

Status of Agricultural Innovations, Innovation Platforms and Innovations Investment in

Burkina- Faso



Program of Accompanying Research for Agricultural Innovation

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Status of
Agricultural Innovations,
Innovation Platforms
and Innovations Investments in Burkina-Faso

Contributors to the study

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STUDY BACKGROUND

Science and technology remains the fulcrum for development over the ages. There is hardly any national development in contemporary history that is not based on consistent efforts from the science and technology sector. The spate of development in agriculture follow suit; the state of efficiency in science and technology generation correlates highly with the development of agriculture. In Africa, agriculture is considered as the sector with the best potential to lead the socioeconomic development of countries on the continent. However, the sector is bedevilled with many constraints that could be categorized as technological, socio-cultural, institutional, infrastructural, and economical. The poor productivity of the enterprise stream in the sector is clearly seen from its contribution to a country's GDP versus the number of active workers engaged in the sector. Africa's agriculture currently engages about 65% of the working population and its average contribution to GDP still stands at 22.9%.

The crave to develop Africa has received good attention in recent years, starting with the political will of the heads of states, under the auspices of the Africa Union Commission, to develop and implement the Comprehensive Africa Agricultural Development Programme (CAADP), the Science Technology and Innovation Strategy (STISA). The Forum for Agricultural Research in Africa (FARA) also came up with a handful of continental initiatives, such as the Sub-Saharan Africa Challenge Programme (SSA CP), *Strengthening Capacity for Agricultural Research and Development in Africa* (SCARDA), Dissemination of New Agricultural Technologies in Africa (DONATA) and several others. The different initiatives aim to foster change by addressing specific issues that constitute constraints in the path of progress in Africa agriculture. The notion that African agricultural research system has generated a lot of technologies with great potentials, but which are not realized due to different institutional and organizational constraints—more specifically, the way agricultural research and development systems is organized and operated—is prevalent among stakeholders in the sector. Indeed, this notion appeals to reasoning. However, there is no known cataloguing or documentation of existing technologies and their veracity in delivering broad-based outcomes. The possibility of finding some documentation in annual reports of research institutes, journal articles and thesis in the universities is known, but this will not meet an urgent need.

Thus, the Programme of Accompanying Research for Agricultural Innovation (PARI) commissioned the three studies reported in this volume to provide a compressive analysis of the state of agricultural technology generation, innovation, and investment in innovations in the last 20 years in selected countries in Africa.

Study 1 is the “situation analysis of agricultural innovations in the country” and provides succinct background on the spate of agricultural innovation in the last 30 years. It provides useable data on the different government, international and private

sector agricultural research and development interventions and collates information on commodities of interest and technologies generated over the years. It also conducted an assessment of the different interventions so as to highlight lessons learnt from such interventions, with regard to brilliant successes and failures.

Study 2 concerns a “scoping studies of existing agricultural innovation platforms in the country”. It carried out an identification of all the existing Innovation Platforms (IP) in the country, including identification of commodity focus, system configuration, and partnership model. The study provides an innovation summary for each IP for use in the electronic IP monitor platform. It further synthesises the lessons learnt from the agricultural IPs established through different initiatives in the country in the last ten years.

Study 3 was an “Assessment of the national and international investment in agricultural innovation”. It is an exhaustive assessment of investments in innovation for agricultural development, food and nutrition security in the country. It collates updated data on investment levels in the past and present, including a projection for the next decade requirement to assure food and nutritional security in the country.

The three studies form the comprehensive collation on the state of agricultural innovation in the 12 countries where the PARI project is being implemented. It is expected that these studies will benefit all stakeholders in Africa’s agricultural research and development, including the users of technologies, research stakeholders, extension system actors and, more importantly, the policymakers.

STUDY ONE

Inventory of Agricultural Technological Innovations (1995 to 2015)

INTRODUCTION

The Forum for Agricultural Research in Africa (FARA), in partnership with the German Government represented by the Research Centre for Development (ZEF), University of Bonn, under the initiative of "One World No Hunger", has undertaken to implement the "Research Support Program for Agricultural Innovations (IRAP)." IRAP takes note of successful research initiatives and innovations in African agriculture, in cognizance of the concept of integrated agricultural research for development (IAR4D), promoted by FARA, to build an independent program accompanying the research to support the scaling of agricultural innovation in Africa and contribute to the agricultural sector development in Africa. IRAP is jointly implemented "A world without hunger" initiative with the Agricultural Innovation Center (AIC).

INERA is empowered in Burkina Faso to provide the necessary support for the implementation of IRAP activities, such as to:

- i. Analyze the situation of agricultural innovations in Burkina Faso and produce reliable information
- ii. Study the scope of existing agricultural innovation platforms in Burkina Faso and provide a synthesis of lessons learned from such platforms by various initiatives in the country
- iii. Study the initiatives of national and international investments in innovation for agricultural development and food and nutrition security in Africa, in general, and in Burkina Faso, in particularly.

