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Why and how do farmers' organizations get involved in the promotion of agroecological techniques? Insights from Burkina Faso

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ABSTRACT

Agroecological techniques (AET) have been recognized by many farmers, NGOs, and farmers' organizations (FOs) as a promising solution for slowing down the persistent soil fertility degradation in West African drylands. In the context of Burkina, the promotion of AET is the result of the interactions between NGOs and farmers' knowledge through the intermediation of FOs. Although numerous studies have highlighted the instrumental role of FOs in the dissemination of AET in Burkina, there are limited studies focusing on the historical dynamic of FOs' involvement in the promotion of agroecology. To address this gap, this study aims to answer the following questions: why and how do FOs get involved in the promotion of agroecological techniques, and how do they define the term agroecology or agroecological techniques? A multiple case study approach was used to provide the answer to these questions. The results from the case studies reveal that the FOs' promotion of AET is largely connected to their aim of fulfilling one of the following three goals: enhancing the productivity of commercial crops; improving the resilience of subsistence farmers; enhancing both the productivity of commercial crops and the resilience of subsistence farmers. The quest to achieve these goals explained their constant interaction with external partners to get the necessary assistance for the provision of agroecological support services to their farmers. Furthermore, the results of the study also reveal that the Farmers' Organizations' definitions of agroecology or agroecological terms are mostly associated with the interpretation of agroecology as a collective practice encompassing both economic and ecological aspects of Burkinabè agriculture. A broader insight is that while FOs can fulfill important roles in agroecology transitions this comes with diverse interpretations of agroecology, in which FOs facilitate the hybridization of existing farmers' practices with those proposed by external actors. The study hence shows the complexity related to the local actors' definitions of agroecological terms and the broader implication is that in the debate on agroecology transitions, these blended or hybrid forms of agroecology should receive

KEYWORDS

Sustainable farming practices; Organic agriculture; Sahel; Agroecology; Sustainability transitions; Farmer organizations

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more attention. Areas for future research include drivers of FOs choice making processes in how they approach agroecology, and subsequently the influence of FOs on the drivers of farmers' decisions toward AET.

Introduction

Over the past decades, there is a growing interest in agroecology as a response to multiple crises in the food system and problems encountered with conventional agriculture (such as the acceleration of soil degradation, the increasing emission of greenhouse gases, the loss of genetic resources, and general health issues) (Anderson et al. 2019). The aim of agroecology is to develop agroecosystems with minimum dependence on synthetic inputs and maximum emphasis on farms' biological components to enhance soil fertility, guarantee crop protection, and boost overall productivity (Altieri 1983). Earlier references using the term agroecology can be traced back to the 1930s for studying the interaction of agroecosystem components based on methods derived from the agronomy and ecology scientific fields (Mockshell and Kamanda 2018; Van Hulst et al. 2020; Wezel et al. 2009). Initially considered as the scientific application of ecology in agriculture, the term agroecology is now increasingly also used by social (see e.g., Rosset and Martínez-Torres 2012; Wezel et al. 2009) and political (cf. Rivera-Ferre 2018) actors besides those part of the scientific arena. The use of this term by diverse actors is reflected by the existence of three widely accepted perspectives on agroecology as both a science, a movement, and a practice (Wezel et al. 2009).

As a movement, the definition of agroecology is primarily rooted in the environmental and agricultural movements following the detrimental impacts of conventional agriculture (Rivera-Ferre 2018; Wezel et al. 2009). The first environmental movement was founded in the USA during the early 1960s (Wezel et al. 2009) to deal with the consequences of pesticides on the environment. The expansion of conventional agriculture beyond the USA border led to the creation of farmers' agricultural movements (which consider more aspects of ecology and environment) in many Latin American countries between the 1980s and 1990s, with farmer-led organizations like "La Via Campesina" as an important driving force (Rosset et al. 2019; Val et al. 2019). From the 1990s the definition of agroecology as a movement started to incorporate the notion of food sovereignty (Rivera-Ferre 2018) besides focusing on the ecological or environmental dimensions of agriculture. Food sovereignty can be defined as the right of people to produce and consume healthy food in an ecological manner through the emphasis on autonomy and equity (Altieri and Toledo 2011). The incorporation of the notion of food sovereignty also marked the beginning of the politico-cultural importance of agroecology (López-García et al. 2021).

The foundations of agroecology as a practice that emerged during the 1980s were initially intertwined with the movements promoting environmentally friendly agriculture (Wezel et al. 2009). The term agroecology is defined here as a collective practice of agriculture considering economic (i.e. the farm income, inputs efficiency, and cost-benefit ratio of production), social (including the health protection and food sustenance), and ecological (i.e. the preservation and restoration of resources such as soil and water) aspects, centered on the combination of traditional farmers' knowledge and knowledge coming from modern scientific research (Mockshell and Kamanda 2018; Rivera-Ferre 2018; Velten et al. 2015). The literature emphasizes three principles (translated into various implemented techniques or practices) underpinning the definition of agroecology as a practice (Van Hulst et al. 2020). The principles imply increases in: i) efficiency; ii) substitution (of one input/practice for another), and iii) redesign of the agricultural landscape. Agroecological practices are viewed as new, amended, or adapted practices or techniques that contribute to more ecological and organic agriculture (Wezel et al. 2009). Examples of agroecological techniques (AET) include intercropping; biological control of pests and diseases; use of nitrogen-fixing crops; crop-livestock integration; crop diversification; agroforestry; compost; and anti-erosion measures; etc (Altieri and Toledo 2011; Giller et al. 2021; Slingerland and Stork 2000; Wezel and Silva 2017). Several AET have been promoted (by NGOs) since the 1980s to improve the agriculture production of subsistence farmers confronted with harsh environments throughout Latin America, Asia, and Africa (Altieri and Toledo 2002).

AET have always been recognized by actors (such as farmers, NGOs, and Farmers' Organizations-(FOs)¹) as a promising solution for West African drylands farmers facing intense soil degradation due to the effect of climatic variability coupled with the continuous population growth (Andrieu et al. 2015; Bancé 2013; Debray et al. 2019; Iyabano et al. 2021; Lancelloti 2019; Mockshell and Kamanda 2018). In the case of Burkina Faso, many studies (see e.g., Barro, Zougmore, and Taonda 2005; Boffa 1995; Kessler 1992) have reported the existence of several AET traditionally practiced by peasant farmers. As Boffa et al. (2000), has pointed out farmers were protecting naturally-regenerated shea nut trees or karité (*Vitellaria paradoxa*) present in their cereal farms because of the multiple benefits (including food, wood for tools, shade, and income from selling the butter for cosmetic and pharmaceutical usage) they yield. Besides karité, néré (*Parkia biglobosa*) trees were also always maintained by farmers for their seeds (which are the ingredients of a local spice called *dawadawa* or *soumbala*), traditional medicine, and soil fertility improvement (Kessler 1992; Teklehaimanot 2004). Other AET widely practiced by Burkinabé farmers (namely those located in the northern regions) include stone-bunds, half-moons or *demi-lune*, mulching, *zaï*, manure, and

compost (Barro, Zougmore, and Taonda 2005; Lancelloti 2019; Sawadogo et al. 2008; Korbéogo 2015; Sidibé 2005; Slingerland and Stork 2000).

