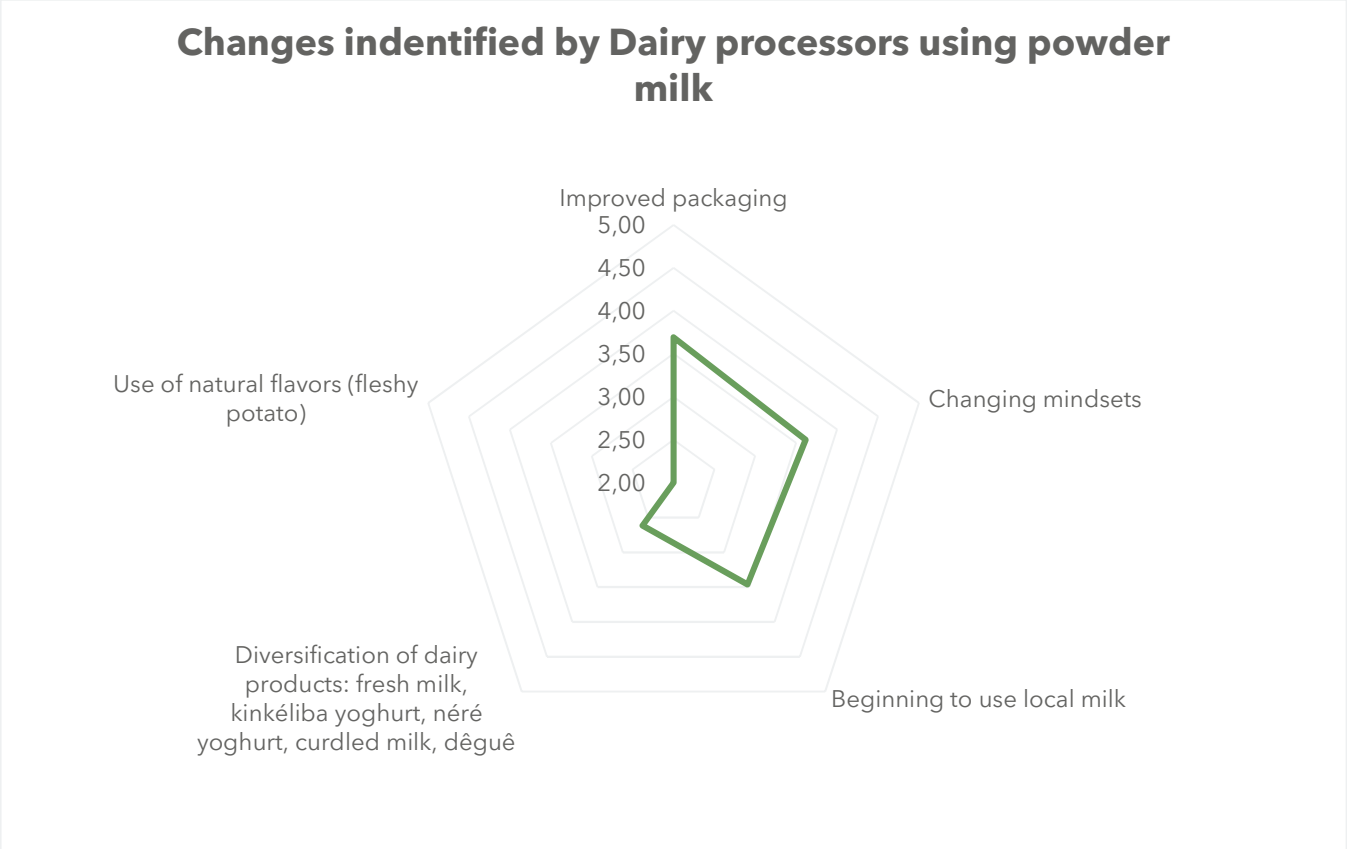


Figure 9. Changes identified by Dairy processors using powder milk

Table 8. Attributes of the main changes identified by Dairy processors using powder milk