Agricultural innovation is defined as "a set of socio-organizational processes (social structure, opportunities, and environment) for the valuation of opportunities to develop or improve the socioeconomic situation of a particular social group." In the implementation of NRC's activities, an inventory of agricultural innovations, as well as their platforms was conducted in the thirteen (13) regions of Burkina Faso. This report provides the results of that study at the national level.

Study Objectives

1. To analyze the situation of agricultural innovations in Burkina Faso and produce reliable information;
2. To determine the scope of existing agricultural innovation platforms in Burkina Faso and synthesis of lessons learned from such platforms established by various initiatives in the country for a period of ten (10) years.

METHODS

Research team organization

INERA is regionalized to bring research results closer to the end users; for this purpose, the country is divided into five environmental and agricultural research regions (map 1). Integrating this, the study covered the 5 regions in taking inventory of all innovations, innovation platforms and technologies with high potential for innovation across all 13 administrative regions of the country.



Map 1. Agricultural research zones of INERA, Burkina Faso

To do so, a multidisciplinary team (of geographers, agronomists, animal scientists, agricultural economists, sociologists, and environmentalists) from all the regions of INERA was drawn. The team members had a workshop where the methods and resources were planned and harmonized. The workshop featured information sharing on the core concepts in the INERA-FARA-PARI collaboration, development of relevant conceptual and theoretical frameworks, design of tools and plans on information gathering techniques, as well as a timetable for data collection and reporting. The research team organization is presented in table 1.

Table 1: Research team composition and organization

<i>N°</i>	<i>Mandated region</i>	<i>Research team</i>	<i>Disciplines</i>
1	Boucle Mouhoun (Dédougou)	Adama OUEDRAOGO, Souleymane OUEDRAOGO	Socioeconomist & Zoo technician
2	Cascades (Banfora)	Souleymane, Baba	Zoo technician & environmentalist
3	Centre (Ouagadougou)	Blaise KABORE, Samuel NEYA, Abdoulaye KAFANDO	Geographer, M&E specialist & research-extension specialist
4	Centre-Est (Tenkodogo)	Hamadé SIGUE, Blaise OUEDRAOGO	Agro-economist & geographer
5	Centre-Nord (Kaya)	Boukaré SAWADOGO, Blaise OUEDRAOGO	Agro-economist & geographer
6	Centre-Ouest (Koudougou)	Sidonie IMA	Sociologist
7	Centre-Sud (Manga)	IMA Sidonie, Abdoulaye KAFANDO	Sociologist & research- extension specialist
8	Est (Fada)	Hamadé SIGUE	Agro-economist
9	Hauts-Bassins (Bobo-Dioulasso)	Souleymane OUEDRAOGO, Adama OUEDRAOGO, Baba OUATTARA	Zoo technician, socioeconomist & environmentalist
10	Nord (Ouahigouya)	Jean-Bosco SANFO, Abdoulaye KAFANDO	Agronomist & research- extension specialist
11	Plateau Central (Ziniaré)	Samuel NEYA, Sidonie IMA	M&E specialist & Sociologist
12	Sahel (Dori)	Boukaré SAWADOGO	Agro-economist
13	Sud-Ouest (Gaoua)	Baba OUATTARA, Adama OUEDRAOGO	Environmentalist & socio- economist

Concepts and Definitions

It has been commonly taken that an innovation is a process or knowledge that a community puts in use so as to improve their livelihoods from the income of this process. Such process or knowledge can be social, organizational or technical (including improved process, improved high yield crop variety, productive animal race, water management technique, soil fertility management technique, etc). This study also retains the definition of innovation by Engel (2009), cited by FAO (2012) that it is:

The process by which social actors create value from knowledge, or the process of creating and putting into use combinations of knowledge from many different sources.

To strengthen agricultural production, several research organizations decided invest in agricultural research for development in the area of innovation platform (IP) as a

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framework for promoting increased use of agricultural innovations in Africa. IPs are ways to bring together different stakeholders to identify solutions to common problems or to achieve common goals. They ensure that different interests are taken into account, and various groups contribute to finding solutions to identified field challenges (CGIAR/ILRI, 2013). Such platforms facilitate dialogues between major stakeholders along the value chain: farmers, input suppliers, traders, transporters, processors, wholesalers, retailers, regulators, and the research and development fraternity. IPs identify bottlenecks and opportunities in production, marketing and the policy environment. The process is galvanized through discussions on market requirements (quantity, quality, and the timing of sales), followed by an analysis of existing production strategies. An IP then identifies and implements technologies to improve production to fulfill market demand. In a parallel and similar process, the marketing system is analyzed and improvements on benefits for all stakeholders are tabled and tested within the local context (van Rooyen and Homann, undated).

We concluded that a technology with high potential for innovation is that which serve as a basis for innovation in the agricultural domain. Such technology includes results of scientific research (eg, on pre-extension varieties and processes), inventors and innovators (eg, equipment). It can also be a locally developed knowledge that is capable of being up-scaled with important impact on the stakeholders.

The data collection method was based on semi-structured interviews with regional directors in charge of rural development (agriculture, livestock, environment and fisheries). The purpose was to identify any agricultural innovation, innovation platform and technology with high potential. Additional data were gathered from visits to some of relevant stakeholders of agricultural innovation. Thereafter, a data base of agricultural innovations, innovation platforms and technologies with high potential for innovation was developed using Microsoft Exel.