Although these techniques were traditionally practiced by the farmers in the northern regions, they were revived during the intensive droughts of the 70s and 80s that caused a decrease in average rainfall (Roose, Kabore, and Guenat 1999). This revival was characterized by the mobilization of NGOs working together with local farmers grouped into various FOs called “*Naam* groups” for the selection and dissemination of efficient AET that can help farmers to continue growing crops for their family sustenance (Bancé 2013; Ledea Ouedraogo 2002). During the same period, a farmer named Yacouba Sawadogo (who is still living in Yatenga province) began to grow trees in traditional *zai* pits in order to reduce the effect of soil erosion (Bancé 2013). The technique was later spread through farmers’ exchanges via their *Naam* groups. Besides NGOs and farmers, President Thomas Sankara also favored the revival of AET in northern regions by appointing Pierre Rabhi (in 1986) to be in charge of the dissemination of updated AET (including the technique of production of biopesticides) that can strengthen farmers’ resilience to the extensive droughts (Bancé 2013; Lancelloti 2019). The activities of Rabhi consisted of the organization of AET training and exchanges session among farmers grouped into various FOs (i.e. *Naam* groups).

Moreover, the increased demand for organic certified products (by the international market) during the early 2000s has also contributed to the spread of AET in many other regions of the country (Bancé 2013). The promotion of organic products was mainly initiated by the actions of NGOs aiming to introduce organic agriculture technology to some farmers through the intermediation of their FOs (Bancé 2013; Iyabano et al. 2021). The overall implications of FOs in the development and spread of AET during the early drought period and introduction of organic certified products period was due to the central place they always have in the agriculture policy of Burkina Faso (Konate 2013; Zett 2013). This started with the colonial administration during which the FOs were serving as bridges connecting farmers with institutions and organizations in charge of agriculture development activities (Arcand 2004; Konate 2013). Following the implementation of the structural adjustment reforms (promoted by the World Bank and the International Monetary Fund) in the early 1990s, the government transferred most of the organizations of agriculture development activities to FOs (DSDR 2015). This transfer was marked by the creation and restructuration² (concerning the FOs that existed before the advent of the reforms) of many FOs in order to actively start the provision of economic (such as credits supply and collective marketing) and technical services to their farmers (DSDR 2015; Zett 2013).

It is widely recognized that FOs play important roles in agrifood innovation and transition (Groot-Kormelinck, Bijman, and Trienekens et al. 2022; Vilas-Boas, Klerkx, and Lie 2022; Yang, Klerkx, and Leeuwis 2014), and this holds

for agroecology as well (Rosset et al. 2019; Schiller et al. 2020; Anderson et al. 2019; Val et al. 2019). However, not many studies look at how a range of different FOs at a country level approach agroecology (except Groot-Kormelinck, Bijman, and Trienekens et al. 2022). Although previous studies have highlighted the instrumental role of FOs in the agriculture development policy of Burkina in general and the dissemination of AET in particular (Bancé 2013; Iyabano et al. 2021), questions about why and how do the current FOs get involved in the promotion of AET, and how do they define the term agroecology or AET are still to be answered. The objective of this study is, therefore, to seek the answer to these questions by exploring the diversity of FOs involved in the promotion of AET in Burkina Faso. Answering the first question can provide a clear understanding of the dynamic of FOs' promotion of AET in Burkina Faso thereby showing how this promotion intersects with the economic, social, and ecological aspects of local agriculture. Answering the second question can also contribute to the ongoing debate regarding the definition of agroecology and/or agroecological terms by focusing on the perspectives of local actors. After this section presenting the background and objective of the study, the next section outlines the research methods employed, starting with the selection of case studies, follows by the description of the data collection and data analysis methods. The results section starts by drawing a picture of the diversity of FOs involved in the promotion of AET. The second section of the results focuses on the historical dynamics of three FOs' involvement in the promotion of AET and the way they define the term agroecology or AET. Following the results section, the next section analyses the results from case studies and discusses key points from these results. The last section concludes the study by pointing out the implication of the results and outlook for future research.

Research methods

A case-study approach

A case-study approach was used to answer the question of why and how do diverse FOs get involved in the promotion of AET. This approach was chosen because of the nature of the study requiring empirical investigation of complex social phenomena and real-life contexts (Yin 2009). The FOs as case studies allowed us to get empirical data regarding the dynamic of agroecology development in Burkina Faso. FOs' studies also enabled us to capture the local actors' definition as they are composed of different types of members (including administrators, advisors, and farmers). FOs' cases were selected in a two-step process: an exploratory followed by in-depth multiple case studies. The exploratory phase aimed to identify the diversity of FOs engaged in the promotion of AET. FOs' cases were identified after conducting an extensive

review of literature and project documents focusing on FOs and the development of agroecology and organic agriculture in Burkina. The identified cases were confirmed and updated during an interview (conducted by the first author) with a resource person working as the president of a rural development network called *réseaux gestion* in Ouagadougou. The list of FOs' cases was also completed during the participation of the first author in two agroecology gatherings (i.e. the peasant innovation fair organized in May 2015 by Prolinnova³ and the agroecology workshop organized by an NGO named Inter-réseaux in November 2015) where some of the FOs involved in the promotion were identified and approached (including those discussed with the resource person mentioned above) to discuss the purpose of this research and to schedule additional interviews at their different location. A total of eight FOs were, therefore, identified as those involved in the promotion of AET in Burkina Faso (Table 1).

Data collection and analysis

Data were collected by using document research, informal (spontaneous conversations) and formal (planned conversations) semi-structured interviews conducted in two phases (cf. Table 1), and observations (during field visits). The first interview phase was conducted between, November 2015 to May 2016, with aim the main of getting information for the characterization of identified case studies. The phase started with conservations interviews with administrators and advisors (selected on the basis of their availability) to get to know FOs' case studies before planning the formal data collection field visits. The data collected focused on describing each case study according to their date of establishment, the types of crops supported, their members' location within the four phytogeographical zones of the country (presented in Figure A1 Appendix A), the current agriculture development functions performed, the types of conventional (if applicable) and agroecological techniques promoted (including the main partners supporting the promotion of these techniques).