	Change 1	Change 2	Change 3	Change 4
Change description	Improved packaging	A change in mentality	Beginning to use local milk	Diversification of dairy products: fresh milk, kinkéliba yoghurt, néré yoghurt, curdled milk, dêguê
What type of change	Professional practice Ability	Behavior	Behavior Professional practice	Professional practice
What are the indicators of this change?	New, more popular packaging	Use of local milk; Savings at the bank; Use of natural flavours; Payment of taxes	Dairy products made from local milk	Number of dairy products processed and marketed
Who are the players involved in this change?	Printers; processors; consumers	Farmers; Processors and consumers	Farmers; Collectors; Processors and consumers	Farmers; Farmers; Processors and their workforces
What are the reasons for this change?	Capacity building; Availability and ease of packaging for effective marketing	Participation in AEI workshops	Capacity building.desire to increase income. Local consumption	Capacity building. Training in agro-ecology, desire to increase income.
What were the main drivers of change?	Capacity building; Packaging printing plants; Converters	Capacity building	Processors (willingness); dairy farmers; financial resources	Processors. Capacity building. Acquisition of new skills.
What is the scale of this change?	All processors have improved their packaging	Some 60% of NEEMA members have changed their mindset	More than half of milk powder processors have begun to diversify their products	More than half of milk powder processors have begun to diversify their products
How has the AE Initiative contributed to this change?	Capacity building	Capacity building (strong contribution)	Capacity-building; raising awareness of the use of LL; establishing contact with local milk collectors and farmers	Capacity building; strengthening collaboration with other local DVC actors.
Are other initiatives or events also behind this change?	FINEC	FINIC; STATE	FINEC	FINEC

Source: Results of the IDEO workshop, Bobo-Dioulasso, November 4-7, 2024

The workshop also highlighted two initial impacts induced by AEI activities among Dairy processors using milk powder. These initial impacts and their scores are as follows: (i) increased workload (3.15) and (ii) increased income (2.85).

4.2. Validation and identification of the most significant changes by professional group

The Bobo-Dioulasso dairy value chain actors who took part in this IDEO workshop identified and validated the most important changes brought about by the AE Initiative over the last three years (2022, 2023 and 2024) of the AE Initiative's implementation, using a show of hands in a plenary session. Identifying and validating the key changes that have impacted value chain players has enabled us to obtain the order of importance of the changes mentioned in Table 9 for the three professional groups.

> “ For farmers, the AE Initiative has led to: (i) an increase in the area sown to fodder production; (ii) the production of quality manure; and (iii) diversification of fodder production.

These changes, considered more important by the stakeholders at farmer level, have taken place through the distribution of dual-purpose forage seeds, training and advisory support on forage production technical itineraries, the co-design of efficient (economically acceptable) rations in dairy workshops using the Jabnde tool, and improved management of plant and animal farm co-products using the CoProdScope tool.

> “ At Collector level, actors testified to the contribution of the AE Initiative to: (i) strengthening collaboration between all actors of the dairy value chain; (ii) supporting farmers with seeds, feed and credit; and (iii) increasing the quantity of local milk collected.

According to milk collection stakeholders, these changes are brought about by the Agroecological Living Landscape (ALL), through which all stakeholders are often invited to workshops to reflect on, in particular, the formalization of the ALL (Sib et al., 2023), business model workshops (current and agroecological) (Sib et al., 2024a), cost-benefit evaluation workshops (Sib et al., 2024b) etc. The collectors also point to the significant support provided to farmers by the AE Initiative, which has boosted milk production and increased the quantity of milk collected.

> “ For their part, dairy processors, like collectors, recognize that the AE Initiative has strengthened collaboration between the various actors of the dairy value chain, stimulated the diversification of dairy products with natural flavors, and created new packaging.

As with the collectors, the dairy processors also recognized the contribution of the AE Initiative to consolidating intra- and inter-actor relations in the Bobo-Dioulasso dairy value chain. The importance attached to innovative products by processors has increased thanks to exchanges during workshops organized by AE Initiative and through the prizes awarded to processors, notably the orange-fleshed sweet potato yoghurt, cream and butter prize. In other words, the emulation generated by the AE Initiative already bears fruit that is recognized beyond the ALL.