Function, Domain and Types of Innovations

A total of 71 agricultural innovations were identified in Burkina Faso during the survey. Table 1 presents their repartition as a function of the domain and that of the innovation itself. According to the domain of innovation, the most frequent technologies are in the areas of agriculture (25%), environment (23%), market access (18%), livestock (17%) and agro-alimentary (10%). With regard to function, the most frequent innovation were on production (35%), storage, transformation and commercialization (17%), storage and commercialization (17%).

Table 1. Agricultural innovations, depending on function and domain (in percentage; n =71)*Function of the innovation**Domain of innovation*

	<i>Agri- culture</i>	<i>Agroali- mentary</i>	<i>Alimen- tation</i>	<i>Live- stock</i>	<i>Environ- ment</i>	<i>Infrast- ure</i>	<i>Irriga- tion</i>	<i>Mar- ket</i>	<i>So- cial</i>	<i>Tot- al</i>
Commercialization	0.0	0.0	0.0	0.0	4.2	0.0	0.0	4.2	0.0	8.5
Production	12.7	1.4	1.4	5.6	5.6	2.8	1.4	2.8	1.4	35.2
Production, storage/ conservation, transformation, commercialization	2.8	0.0	0.0	2.8	2.8	0.0	0.0	0.0	0.0	8.5
Storage/conservation, transformation, commercialization	2.8	0.0	0.0	1.4	5.6	0.0	0.0	7.0	0.0	16.9
Transformation, commercialization	1.4	4.2	0.0	5.6	1.4	0.0	0.0	4.2	0.0	16.9
Valorization	0.0	0.0	0.0	0.0	1.4	0.0	0.0	0.0	0.0	1.4
Production, commercialization	4.2	0.0	0.0	0.0	1.4	0.0	0.0	0.0	0.0	5.6
Production, storage/ conservation, commercialization	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4
Collect, transformation, commercialization	0.0	1.4	0.0	1.4	0.0	0.0	0.0	0.0	0.0	2.8
Collecte, storage/ conservation, transformation, commercialization	0.0	2.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.8
Total	25.4	9.9	1.4	16.9	22.5	2.8	1.4	18.3	1.4	100.0

The categories of the identified innovations as function of innovation type and domain are presented in table 2. The main types of innovation were technical (44%), socio-organizational (25%), technico-economical (14%) and socio-technical (12%). A small part of innovations were the socio-technico-economical type (4%).

Table 2. Identified innovations as function of domain and type (in percentages)

<i>Domain of innovation</i>	<i>Type of innovation</i>					<i>Total</i>
	<i>Socio-organizational</i>	<i>Socio-technical</i>	<i>Socio-technico-economical</i>	<i>Technical</i>	<i>Technico-economical</i>	
Agriculture	9.9	0.0	1.4	8.5	5.6	25.4
Agro-alimentary	0.0	2.8	1.4	2.8	2.8	9.9
Alimentation	0.0	1.4	0.0	0.0	0.0	1.4
Livestock	2.8	2.8	0.0	8.5	2.8	16.9
Environment	2.8	4.2	1.4	12.7	1.4	22.5
Infrastructure	0.0	0.0	0.0	1.4	1.4	2.8
Irrigation	0.0	0.0	0.0	1.4	0.0	1.4
Market	8.5	1.4	0.0	8.5	0.0	18.3
Social	1.4	0.0	0.0	0.0	0.0	1.4
Total	25.4	12.7	4.2	43.7	14.1	100.0

Table 3. Innovations as a function of their types and areas of intervention (in %)

<i>Type</i>	<i>Area of intervention</i>						<i>Total</i>
	<i>National</i>	<i>Regional</i>	<i>Provincial</i>	<i>Communal</i>	<i>Local</i>	<i>No information</i>	
Socio-organisational	2.8	15.5	4.2	1.4	0.0	1.4	25.4
Socio-technical	1.4	4.2	0.0	4.2	1.4	1.4	12.7
Socio-technico-economical	1.4	1.4	1.4	0.0	0.0	0.0	4.2
Technical	15.5	11.3	4.2	5.6	0.0	7.0	43.7
Technico-economical	4.2	5.6	4.2	0.0	0.0	0.0	14.1
Total	25.4	38.0	14.1	11.3	1.4	9.9	100.0

Intervention areas

The repartition of the innovation as a function of intervention areas is presented in table 3. The data showed that most innovations were across the Region (38%) and had national scale (25%). Some innovations were at provincial and communal levels (11% and 11%, respectively). The data also showed that innovations at the local level were under-represented. This may be related to the inventory method used, which

was largely based on extension structures. It was also noted that about 10% of the innovations identified were uncategorized.