The second interview phase was conducted between February and May 2018 for deepening information obtained during the first phase in order to identify important events⁴ that shaped the FOs' promotion of AET based on three selected case studies (see the second section of the results). The phase also helped to look at the FOs' understanding of the term agroecology and/or AET from the perspective of their administrators, advisors, and farmers. Farmers were selected according to their location, types of crops grown, and previous cropping history (regarding the case of organic cotton growers from one of the case studies). These criteria were defined by the administrators and advisors (of the three FOs' cases) so as to get a large diversity of their definitions of agroecological terms. The selected farmers were all members of one of the



Table 1. Summary of interview phases.

Name of FO	First phase: 2015/2016		Second phase: 2018		Total number of interviewees
	Informal interviews and formal semi-structured interviews	Formal semi-structured interviews	Formal semi-structured interviews	Formal semi-structured interviews	
AIDMR: <i>Association Interzones pour le Développement en Milieu Rural</i>	<ul style="list-style-type: none"> 1 administrator: the coordinator of the FO 1 advisor 		<ul style="list-style-type: none"> 2 Administrators: the president and the coordinator of the FO 1 advisor 15 farmers 		20
Beo-neere	<ul style="list-style-type: none"> 1 administrator: the president of the FO 2 advisors 		-		3
FEPAB <i>Fédération Professionnelle des Agriculteurs du Burkina Faso</i>	<ul style="list-style-type: none"> 1 administrator: a board member 1 advisor 		-		2
FNGN: <i>Fédération Nationale des Groupements NAAM</i>	<ul style="list-style-type: none"> 2 administrators: 1 board member and the coordinator of the agricultural economic unit 		-		2
UGCPA: <i>Union des Groupements pour la commercialization en commun des produits agricoles de la Boucle du Mouhoun</i>	<ul style="list-style-type: none"> 1 administrator: the coordinator of agriculture production unit 3 advisors of the organic hibiscus program 		<ul style="list-style-type: none"> 2 administrators: the president and the coordinator of the agriculture production unit 1 advisor of general agriculture activities 15 farmers 		22
Union niébè	<ul style="list-style-type: none"> 1 administrator: a member of the administrative board 3 advisors 		-		4
UNPCB: <i>Union Nationale des Producteurs du Coton du Burkina</i>	<ul style="list-style-type: none"> 2 administrators: the director of agriculture development unit and the national coordinator of the organic cotton program 2 organic cotton advisors 		<ul style="list-style-type: none"> 1 administrator (regional director of organic cotton) 2 advisors: 1 for conventional and 1 for organic cotton 14 farmers 		21
Union Signassigui	<ul style="list-style-type: none"> 1 administrator: the president of the FO 3 advisors 		-		4

three FOs studied during the second interview phase. Their age varies from 28 to 74 and they are composed of both men and women with diverse ethnic groups (including Mossi, Sénofo, Dafi, Fulani, and Bwaba depending on their geographical location) who largely depend on agriculture as their source of livelihood. During the field visits, interviewees were asked whether they know the term agroecology and how they would define that term, how they differentiate between AET and conventional techniques, and which terms do they usually use when referring to agroecology or AET in their FO.

Information obtained during interviews was completed with document research in order to multiply sources of evidence for the validity of the study (Yin 2009). All the interviews were transcribed and stored together with the data obtained from research documents for systematic analysis through the use of two qualitative methods: content analysis and event history timeline analysis (Silverman 2013). Content analysis was used to find meaningful information from the data gathered in order to understand the goal of FOs in promoting AET by connecting the types of AET promoted with the FOs' objectives. The analysis was done with the aid of Sphinx (concerning the interview data) and Microsoft Excel software to sort, organize, store, and manage large amounts of textual data. Data were coded through an iterative reading and rereading of the transcripts to distinguish the current agriculture development functions of FOs and to identify the types of AET promoted. Codes were derived from the reviewed literature concerning the agriculture development functions performed by the Burkinabè FOs (cf. DSDR 2015; Zett 2013) and the diversity of agroecological techniques promoted in Burkina Faso (see Bancé 2013; Inter-réseaux 2015; Roose, Kabore, and Guenat 1999). The event history timeline helped to reconstruct the dynamics of three selected FOs' promotion of AET by stressing their evolving relations with external partners. Events were constructed based on (updated) information obtained from documents and interviews conducted with the administrators and advisors of the three FOs. Quotes were also used in this analysis to capture the FOs' definition of the term agroecology or AET.

Results

Exploring the diversity of FOs involved in the promotion of agroecological techniques

The study identified eight cases of FOs (cf. Table 2) involved in the promotion of AET in Burkina Faso with three distinct goals. These include the promotion of AET for enhancing the productivity of commercial crops; the promotion of AET for improving the resilience of subsistence farmers; and the promotion of AET for enhancing the productivity of commercial crops and the resilience of subsistence farmers. The goal of promoting AET for only enhancing the

Table 2. Characterizing the diversity of farmers' organizations involved in the promotion of agroecological techniques.

FO	Date of establishment and objectives	Current agriculture development functions performed	Types of conventional techniques promoted	Types of agroecological techniques promoted (AET)					The goal of promoting AET
				Soil Fertility Management	Pests and Diseases Management	Soil and Water Conservation measures	Main partners supporting AET		
AIDMR: <i>Association Inter-zones pour le Développement en Milieu Rural</i>	Established in 1993 to strengthen the development of subsistence crops (sorghum, millet, and cowpea) of village members located in the center and northern regions (in the north Sudanian and sub-Saharan zones). The FO is registered under the grassroots or community association law called "loi 10"	-Economic services: micro-credits (depending on the availability of funds) -Technical training services	-	-Compost, mulching and manure -Mixed sorghum-cowpea -Rotation sorghum-cowpea	-Biopesticides -Improved seeds	-Zai -Stone-bunds and Demi-lune -Agroforestry	<i>Terre et Humanisme; Eau-vive; Emmaüs lescares Pau</i>	Improving the resilience of subsistence farmers	
Beo-neere	Established in 2013 to promote the development of organic vegetables (cucumber, watermelon, and cucumber) and subsistence crops (sorghum, millet, cowpea) of their members located in the center and northern regions (in the north Sudanian and sub-Saharan zones). The FO is registered under "loi 10"	-Economic services: marketing -Technical training services	-	As above	As above	As above	<i>Terre et Humanisme</i>	Enhancing the productivity of commercial crops and improving the resilience of subsistence farmers	
FEPAB: <i>Fédération Professionnelle des Agriculteurs du Burkina Faso</i>	Established in 2001 to structure the cereals (maize, sorghum, and millet), fruits, and vegetable value chains operating in the sub-Saharan north and south-Sudan zones. The FO is registered under the corporatist or value chains law called "loi 14"	-Economic services: credits-inputs, marketing -Technical training services	-Improved seeds -Pesticides, Synthetic fertilizers	-Compost, mulching and manure -Mixed sorghum-cowpea -Improved cowpea seeds	Improved sorghum seeds	As above	Oxfam ; AFDI-Agriculteurs Français développement international ; FAO; McKnight foundation	As above	

(Continued)



Table 2. (Continued).