Table 9. Most significant changes by occupational group

Professional groups	Change titles	Ranking by occupational group
Farmers		
	Increase in area sown for forage production	1 er
	Production of quality manure	2 ème
	Diversification of forage production	3 ème
Collectors		
	Strengthening collaboration between all actors of the dairy value chain	1 er
	Support for farmers in terms of seed, livestock feed and credit through processors and projects	2 ème
	Increase in the quantity of local milk collected	3 ème
Processors		
	Strengthening collaboration between the various actors of the dairy value chain	1 er
	Increased diversification of dairy products with natural flavours	2 ème
	Creating new packaging	3 ème

Source: Results of the IDEO workshop, Bobo-Dioulasso, November 4-7, 2024

4.3. Lessons learned and the way forward

4.3.1. Strategies for maintaining change

With the aim of sustaining the achievements of the AE Initiative, stakeholders of the Bobo-Dioulasso dairy value chain have listed a number of actions to be carried out, which are presented below:

- Continue to build and share capacity, even with our own funds,
- Maintain and further energize the WhatsApp group created thanks to the AEI project, sharing more information and generating fruitful exchanges,
- Set up a common fund at the level of each link, to be bolstered by membership fees to maintain momentum and organize professional meetings,
- Set up a forum to facilitate discussion meetings between dairy value chain managers,
- Maintain the DIP and work towards a frank and sincere collaboration between all players,
- Maintain, or even encourage, greater commitment from the people in charge of the various links, especially the DIP manager,
- Work to maintain the momentum used to set up the DIP while integrating new milk collection centers and cooperatives,
- Strengthen and expand the DIP communication system,
- Continue to work with DIP using our own resources without the project.

4.3.2. Responsibility and role for each player

Sustaining the changes brought about by the AE Initiative requires a strong commitment from the various players in the dairy value chain. The responsibilities and roles to be played by the various players are summarized below:

Farmer level:

- Increase forage production by reserving more seed for subsequent seasons,
- Adopt more of the good farming practices tested through the AEI project,
- Continue to produce manure, with a view to increasing the number of manure pits,
- Continue the redistribution of seeds between Mothers and Babies,
- Involve farmers more in forage production.

At the Collector level *:*

- Improve support for farmers by making inputs available on credit (livestock feed, veterinary products),
- Ensuring the quality of milk collected by using safe and appropriate equipment,
- Deliver milk on time to processors or milk collection centers,
- Facilitate the acquisition of credit for farmers by guaranteeing repayment in the event of farmers being unable to pay on time.

Transformers*:*

- Support farmers with feed and credit,
- Produce forage for dairy farmers in exchange for milk,
- Organize milk promotion days and fairs,
- Organize internally to request training to improve our skills at our own expense,
- Provide collectors with better collection equipment/materials, if possible on credit,
- Draw up technical sheets/technological diagrams for milk processing.

4.3.3. Key lessons learned

Stakeholders in the Bobo-Dioulasso milk value chain drew up a list of lessons learned through the AE Initiative. The quintessence of these lessons is as follows:

- Awareness of the benefits of agroecological practices,
- The advantage of sharing, especially seed redistribution,
- Self-sacrifice in our work and sincerity with our employees,
- Awareness of input costs,
- Self-confidence is a decisive factor in going beyond production capacity and product diversification,
- Awareness that it's better to consume our natural local products, use them in milk processing,
- The importance of prioritizing consumer health over an inordinate quest for profit,
- Awareness of the need to produce your own feed for your animals,
- Need for greater collaboration between all CVL players.

4.3.4. The way forward

Actors of the dairy value chain feel they have no choice but to continue with agroecological practices. They also point to the need to establish commitments at the level of each player for the continuation of the good practices identified, while taking care to further improve relations between players for better connectivity.

5. Conclusion

The IDEO workshops highlighted all the changes brought about by the AE Initiative after three years (2022, 2023 and 2024) of implementation of AE Initiative activities at the level of dairy value chain players in Bobo-Dioulasso. The changes brought about at this stage are more than impressive.

The key changes identified for dairy farmers (Agropastoralists and Mini-Farms), in descending order, were: (i) increasing the area sown for forage production; (ii) producing quality manure; and (iii) diversifying forage production. These changes were largely brought about through the cooperative system for the production and redistribution of dual-purpose forage seeds between farmers, training and advisory support on forage production technical itineraries, co-design of efficient (economically acceptable) rations in dairy cows production units using the Jabnde tool, and improved management of crop and livestock farm co-products using the CoProdScope tool.

The most important changes identified by collectors (Milk collection centers and Independent collectors), in descending order, were: (i) the strengthening of collaboration between all actors of the dairy value chain; (ii) support for farmers in the form of seeds, livestock feed and credit from processors and projects; and (iii) the increase in the quantity of local milk collected. The collectors stated that these changes were brought about thanks to the Agroecological Living Landscape (ALL), through which all stakeholders were frequently invited to take part in reflection workshops, notably on the formalization of the ALL, business model workshops (current and agroecological), cost-benefit evaluation workshops, workshops to identify areas for stakeholder initiatives, etc. They mentioned the significant support of the French Ministry of Agriculture and the French Ministry of Agriculture. They mentioned the significant support provided by the AE Initiative to farmers, which has boosted milk production and increased the quantity of milk collected.