Table 4. Drivers of innovations as function of innovation types (in %)

<i>Driver 1</i>	<i>Innovation types</i>					<i>Total</i>
	<i>Socio-orga- nisationnal</i>	<i>Socio- technica l</i>	<i>Socio-technico- economical</i>	<i>Techni- -cal</i>	<i>Technico- economical</i>	
Associative activities	2.8	0.0	0.0	5.6	0.0	8.5
Cattle potential	2.8	0.0	0.0	0.0	0.0	2.8
Existence of transformation unit	0.0	0.0	0.0	0.0	1.4	1.4
Fodder shortage	0.0	0.0	0.0	2.8	0.0	2.8
High production	5.6	0.0	0.0	1.4	0.0	7.0
Institutional support	0.0	0.0	0.0	1.4	0.0	1.4
Low income	0.0	0.0	0.0	1.4	0.0	1.4
Low production	0.0	0.0	0.0	1.4	0.0	1.4
Malnutrition	0.0	1.4	0.0	0.0	0.0	1.4
Market access problem	1.4	0.0	0.0	0.0	0.0	1.4
Need for agricultural equipment	1.4	0.0	0.0	0.0	0.0	1.4
Need of high production animals	0.0	0.0	0.0	2.8	0.0	2.8
Pest problem	0.0	0.0	0.0	1.4	0.0	1.4
Political engagement	2.8	1.4	0.0	0.0	0.0	4.2
Production increase	0.0	0.0	2.8	0.0	0.0	2.8
Projects' supports	2.8	7.0	0.0	2.8	1.4	14.1
Rainfall shortage	0.0	0.0	1.4	4.2	2.8	8.5
Shortage of fodder	0.0	0.0	0.0	4.2	0.0	4.2
Soil degradation	0.0	0.0	0.0	2.8	1.4	4.2
Visits in Niger	0.0	0.0	0.0	1.4	0.0	1.4
Capacity building	1.4	0.0	0.0	0.0	0.0	1.4
Market demand	4.2	2.8	0.0	8.5	7.0	22.5
Decrease of productivity	0.0	0.0	0.0	1.4	0.0	1.4
Total	25.4	12.7	4.2	43.7	14.1	100.0

Drivers of Innovation

Several drivers were identified for agricultural innovations in the country. Table 4 presents the repartition of the first cited drivers of the identified innovations. The first ranked drivers (driver 1) of innovations were mainly market demand (22.5%), project supports (11%), associated activities (8.5%) and dwindling rainfall (8.5%). A few innovations, however, had more than one driver.

Effects of identified innovations

Several positive effects of the innovations were cited, some in a combination. Overall, increase in income and livelihood improvement (or wellbeing) were the most cited. Some specific aspects were social cohesion, solidarity, awareness and employment. Also, about 69% of the innovations had some negative effects. The more frequent cited effects were related to increase in labor demand, pain, low prices of agricultural produce and environment degradation—most came in a combination of two or more effects.

Inventory of innovation platforms (IP)

A total of 41 IPs were identified during the survey. Table 5 presents the repartition on the identified IPs as function of the related value chain (or entry point) and the state of functioning. The best represented entry points were maize grain (7) and local milk (6). These were followed by cowpea grain (3), processed meat in *kilichi*, livestock, sesame, and rice (2 cases each). Most of them (35) were still active, while only 3 were inactive. However, there was no information on 3 IPs.

Table 6 presents the categories of the identified IPs as a function of their intervention areas and their phase in the IP process. Most of the identified IPs were operating at provincial (15) and regional (19) scales, while only one IP operated at a national scale. With regard to the phase in the IP process, most IPs were in the initial-to-maturity phase. Only one IP was independent and one at maturity vs independent phase. However, the research team was not able to appreciate 21 IPs in their IP process.

Table 5. IPs as function of their entry point and state of functioning

<i>Entry point or related value chain</i>	<i>State of functioning</i>			<i>Total</i>
	<i>Active</i>	<i>Inactive</i>	<i>No information</i>	
Cereals	1			1
Forestry products	1			1
Livestock	1	1		2
Seeds	1			1
Soil fertility		1		1
Sesame	2			2
Oignon			1	1
Millet grain			1	1
Kilichi	2			2
Peanut	1			1
Soumbala	1			1
Honey	1			1
Shea nut/butter	1			1
Local milk	6			6
Draught donkey	1			1
Cowpea grain	3			3
Rice	2			2
Maize grain	7			7
Mango	1			1
Fonio	1			1
Yam	1			1
Multi-nutritional blocs	1			1
Sorghum and animal products			1	1
Policy		1		1
Total	35	3	3	41

Table 6. Categories of IPs as function of intervention areas and phase in IP process

<i>Phase in IP process (initial, maturity, independent)</i>	<i>Intervention areas</i>				<i>Total</i>
	<i>Provincial</i>	<i>Regional</i>	<i>Communal</i>	<i>National</i>	
Independent	1				1
Initial	3	4	3		10
Maturity	3	4	1		8
Maturity vs independent	1				1
No information	7	11	2	1	21
Total	15	19	6	1	41

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The study also found that the IPs were funded by a number of sources and were addressing diversities of commodities—from agricultural products and natural resource management to market access. It was found that the IPs made a lot of achievement, although a number of challenges existed, including the need to link production to markets.