FO	Date of establishment and objectives	Current agriculture development functions performed	Types of conventional techniques promoted	Types of agroecological techniques promoted (AET)					Main partners supporting AET	The goal of promoting AET
				Soil Fertility Management	Pests and Diseases Management	Soil and Water Conservation measures				
FNNG: <i>Fédération Nationale des Groupements NAAM</i>	Established in 1967 (during the implementation of agriculture modernization projects) to support the development of subsistence (sorghum, millet, and cowpea) and commercial crops (cereals surplus, potatoes, tomatoes, and cowpea) of their members located in sub-Saharan, north and south-Sudanian zones. The FO is registered under "loi 10"	-Economic services: credits- inputs, micro-credits, marketing -Technical training services	As above	-Compost, mulching and manure -Mixed sorghum-cowpea -Rotation sorghum-cowpea -Improved cowpea seeds	As above	As above	As above	USAID; McKnight foundation	As above	
UGCPA: <i>Union des Groupements pour la commercialization en commun des produits agricoles de la Boucle du Mouhoun</i>	Established in 1993 initially for the collective marketing of surpluses of cereals (maize, sorghum, millet) and cowpea of their members living in the Boucle du Mouhoun region (located in north and south-Sudanian zones). The FO is registered under "loi 14"	-Economic: credits- inputs, marketing -Technical training services	As above	As above	As above			L'Œuvre Léger ; McKnight foundation ; <i>Fondation pour l'Agriculture et la Ruralité dans le Monde</i>	As above	
<i>Union Niébé</i>	Established in 2003 to structure the cowpea value chain of farmers living in the central region, located in sub-Saharan and north Sudanian zones. The FO is registered under "loi 14"	-Economic; marketing -Technical training services	As above	-Compost, mulching and manure -Mixed sorghum-cowpea -Rotation sorghum-cowpea	Biopesticides	As above		Fert, an NGO	As above	

(Continued)

Table 2. (Continued).

FO	Date of establishment and objectives	Current agriculture development functions performed	Types of agroecological techniques promoted (AET)				
			Types of conventional techniques promoted	Soil Fertility Management	Pests and Diseases Management	Soil and Water Conservation measures	Main partners supporting AET
UNPCB <i>Union Nationale des Producteurs du Cotton du Burkina</i>	Established in 1998 to structure the cotton value chain from the transformation of former FOs (called <i>Groupements Villageois</i>) composed of both cotton and non-cotton growers to FOs composed of only cotton growers operating at local, departmental, provincial, and national levels (present in the north and south-Sudanese zones). The FO is registered under "loi 14"	-Economic: credits-inputs, marketing -Technical training services	As above	-Compost, mulching, and manure -Rotations and associations of crops with legumes	-Biopesticides -Trap crop.	-	SOFITEX (<i>Société des Fibres Textiles</i>) ; FAO Catholic Relief service; Helvetas
Union Signassiguï	Established in 2007 to organize the processing and marketing of paddy rice in the Hauts-Bassins region located in the south-Sudanese zone. The FO is registered under "loi 10"	-Economic: micro-credits, marketing -Technical training services	As above	-Compost, mulching, and manure	Biopesticides	-	FENOP: <i>Fédération Nationale des Organisations Paysannes</i> , an umbrella FO registered under "loi 10"

Source: Own elaboration based on information obtained from documents research, interviews and observation.

productivity of commercial crops concerns two cases of FOs i.e. the *Union Nationale des Producteurs de Coton du Burkina Faso-UNPCB* and the *Union Signassigui*. These FOs were established to better ensure the organization of the cotton value chain (concerning UNPCB), and the processing and marketing of paddy rice (concerning the *Union Signassigui*). They are doing that by providing the necessary economic (such as credits and collective marketing) and technical services to their members. The technical services include the organization of agroecological training sessions during which their advisors exchange with farmers about available ecologically-based soil fertility management techniques.

These include mulching, manure,⁵ and compost (an organic fertilizer created from a decomposed mixture of manure, crop residues, and water). They (FOs) usually initiate these training sessions after receiving assistance from external partners. For example, the promotion of compost pits conducted through the technical and economic assistance of partners like *Société des Fibres Textiles-SOFITEX*⁶ (the case of UNPCB) or the *Fédération Nationale des Organisations Paysannes-FENOP* (the case of the *Union Signassigui*). Then the promotion of AET was intensified with their (FOs) engagement in the production and marketing of organic certified products such as cotton and rice respectively for UNPCB (cf. the second section of the results) and *Union Signassigui*. This was mainly by introducing the techniques of biopesticides production from the transformation of neem and the updated compost production techniques (i.e. the compost pile which is less labor intensive compared to the compost pits). The introduction of these techniques (in both FOs) was related to the necessity of complying with the standards for organic certification calling for a total absence of the use of synthetic inputs.

The goal of promoting AET for improving the resilience of subsistence farmers was observed with only one case of FO i.e. the *Association Inter-zones pour le Développement en Milieu Rural-AIDMR* (Table 2). This FO was established through the assistance of an NGO called *Eau vive* to jointly promote soil and water conservation measures and soil fertility management techniques to tackle the persistent land degradation witnessed in northern Burkina (i.e. the sub-Saharan and north-Sudanian zones, cf. Figure A1 in appendix A). Promoted AET (see the second section of the results for further details) include *zai* (i.e. traditional soil and water conservation technique involving digging pits which are filled with manure and/or compost), mulching, manure, compost, stone-bunds (farms' water and nutrients catchment technique), *demi-lune* (which is a water and nutrients catchment technique consisting of digging pits in the shape of half-moons in the farms), and the association of trees with crops. All these AET are promoted by AIDMR because of their efficiency in restoring degraded lands. And the AIDMR's activity is centered on the improvement of these techniques by organizing various agroecological knowledge exchanges among members (from farmers to farmers and from farmers to advisors) regarding the updated AET. A typical

example was observed with the recommendation of a *zai* disposition that follows the shape of an equilateral triangle, which is more efficient in terms of capturing and conserving water as compared to the random disposition (which is widely practiced by many farmers in northern Burkina).

The last goal which is the promotion of AET for enhancing the productivity of commercial crops and the subsistence farmers' resilience concerns five cases of FOs presented in Table 2. All these FOs are actively involved in the promotion of many AET ranging from pests and diseases management techniques to soil fertility and water conservation measures. While most of the soil and water conservation measures are primarily targeting some of the FOs' members (especially those located in areas frequently affected by land degradation issues); the soil fertility management techniques (like compost and manure) are rather promoted for all the members of the FOs regardless of their geographical location. This is mainly due to their efficiency in increasing the productivity of their members' crops. The FOs are promoting these AET by organizing technical training of AET and facilitating members' access to some inputs (in credits and/or subsidies) and marketing services (co). The latter mostly concerns the cases of members involved in commercial crops which vary according to FO (cf. Table 2).