For Dairy processors (using local milk, or powder milk), the most important changes in descending order were: (i) the strengthening of collaboration between the various actors ot the dairy value chain; (ii) the increased diversification of dairy products with natural flavors; and (iii) the creation of new packaging. Like the collectors, the processors also recognized the AE Initiative's contribution to consolidating intra- and inter-actor relations in the dairy value chain. They affirmed that the importance given to innovative products had increased thanks to exchanges during workshops organized by the AE Initiative and through the prizes awarded to processors, notably the orange-fleshed sweet potato yoghurt, cream and butter prize.

Other initiatives and structures have, in one way or another, contributed to these changes. These include: CIRAD, CIRDES, INERA, PRECAM, DRARAH, PAPSA, EAT Burkinabé, IRSAT, PDPS, DPARAH, Université Nazi Boni/Institut de Développement Rural, AGRODEV, PADELB, PAPEA, APESS, PRASP, Ministère de l'agriculture, des ressources animales et halieutiques du Burkina Faso, Africa-Milk and IPROLAIT.

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7. Appendices

7.1. Initial impacts of the Initiative on agroecology identified during IDEO workshops

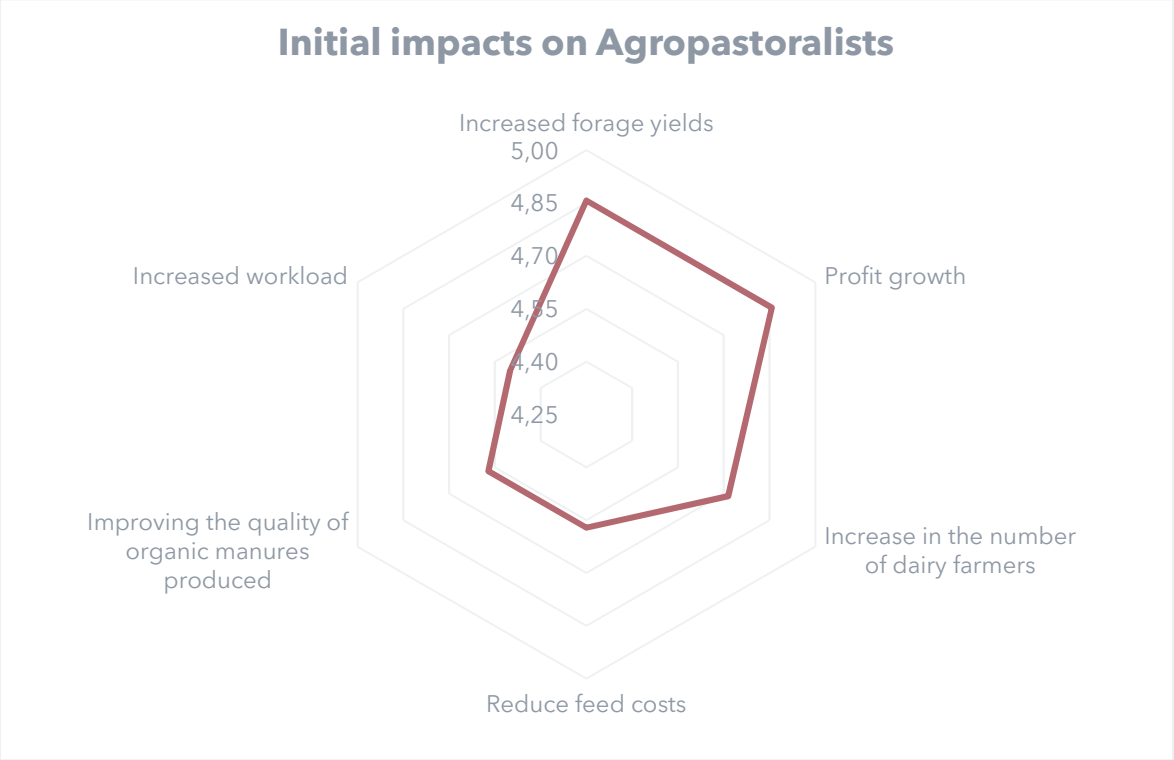

Figure 10. First induced impacts on Agropastoralists

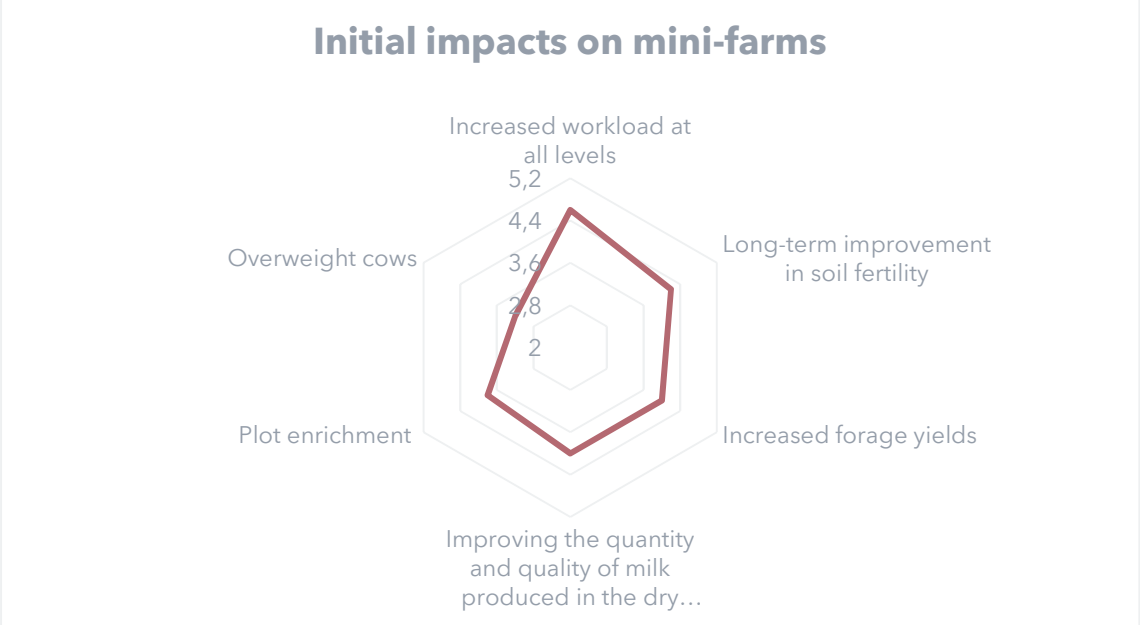

Figure 11. Initial impacts on mini-farms

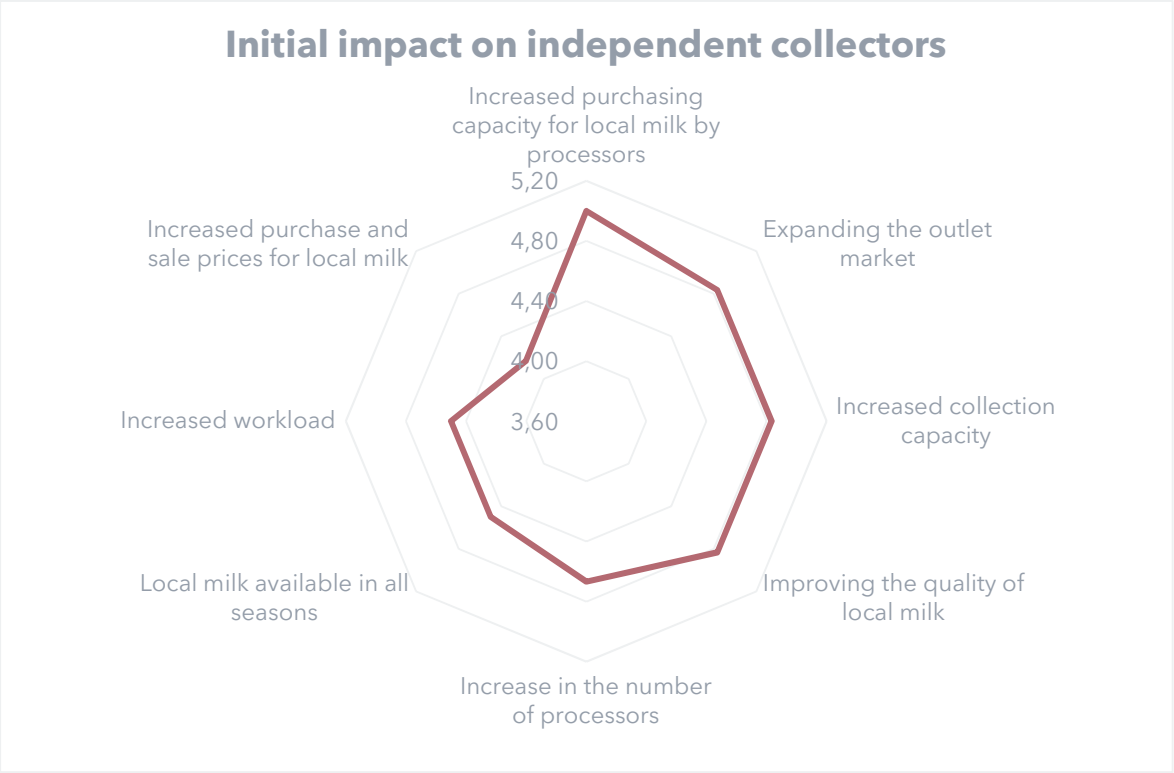

Figure 12. Initial impacts on independent collectors

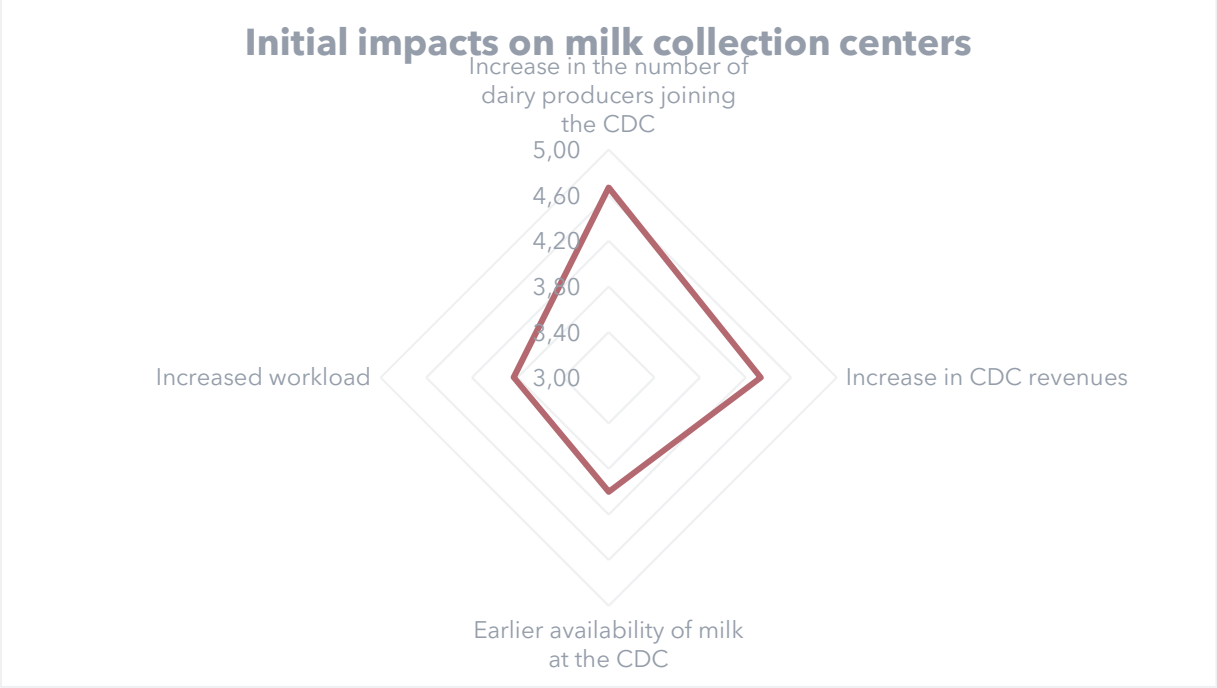