Inventory of technologies with high potential for innovation

Apart from the innovations themselves and their IPs, 53 technologies with high innovation potential were identified. Table 7 presents their repartition as a function of the related innovation domain and type.

Table 7. Repartition of technologies with high potential as a function of the related innovation domain and types

<i>Domain of related innovation</i>	<i>Type of related innovation</i>				<i>Total</i>
	<i>Socio-organizational</i>	<i>Socio-technic</i>	<i>Socio-technico-economic</i>	<i>Technic</i>	
Agro-alimentary	3	20		5	28
Cosmetics		3			3
Crop-livestock		1			1
Energy		2		1	3
Livestock	1	4	1	4	10
Market	1				1
Postharvest	1	1		1	3
Technical				2	2
Soil fertility		1		1	2
Total	6	32	1	14	53

Table 8. Main technologies as function of their types

<i>Technologies</i>	<i>Type</i>				<i>Total</i>
	<i>Socio-organiz-ational</i>	<i>Socio-technic</i>	<i>Socio-technico-economic</i>	<i>Technic</i>	
Bio-digester				2	2
Multipurpose grinder					
Compost in heap		1			1
Onion counters	1				1
Onion conservation		1		1	2
Large capacity incubator for traditional chicks				2	2
Fattening ruminants			1		1
Per-boiling local rice	1	4			5
Extraction of corn vitamins for children, nursing mothers, pregnant women and elderly		1			1
Manufacture of improved stoves		1			1
Hygienic milk collection	1				1
Artificial insemination		1			1
Shea nut press for butter extraction				1	1
Production of local chicks		2			2
Production of rations for animal fattening	1				1
Production of wine from the fruit of <i>Saba senegalensis</i>		1			1
Production & processing of honey	1				1
Storage and commercialization	1				1

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Transformation of shea butter		2			2
Local milk processing				2	2
Processing local milk into Gapal				1	1
Processing millet in local dishes			2	1	3
Using bio-activator COMPOST for more compost production				1	1
Promotion of local products in animal feed				1	1
Double purpose maize production		1			1
Processing of non-timber forest products		10		1	11
Modern honey production		1			1
Jatropha seed processing		1			1
Processing of medicinal plants					
Fodder production					
Transformation of crop residues		1			1
Cassava processing into Atiéké		1			1
Processing rice husks & hulls of seeds <i>Balanites</i> to energetic bricks				1	1
Total	6	31	1	15	53

The data in table 7 showed that most of the technologies were related to innovations of the socio-technical (32) and technical (14) types, while 6 others were related to the socio-organizational type. With regard to the innovation domain, most of the technologies were related to agro-alimentary (28) and livestock (10). Table 8 shows the main technologies as function of their types.

The data in table 8 showed that most of the technologies identified were related to processing/ transformation, which help achieve value addition and provide access to the market. In this category, a large number was related to processing of non-timber forestry products, while a few were related to storage and commercialization, as well as production (of maize, local chicken, modern honey and fodder). There were no specific cases for bio-digester and processing of rice husks and *Balanites* seed hulls into energetic bricks for energy production; there was also none for compost production in heaps for soil fertility regeneration.

CONCLUSION

From this inventory of innovations, IPs and technologies with high potential of innovation, the study found that there is potential for innovations in agricultural research in Burkina Faso. But a few constraints have been identified. The first concerns the fact that research and development actors were not prepared to deal with market challenges, and this often determined the success of each innovation. Indeed, project support determined the success of many of the identified innovations. The second concerns the actors' organizations— organizational barriers affects the innovation system in Burkina Faso. Often too, the challenge of individualism affects the system, and since many of the beneficiaries of the innovations identified were traders with a number of intermediaries, from production to the market, this becomes a serious concern. The third challenge was the weakness of the processing sector. Most of the identified innovations dealt with marketing non-processed products (maize grain, sesame, shea nuts, etc). The only innovations involving value chains with processing aspects were local milk, shea butter and parboiled rice.

There is great potential for technologies that can become 'innovations in the basket'. This potential was, however, underestimated by the study because it took into account only promising technologies known by the sampled extension agents. The potential could be studied with a larger-scale survey using research institutions and universities.

With regard to innovation platforms, there was an issue of shortage of resource persons to support the IPs and make them work properly. Most IP facilitators were researchers. Indeed, from the perspective of research and development, researchers

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can be part of such initiatives, especially during the initiation phase; but their expertise is only solicited when needed during the maturity and independence phases, when dealing with specific issues regarding a technology, process or capacity building. There was also a funding constraint for IPs, and this was critical. Some IPs only functioned with much difficulties after the end of the immediate projects. Thus, there is the need to develop the needed mass of people to effectively handle agricultural innovations and their platforms, from both the research and development perspectives. The activities of 2016 should, therefore, take this into consideration so as to improve agricultural productivity and rural livelihoods through relevant innovations in the country.