Although most of these AET are promoted by improving the already existing farmers' practices, the frequency of the provision of support services (by these FOs) largely depends on the availability of assistance from external partners. Examples include the dependence on the *Fédération des Professionnels Agricoles du Burkina Faso-FEPAB* and the *Union niébé* of NGOs like Oxfam (concerning FEPAB) and Fert (regarding the *Union niébé*) for supporting the organization of their compost training sessions. Similarly, the distribution of Faidherbia seedlings as incentives by FO like the *Union des Groupements pour la Commercialization en commun des produits agricoles de la Boucle du Mouhoun-UGCPA* was based on the reception of financial assistance of an NGO called "L'Œuvre Léger." It becomes clear from these results that the promotion of these AET by FOs intersects with the economic, social, and ecological aspects of the agriculture context of Burkina. This is because the promotion of AET is essential for restoring and preserving the degraded soils of some of their members on the one hand and for improving the crops' productivity of their members on the other hand. Good productivity is important for the members' sustenance and/or members' income (concerning the cases of those promoting commercial crops).

Historical dynamics of three FOs' promotion of agroecological techniques

This section presents the historical dynamics of three selected cases of FOs' promotion of agroecological techniques (AET) and how these FOs define the term agroecology or AET. The three cases are selected according to their goal of

the promotion of AET (see the first section of the results). The first case (i.e. the *Union Nationale des Producteurs du Coton du Burkina Faso*-UNPCB) is selected from one of the two cases of FOs promoting AET for enhancing the productivity of commercial crops. The second case (i.e. the *Association Inter-zones pour le Développement en Milieu Rural*-AIDMR) corresponds to the only case of FO promoting AET for improving the resilience of subsistence farmers. The third case (i.e. the *Union des Groupements pour la Commercialization en commun des produits agricoles de la Boucle du Mouhoun*-UGCPA) is selected from one of the five cases of FOs promoting AET enhancing the productivity of commercial crops and improving the resilience of subsistence farmers.

Case 1: The UNPCB: an FO promoting AET for enhancing the productivity of commercial crops

UNPCB was created in 1998 (Figure 1) as a formal FO in charge of the development of the cotton value chain following the partial liberalization of the governance of the cotton sector (Dowd-Urbe 2014). The creation of UNPCB was the result of the transformation of the former local cotton FOs known as *Groupements Villageois* (which is composed of both cotton and non-cotton farmers) following a series of negotiations between the *Société des Fibres Textiles*-SOFITEX, international donors, and the former local cotton FOs. The new local cotton FOs called “*Groupements de Producteurs de Coton*” (GPCs) are composed of only cotton farmers for better management of credits-inputs (obtained from SOFITEX) repayment through a collective responsibility of all farmers within every GPC (Luna 2019). UNPCB is an umbrella union composed of many GPCs grouped into departmental and provincial sub-unions. SOFITEX is also supporting UNPCB in the provision of technical training (including the recommendation of cotton farming and the techniques of compost production) and the organization of harvested cotton marketing (Dowd-Urbe 2014; Luna 2020). The liberalization of the sector also favored the arrival (in 2004) of two other companies: the “*Société Cotonnière du Gourma*” (SOCOMA) and FASO COTON for supporting the provision of credits and marketing to cotton farmers in areas not covered by SOFITEX (Dowd-Urbe 2014).

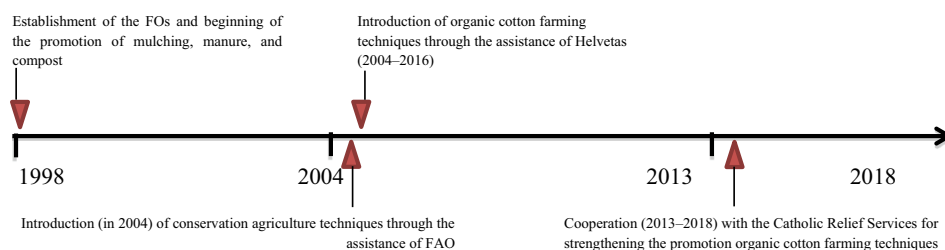


Figure 1. Historical dynamics of UNPCB's promotion of agroecological techniques.

Nevertheless few years after its establishment, the FO started to face challenges related to low cotton productivity affected by issues such as continuous decrease of soil fertility, low cotton prices, reduced effectiveness of cotton pesticides, resistance to cotton pesticides, and the breeding of pest-sensitive cotton varieties, reduced subsidies of inputs, amongst others (Bassett 2002; Kaminski, Headey, and Bernard 2011; Petit 2003). This situation resulted in the low credit repayment of the majority of the FO's members. To tackle the decrease in soil fertility, the FAO assisted UNPCB to start (in 2004) the promotion of conservation agriculture technology (Ndah et al. 2014). This was by adapting and testing (with farmers-members of the FO) technologies for crop diversification and intensification (through the development of fodder crops) so as to apply conservation agriculture principles.⁷ Like FAO, another NGO called Helvetas also supported UNPCB to introduce organic cotton technology. This was part of the organic cotton aiming to exploit a global niche market of certified cotton (Coulter 2011; Dowd 2008). Helvetas transferred the management of the project to UNPCB since the FO was familiar with the organization of the cotton value chain. UNPCB created a sub-value chain within the conventional cotton structuration from national to local levels. Helvetas sponsored the recruitment of organic cotton advisors within the agriculture production unit of UNPCB. These advisors are those in charge of the provision of technical training at the GPCs level. The introduction of the organic project marked the beginning of many AET that were not previously promoted by UNPCB.

The introduction of the organic project marked the beginning of the promotion of many AET (that were not previously promoted by UNPCB). This mostly concerned the techniques of pests and diseases management such as the production of biopesticides from the grains of neem or the association of organic cotton with crops like okra (to serve as a trap for some cotton pests). Every farmer within a cotton-producing village can join the project under the condition of not having sprayed chemicals on the farm for two consecutive years. This requirement explained why most of the project sites were selected in forested areas which offered the possibility of fallow practice (Dowd 2008). In 2013, UNPCB started to cooperate with the Catholic Relief Services-CRS (an NGO) to continue its promotion of organic cotton by receiving both technical (i.e. updated knowledge of the organic technology) and financial (like inputs subsidies) assistance.