Figure 13. Initial impacts on milk collection centers

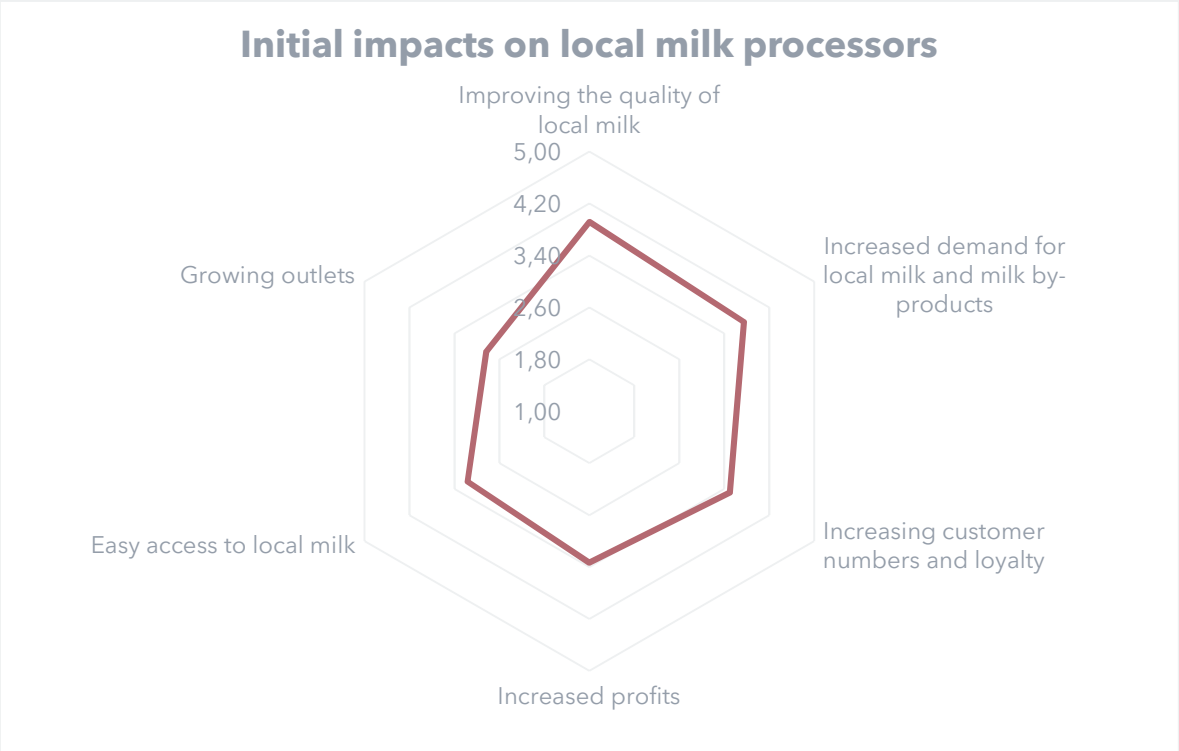

Figure 14. Initial impacts on local milk processors

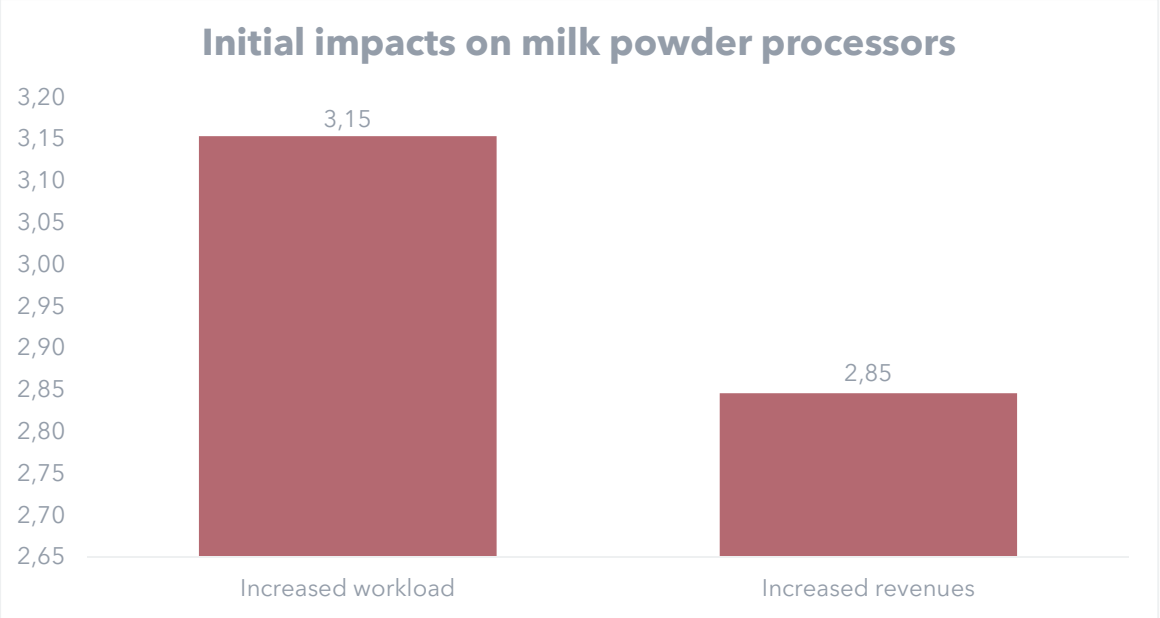

Figure 15. Initial impacts on milk powder processors

7.2. Photos taken during the workshops

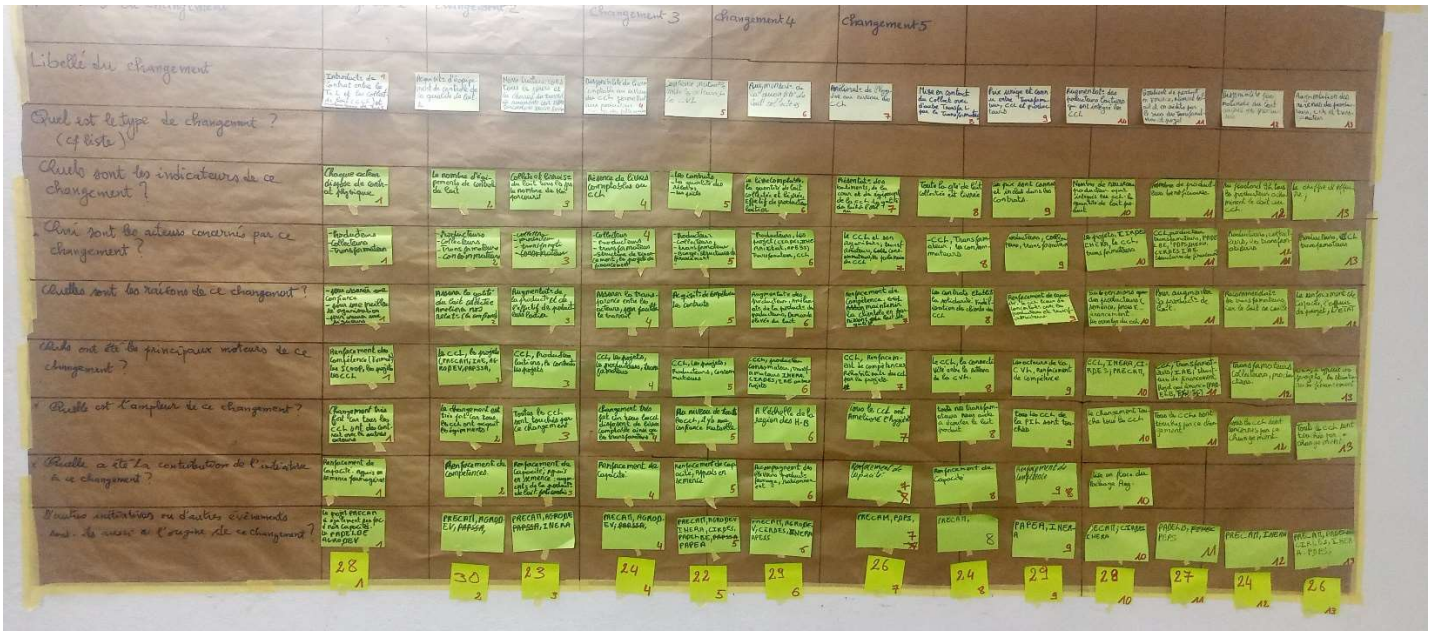

Photo 1: Example of characterization of change attributes identified by focus group

Photo 2. IDEO workshop participants in the plenary session room (back view)

Photo 3. IDEO workshop participants in the plenary session room (front view)

Photo 4: Family photo with milk farmers

Photo 5: Family photo with milk collectors

Photo 6: Family photo with milk processors

Photo 7: Family photo with all the players in the Bobo-Dioulasso milk value chain.

Photo 8: Workshop participants at a coffee break

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We would like to thank all funders who support this research through their contributions to the CGIAR Trust Fund: www.cgiar.org/funders.

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