STUDY TWO

Inventory and Characterisation of Innovation Platforms

INTRODUCTION

The Forum for Agricultural Research in Africa (FARA), in partnership with the German Government, represented by the Research Centre for Development (ZEF), University of Bonn, under the initiative "One World No Hunger", has undertaken to implement the integrated research programme for agricultural Innovations (IRAP). IRAP takes note of successful research initiatives and innovations in African agriculture, and taking into account the concept of the Integrated Agricultural Research for Development (IAR4D) promoted by FARA, to build an independent programme accompanying the research to support the scaling of agricultural innovation in Africa and contribute to the agricultural sector development in Africa. IRAP will be implemented jointly with the Agricultural Innovation Centers (AIC) in the initiative "A world without hunger".

INERA was empowered in Burkina Faso to provide the necessary support for the implementation of IRAP activities:

- iv. Conduct an analysis of the situation of agricultural innovations in Burkina Faso and to produce reliable information.
- v. A study of determining the scope of existing agricultural innovation platforms in Burkina Faso and synthesis of lessons learned from agricultural innovation platforms established by various initiatives in the country in the past decade.
- vi. A scientific study on the initiatives of national and international investments in innovation for the development of agriculture and food and nutrition security in Africa, and particularly in Burkina Faso.

Regarding the activities of this convention, agricultural innovation is defined as "a set of socio-organizational processes (social structure, opportunities and environment) for the valuation of opportunities to develop or improve the socio-economic situation of a particular social group." In the implementation of NRC's activities, an inventory of agricultural innovations and agricultural innovation platforms were conducted in the thirteen (13) regions of Burkina Faso. This report provides the results of this study at the national level.

METHODOLOGY

INERA was regionalized to bring closer research results to the users by dividing the country into five environmental and agricultural research regions (map 1). Integrating this, the methodology of the study is based on these 5 environmental and agricultural research regions to make inventory of all innovations, innovation platforms and

technologies with a high potential for innovation across all the thirteen administrative regions of the country.



Map 2. Agricultural research zones of INERA, Burkina Faso

To do so, a multidisciplinary team (geographers, agronomists, animal scientists, agricultural economists, sociologists, environmentalists) from all these research regions of INERA was constituted. All the team members convened a methodological harmonization workshop for sharing information on the INERA-FARA-PARI convention, consensual definition of agricultural innovation, revise the tools and methodology for collecting information, distribute the 13 administrative regions among the research teams, and adopt a timetable for data collection and report. The research team was organized as shown below.

The data collection method was based on semi-structured interviews with main actors of the selected IPs. Additional information was collected from visits to some of the relevant stakeholders of agricultural innovation. A database of agricultural innovations, innovation platforms and technologies with a high potential for innovation was built. Initially, four IPs were identified of in-depth case-studies (milk in Banfora, maize in Leo, kilichi in Koupela and rice in Bama). With relevant stakeholders of these IPs, interviews were conducted to make a reflective analysis on

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the progress made by the IPs to achieve the initiation and development of an innovation in each of the related value chains.

<i>SN</i>	<i>Mandated region</i>	<i>Research team</i>	<i>Disciplines</i>
1	Boucle Mouhoun (Dédougou)	Adama OUEDRAOGO, Souleymane OUEDRAOGO	Socio-economist and zootechniciann
2	Cascades (Banfora)	Souleymane, Baba	Zootechnician and environmentalist
3	Centre (Ouagadougou)	Blaise KABORE, Samuel NEYA, Abdoulaye KAFANDO	Geographer , M&E specialist and research-extension specialist
4	Centre-Est (Tenkodogo)	Hamadé SIGUE, Blaise OUEDRAOGO	Agro-economist and geographer
5	Centre-Nord (Kaya)	Boukaré SAWADOGO, Blaise OUEDRAOGO	Agro-economist and geographer
6	Centre-Ouest (Koudougou)	Sidonie IMA	Sociologist
7	Centre-Sud (Manga)	IMA Sidonie, Abdoulaye KAFANDO	Sociologist and research- extension specialist
8	Est (Fada)	Hamadé SIGUE	Agro-economist
9	Hauts-Bassins (Bobo-Dioulasso)	Souleymane OUEDRAOGO, Adama OUEDRAOGO, Baba OUATTARA	Zootechnician, socio- economist and environmentalist
10	Nord (Ouahigouya)	Jean-Bosco SANFO, Abdoulaye KAFANDO	Agronomist and research- extension specialist
11	Plateau Central (Ziniaré)	Samuel NEYA, Sidonie IMA	M&E specialist and sociologist
12	Sahel (Dori)	Boukaré SAWADOGO	Agro-economist
13	Sud-Ouest (Gaoua)	Baba OUATTARA, Adama OUEDRAOGO	Environmentalist and socio- economist

Maize Grain IP in Leo

As part of the initiative "One World No Hunger", the German Government through the Research Center for Development Research (ZEF), University of Bonn, in cooperation with the Forum for Agricultural Research in Africa (FARA), the "Programme for Accompanying Research for Agricultural Innovation (IRAP)" is being implemented in 12 African countries. This was based on the success of research initiatives and innovations in African agriculture to support research in scaling up agricultural innovation in Africa and contribute to the development of agriculture. To do so, IRAP integrates the concept of integrated agricultural research for development (RAIPD/ IAR4D) promoted by FARA. It is in this context that this

study was conducted in order to make a reflexive analysis of the processes by which the IP could help develop agricultural innovation in Africa in order to draw lessons for the new programme.