When the administrator (director of the organic cotton unit in Banfora) and advisor were asked about their definition of agroecology or AET they replied: *“Agroecology, is a technique of living in harmony with nature with no external inputs in comparison to conventional techniques . . . Here (in UNPCB), we use the term organic agriculture for our farmers in relation to the organic cotton program . . . It is almost the same as agroecology, but organic agriculture has a certification constraint”* (administrator). Or *“Agroecology is a method of*

farming respecting the environment for future generation ... We use the term organic agriculture and this is for small farmers who can produce with non-chemical inputs (i.e. through using manure, compost, and bio-pesticides) ... ”(advisor). The majority of farmers interviewed were not familiar with the terms agroecology or AET, but they rather used the term organic (as shown in the previous quotes) when speaking about the alternative of conventional techniques as noted in their following statements: “organic cotton is the one with no herbicides for land preparation where we used biopesticides (for crop protection)” (woman farmer). Or “conventional cotton in comparison to organic cotton is equal to credits (for accessing to synthetic fertilizers and pesticides) and health poison (from the spray of pesticides)” (man farmer). “... For me organic cotton is women’s cotton, I am not familiar with conventional cotton, but I know that it involves many expenses (for inputs) and credits’ (woman farmer). Or “Never heard the word agroecology ... I was involved in conventional cotton, and if it happened that you are having debts (for paying credits), they (GPCs) will never give you input credits anymore” (man farmer). The fact that most of these farmers mentioned their non-familiarity with the term “agroecology” does not mean that they were practicing these techniques prior to the advent of the organic cotton project. This is because techniques like manure and compost are always part of members’ strategies for soil preparation in cotton farming. This is more frequent for farmers located in the north-Sudanian zone (see Figure A1 appendix A) explaining the actions of partners like SOFITEX in the organization compost training to reinforce members’ knowledge on the integrated (combination of synthetic with organic) soil fertility management techniques (cf. the first results section).

Case 2: The AIDMR: an FO promoting AET for improving the resilience of subsistence farmers

The AIDMR was established in 1993 (Figure 2) as an FO composed of groups of young farmers promoting AET (e.g., compost, zaï, stone-bunds, etc.) in the center and northern regions of Burkina. These techniques were promoted

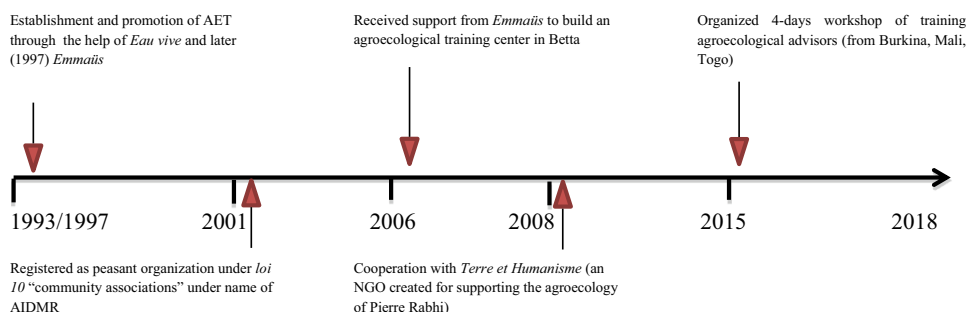


Figure 2. Historical dynamics of AIDMR’s promotion of agroecological techniques.

because of their positive contribution to the restoration of degraded lands witnessed in the Yatenga province (also located in the northern region). In 1997, *Emmaüs Lescar Pau*, (an NGO introduced by Eau vive, which was the first partner of AIDMR) sponsored the organization of multiple village training and exchanges (between members of the FO) on various AET. *Emmaüs* later connected AIDMR to an NGO called *Associations pour la Vulgarization et l'Appui aux Producteurs Agroécologistes-AVAPAS* to reinforce their technical knowledge of the promoted AET. AVAPAS is an NGO established (during the late 80s) by the former students of Pierre Rabhi to continue the diffusion of AET in Burkina Faso. Pierre Rabhi is a writer, farmer, and activist for agroecology based on the preservation of natural resources and farmers' autonomy. In 2006 *Emmaüs* assisted AIDMR to build an agroecological training center in Betta (in the Ouhritenga province, the center region) to intensify the organization of the AET training for both members and nonmembers (including neighboring farmers and other actors suchlike national and international NGOs) of the FO. In 2008, AIDMR received the assistance of *Terre et Humanisme* (an NGO of Pierre Rabhi) to develop a catalog of the promoted AET, which also includes techniques like seed multiplication and the development of biopesticides. This catalog is serving as the training tool used by the FO's advisors.

Administrators' and advisors' definitions of the term agroecology were largely associated with the agriculture of protection (i.e. the ecological aspect of agriculture) as stated in the following quotes: "*Agroecology is defined as an ethic of life. . . Everyone should respect all the elements of the environment . . . Agroecology is the agriculture of protection which is translated into Mooré (the spoken language in the center and north regions) as "Kokol Zanga Koobo-KZK," i.e. agriculture of protection. . . To be an agroecologist means to focus on farmers' autonomy*" (administrator: the coordinator). And "*Agroecology is about the protection of everything that lives on the earth, what we can see and what we cannot see. . .*" (administrator: the president). Or "*KZK means protection of air and soils by avoiding pesticides . . .*" (advisor). The term KZK is thus used by the administrators and advisors of AIDMR to speak about agroecology to the farmers (members). Examples of farmers' explanations of agroecology are illustrated in the following quotes: "*I heard about agroecology from AIDMR in the name of KZK, in agroecology there is compost . . .*" (man farmer). And "*AE (KZK) equals to compost which improves soil fertility for three to four years . . . It does not require too much rain to work. . . whereas; conventional techniques depend on synthetic fertilizer*" (man farmer). Or "*KZK with AIDMR, . . . Compost increases yields for filling my silo*" (man farmer). And "*Agroecology: compost gives well (good production); whereas NPK (referring to synthetic fertilizers) requires a lot of water*" (man farmer). Or "*KZK and I have participated in training (organized in AIDMR) even if there are others (farmers) who are ahead of me in this knowledge . . . In AE, I am the one who is making my inputs (compost in this case)*" (woman farmer). It can be noted

from these quotes that, although the AIDMR is speaking about the ecological aspect of agriculture when referring to agroecology, most of the farmers' explanations of AET are rather centered on the economic aspect of farming (i.e. efficiency and autonomy) derived from the compost application. These explanations can be due to the fact that compost is one of farmers' traditional soil fertility management techniques largely practiced (in association with other techniques like *zai* and half-moon) in the areas of AIDMR operation: the north Sudanian and Sub-Saharan zones.

Case 3: The UGCPA: an FO promoting AET for enhancing the productivity of commercial crops and improving the resilience of subsistence farmers

The UGCPA was established in 1993 (Figure 3) for ensuring the collective marketing of cereals (maize, sorghum, millet) and cowpea surpluses in the Boucle du Mouhoun region. The establishment of this FO was sponsored by the Canadian development agency (*Agence canadienne de développement international*, ACDI) through the intermediation of the *Union des producteurs agricoles du Québec* (UPA). UPA assisted the FO in the organization of marketing activities, which included collecting, packaging, and transporting farmers' surpluses from villages to the FO's stores. In the late 1990s, UGCPA started the production and exportation of organic certified hibiscus. This production was facilitated by the provision of credits inputs and technical training (on ecological management of soil fertility and post-harvest handling of hibiscus) to members interested in organic hibiscus farming. In 2002, UGCPA collaborated with the national agricultural research institute to implement a participatory selection and multiplication of improved (resistant) sorghum varieties project funded by the French Global Environmental Facility.