In July 2008, INERA conducted a pilot innovation multi-stakeholder platform on the value chain of the corn grains to Leo in the Sissili Province in southwestern Burkina Faso. It was part of the DONATA project (Dissemination of New Agricultural Technologies in Africa) of the Promotion of Science Program and Technology for Agricultural Development in Africa (PSTDA) by FARA through funds by the African Development Bank (ADB). This innovative platform is one of the first practical implementation of experiences of integrated agricultural research for development approach (RAIPD or integrated agricultural research for development IAR4D). The results obtained resulted in the organization of an experience sharing hub for many emerging IP, and a thorough case study in order to learn about the process of innovation, by which knowledge and technologies generated by agricultural research were valued by the communities in the area of Leo for their development. IP "Corn Leo" was chaired by the High Commissioner of the Province of Sissili, the first administrative authority of that province. The facilitation was conducted by researchers from INERA.

Through regular consultation meetings between players in the value chain of corn grains in the province, many demonstrative tests have been conducted regularly and served as training grounds for producers and community members. An important advocacy work was conducted by the leaders of the peasant organization, FNZ, with many partners to start solving problems beyond the reach of the farmers and their organizations.

This resulted in many favourable achievements. For producers, the IP has a good knowledge of improved varieties and production potential with appropriate crop management through the Field Schools network. This enabled an improvement in the culture of these improved varieties and increased production. Human resources of the OP have been developed for training through a practice based on the "farmer to farmer" principle. This network of trainers and endogenous monitoring charge can be potentially valued for any agricultural programme in the area. The OP leaders have recognized the role of advocacy to support the development of agriculture and now desire to develop initiatives in this direction. For research, IP was a springboard to better dissemination of agricultural technologies in corn production. This led to an increase in production, explained by improved yields and increased producers performance related to capacity building (training field, demonstrations, guided tours, etc), and by the increase of the area under maize in view of market opportunities

created by IP around the CV-corn. A study by Millogo (2013) indicated that the average yield of corn grains increased from 2.03t/ha in 2008 (year of installation of the PI) to 3.9t/ha in 2012. At the same time interval, the average area sown to corn producers also increased from 2.7t/ha to 4.7t/ha, and the average output per producer has more than tripled (from 5.4t/ha to 18t/ha). In the same period, large investments in warehouses were achieved through lobbying and advocacy IP with UEMOA and PAPSA partners. Seven stores (500 tons capacity, 2x250 tons and 54 silos of 500 to 1300kg capacity) were acquired. In addition, PIs may have, in return for agricultural research, many observations on plant materials improved by extension, to even allow it to continue to improve. Traders have begun to appreciate the role of IP in improving the marketing of maize grains. Local and regional political authorities have also played their part in supporting the IP for the first time in Burkina Faso. In terms of human resources, the IP revealed to several peasant leaders the needs of peasant farmers. It also strengthened the network of trainers and endogenous technical monitoring agents (FNZ) to be able to support any approach to agricultural extension and training.

The issue of sustainability of IPs could become an issue at the end of AGRA funding. It requires a change in the governance of IPs and their institutional relationships. Indeed, Leo PI-Corn did not have a governance structure as such. It ran through a near-total control of the research that brought together actors, programmed activities, conducted and evaluated the activities with the participation of other stakeholders. Such a scenario may not be sustainable because it is based on projects with a timeframe. It will have to develop a well thought out plan, that is driven primarily by the direct beneficiaries. Institutional change requires consultations at the highest level of government, to ensure consistency of roles and funding methods of the actors involved in the field of agricultural development. Indeed, the implementation process of IAR4D requires consultation of stakeholders for consistency of action. One actor usually cannot alone effectively manage agricultural development issues. Also, these consultations are the most expensive components of the IP operation (fuel for the movement of partners and mission expenses). This issue could be resolved if each of the stakeholders took on itself the burden of its participation in the IP activities that are not different from those they were to lead individually. For example, the movement of the regional political authority to bring greater visibility and moral support to IP activities are significant costs that are not supportable by the IP outside a draft accompaniment. Stakeholders' analysis is not exhaustive in that it did not seize the opportunities presented. There are opportunities that have not been explored by the PIs in the regions and provinces. This is, among others, the support of CRA and CR. The management of regional and central-western economy is planning to establish political institutions that can ensure the sustainability of IP operation, as this

is in line with their agricultural development plans. Also, agricultural input suppliers (local representatives, AGRODIA) are not much involved in IP activities. However, changes in mentality and institutions are needed to reduce the overheads of IP operations. It is particularly important to get each participant to support its structure because, in practice, managing the costs (especially per diem and travel costs) is a necessity for participation in IP activities—this is because they increase the operational budgets (approximately CFAF 10 million/ year, according to INERA, 2011).