In 2009 UGCPA received the assistance of an NGO called *Fondation pour l'Agriculture et la Ruralité dans le Monde*, to develop an agro-environmental policy. The aim of this policy was to sensitize its members on soil fertility depletion issues and the consequences of the intensive use of pesticides. The policy also helped to sort and communicates (through the use of video) a list of recommended AET that

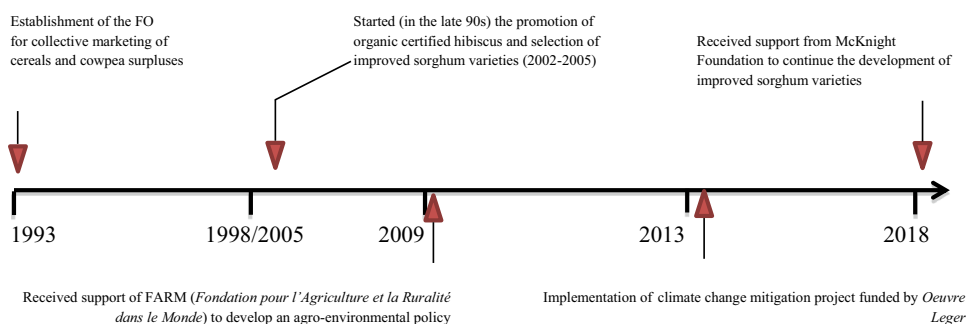


Figure 3. Historical dynamics of UGCPA's promotion of agroecological techniques.

can enhance both commercial crops' productivity and farmers' resilience to land degradation. In 2013, *Oeuvre leger* (an NGO) assisted UGCPA to implement a climate change mitigation project aiming to promote a new cowpea variety, the use of biodigester, and the promotion of agroforestry. The promoted cowpea variety is grown as a single crop and produces more leaves (serving for forage) and grains (for food consumption and profit-making) as compared to the variety grown as a mixed crop. When an administrator was asked about the definition of AET, he pointed to both compost and synthetic inputs as noted in the following quotes: *"Agroecological techniques are those involving rational use of pesticides (to deal with synthetics inputs) and compost for soil fertility"* (administrator: the director of the agricultural production unit). Most of the definitions of AET used by the advisor and farmers were centered on compost as illustrated in the following quotes: *"Agroecological techniques refer to the use of use of compost or farafinogo in Dioula (the spoken language in Boucle du Mouhoun region) in growing crops"* (advisor). Or *"an agroecological technique is the compost (Farafinogo) which is not rapid (compared to the synthetic fertilizers), but stay longer . . ."* (woman farmer). And that *"Farafinogo is very positive in conserving humidity . . . I applied it in my maize farm together with synthetic fertilizers . . ."* (man farmer). Or *"Agroecological technique is the compost (Farafinogo), it is not rapid, but lasts long . . . The opposite (toubabou nogo or synthetic fertilizers) is rapid but costly"* (woman farmer). *"Compost is less expensive and lasts longer, whereas synthetic fertilizer doesn't retain water . . ."* (man farmer). Although farmers' explanations of compost are mostly focused on the existing economic aspect of local agriculture associated with its efficiency for crop productivity, the results also show the existence of some ecological explanations of compost application. This was mostly observed with maize farmers since they were those mentioning the role of compost in water retention in their respective farms.

Analysis and discussion

As the results show, echoing findings elsewhere (e.g. Groot Kormelinck, Bijman, and Trienekens 2019; Schiller et al. 2020), FOs can play important roles in promoting agroecology. In this section, we will reflect on the questions that guided the study: why and how do FOs get involved in the promotion of agroecological techniques, and how do they define the term agroecology or agroecological techniques?

External partners as the main trigger of the intensive promotion by FOs of agroecological techniques

The above results indicate how external partners (dominantly NGOs) have shaped the intensive FOs' promotion of AET. As shown in the results sections, most of the FOs were already promoting many AET (especially those related to

soil fertility management and conservation measures) since their establishment. The promotion of these AET is a continuity of a broader dynamic of ongoing experimentation of agroecology (based on traditional practices) in northern Burkina (more precisely the Sahelian and the north-Sudanian zones) which was amplified during the droughts of the 70s and 80s. This dynamic was characterized by the engagement of NGOs in a participative development of adapted AET (see Bancé 2013, 2013; Lancelloti 2019; Ledea Ouedraogo 2002; Roose, Kabore, and Guenat 1999). NGOs continued to be active in this dynamic as they are those assisting the current FOs in updating their members' knowledge about the improved AET like the case of the promotion of a new disposition of *zai* and/or the less labor-required composting technique.

Furthermore, the involvement of some FOs (through the assistance of NGOs) in the production of organic certified crops has contributed to intensifying the promotion of many other types of AET and/or the promotion of AET in areas characterized by limited agroecology experimentation such as the south-Sudanian zone. FOs are, thus, continuously interacting with NGOs in order to have access to technical and (in some cases) financial assistance necessary for their promotion of AET. The establishment of these relations is sometimes facilitated through the actions of their (FOs) previous partners and/or through a request for cooperation from the NGOs themselves. This is consistent with Mockshell and Kamanda (2018) conclusions, regarding the dominance of NGOs within the landscape of actors supporting the promotion of agroecology, and those of Mockshell and Birner (2015), on how donor priorities also shape agricultural development. However, in addition to Mockshell and Kamanda's findings (2018), the above results also show the implication of another actor beyond NGOs. In this case, a parastatal agro company was involved in supporting some FOs' promotion of agroecological technical techniques besides the NGOs. The involvement of this actor is mainly due to its involvement in a crop-livestock integration program (Slingerland 2000) which was also targeting cotton farmers located in the northern regions and this connects to ideas of private sector actors such as traders being influential in stimulating more sustainable forms of agriculture (Grabs and Carodenuto 2021).

Farmers' organizations' definitions of agroecological terms

The results reveal that most of the FOs administrators' definitions of agroecological terms were rooted in their broader goal of the promotion of agroecological techniques. These terms are either defined as organic agriculture or "*Kokol Zanga Koobo*" (i.e. the agriculture of protection) or the use of compost as shown in sub-sections (a), (b), (c) of the second section of the results respectively. The term organic agriculture was also mentioned by the advisor and farmers in the first case study (sub-section (a)) to refer to the inputs substitutions of the alternative to the conventional techniques. The term

compost was similarly used by all the members in the third case study (sub-section (c)) to refer to the technical efficiency of the alternative techniques. The term “*Kokol Zanga Koobo*” was differently defined by the administrators/ advisor and farmers in the second case study (sub-section (b)). Concerning the latter, farmers’ definitions were primarily focused on input efficiency, while the administrators’ and advisors’ definitions emphasized resource preservation. These differences show that farmers’ definitions were mostly reduced to agricultural production (i.e. the economic aspect of agriculture) with very limited integration of the ecological aspect of farming (cf. Mockshell and Kamanda (2018)).

Moreover, examining the three FOs’ explanations of agroecological terms from the above results shows the existence of areas of convergence and divergence. The area of convergence concerns the combination (as per Giller et al. 2021) of some agroecological techniques such as compost with synthetic fertilizers (used in the conventional techniques). This combination was due to both the cost-benefit ratio (case 1) and the efficiency of this technique in managing soil fertility (cases 2 and 3). The area of divergence was the inclusion (case 3) and exclusion (case 1 and case 2) of synthetic inputs in the explanations of agroecological techniques. These results, therefore, support the observations of Wezel et al. (2009) concerning the existence of multiple definitions and interpretations of agroecology within the local actors’ arena. This interpretation of agroecological terms is sometimes induced by the broader discourses and interpretations of agroecology of international donors (as per Mockshell and Birner 2015; Smith, Fressoli, and Thomas 2014), and while this may stimulate elements of agroecological development it may dilute some of its original meaning espoused by agroecology pioneers (especially as a movement) since it becomes co-opted (see also Giraldo and Rosset 2018; Schiller et al. 2020).

Conclusion

This study has demonstrated why and how FOs do FO get involved in the promotion of agroecological techniques (AET) in Burkina Faso. This was by identifying three main goals behind the promotion of agroecology (i.e. enhancing the commercial crops’ productivity or improving the subsistence farmers’ resilience or enhancing both the commercial crops’ productivity and the subsistence farmers’ resilience) and by showing an intense involvement of external partners in the amplification of their promotion of AET. This study shows that the ‘social life of agroecology’ in Burkina is a result of FOs’ hybridization of existing farmers’ practices with those proposed by external actors. Such hybridization explains the FOs’ navigation on a spectrum from light to heavy promotion of agroecology, depending on their geographical location, the values of the farmers and other actors involved, and the types of crops supported. The study

also shows the complexity related to the local actors' definitions of agroecological terms as AET are mostly interpreted as a practice that encompasses the economic and ecological aspects of agriculture, and to a lesser degree as a movement with a particular set of socio-economic values also. The broader implication is that in the debate on agroecology transitions, these blended or hybrid forms of agroecology should receive more attention, and what drives processes of FOs making choices in how they approach agroecology. Since most of the identified FOs are promoting AET by facilitating their farmers' access to technical training and (to some extent) market, and credit services, the study calls for further investigation of the effectiveness of these services for a broader agroecological transition. Future research could also look at the detailed drivers of farmers' decisions toward AET and how do the FOs influence these decisions.

Notes

1. FOs are defined in this study as all type of organizations ranging from village associations, village groups, to unions and/or federation composed of farmers that seek to fulfill agricultural development activities (Diagne and Pesche 1995; Tanguy et al. 2008).
2. This restructuration was mainly due to the establishment (in 1999) of a value chain law called "*loi 14*" calling for existing FOs to group according to value chains in order to better organize their provision of agriculture development services to farmers and some of the FOs that were grouped according to value chain can be registered under a community development association existing law called "*loi 10*" (DSDR 2015; Konate 2013).
3. Is the acronym of an NGO called Promoting Local innovation in ecologically-oriented agriculture.
4. An event is something that occurs in real-life leading to some changes (such as international relations, organizational and managerial processes, group behavior, individual life cycles, etc . . .) and this can be studied through documentation, direct observation of the situations, and interviews of persons involved in these changes (Yin 2009).
5. Manure is a traditional soil fertility management technique largely practiced by Burkinabè farmers.
6. SOFITEX is a parastatal agro-company created in 1979 (for the development of cotton in Burkina), and currently owned by three main shareholders: the Burkinabè government, the French Geocoton group, and the UNPCB (after its creation from the transformation of village groups in 1998) (Kaminski, Headey, and Bernard 2011).
7. The principles of CA are the low soil disturbance, the high mulching of the soil with crops residues, the diversification of crops (rotations or associations) with legumes (Kassam et al. 2009).

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Appendix A

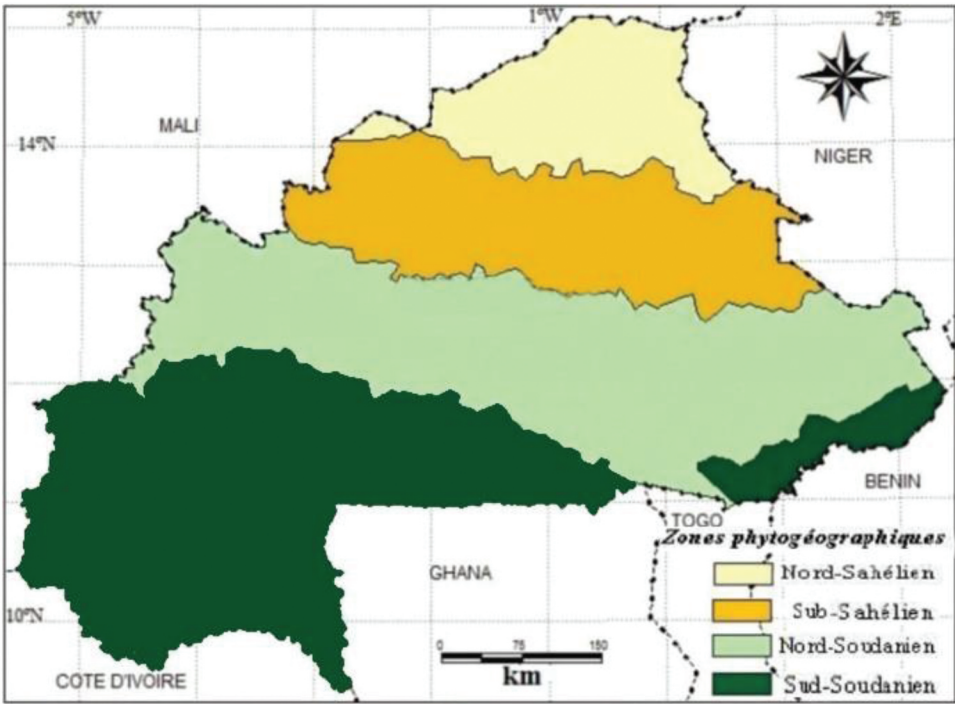


Figure A1 The phytogeographical zones of Burkina Faso. Source: (Fontès and Guinko 1995)