Choice of maize IP of Leo

The Leo grain corn Innovation Platform is one of the first experiences of the practical implementation of the integrated approach to agricultural research for development (RAIPD or integrated agricultural research for development (IAR4D)). The exemplary results obtained were responsible for the constitution of an experience sharing hub for many emerging IPs. This was why it has been the subject of a thorough case study. The goal is to learn about the process of innovation, by which knowledge and technologies generated by agricultural research were valued by the communities in the Leo area for their development.

As part of the project of the Promotion of Science and Technology for Agricultural Development in Africa (PSTDA), FARA has secured funding from the African Development Bank (ADB) to finance two of its regional initiatives, namely: DONATA (Dissemination of New Agricultural Technologies in Africa) and RAIL (Regional Agricultural Information and Learning Systems). For the implementation of the DONATA initiative in Burkina Faso, corn was retained as speculation to develop. This initiative aims to develop the value chain "corn" by: (a) a better understanding of improved maize varieties available as well as mastery of technical production routes and access to quality seeds and inputs, (b) ensure proper marketing of production, (c) and develop the transformation of derivatives in maize grains to add more value and support to the market. Sissili is a maize-growing Province par excellence. The organizational environment of producers is marked by the existence of the Federation Nianzwe or FNZ (formerly Provincial Federation of Agricultural Professionals in Sissili or FEPASSI) a very dynamic ridge of peasant organization composed of 7 municipal unions of producers. The combination of these two factors determined the choice of Leo for the implementation of project activities. Thus was born the IP "Grain Corn" Leo on July 22, 2008.

The Concept of Innovation Platform

The Innovation Platform (IP) is the operational tool for the approach of "Integrated Agricultural Research for Development (RAIPD or IAR4D)." It connects groups of

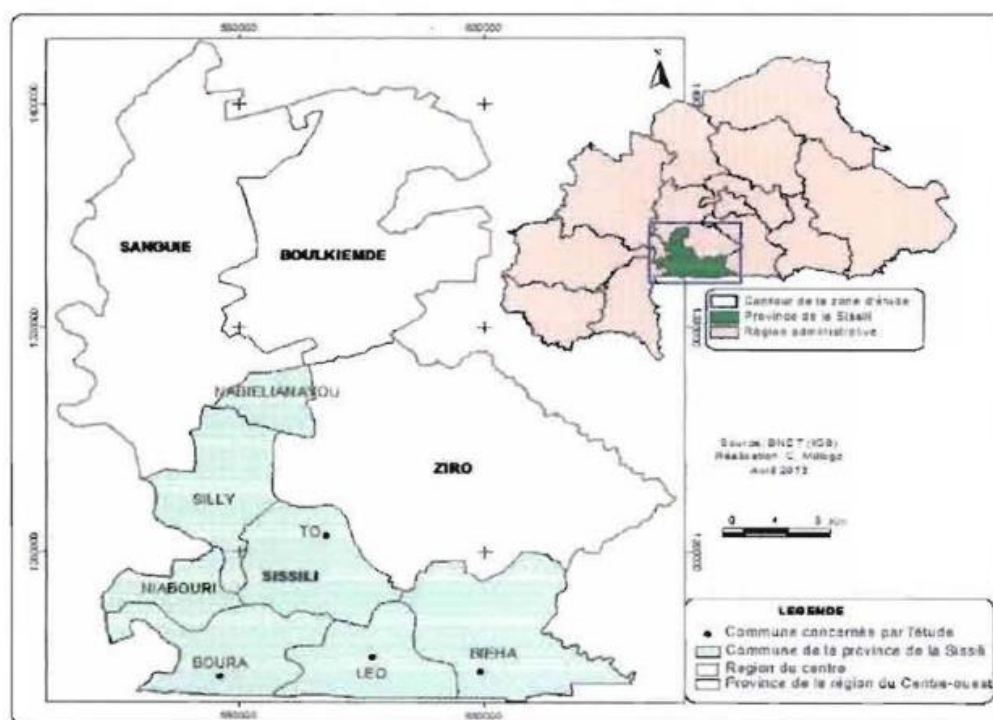
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actors with a common interest. They act collectively to identify problems, explore solutions, and implement and evaluate them. The IP aims to increase the capacity to manage and use existing knowledge to innovate, strengthen individual/institutional capabilities, and to integrate research with the rest of the society to produce public goods for her.

The IP is a dynamic multi-actor and systemic approach that takes into account the complexity of the constraints affecting production, marketing and sustainability in the design of solutions to seize opportunities. Unlike previous approaches (top-down, action research etc), RAIPD leads research and development to interact along a given value chain by having the priority needs of recipients. This approach aims to break the traditional linear configuration of past concepts and encourages many players to engage together in a given product value chain to promote innovative processes in the agricultural system. It follows the finding of inadequate performance of conventional approaches to research and extension in the positive transformation of agriculture and the elimination of hunger and poverty in sub-Saharan Africa. The city of Leo is located 165 km south of Ouagadougou, with the following geographical coordinates: 11°06'01 "north latitude, 2°06'23" West longitude. Its height above sea level is 349 m. It is the administrative capital of the province of Sissili, one of the four provinces that make up the administrative region of west central Burkina Faso. This administrative region is marked by two major agro-ecological zones: the north-Sudanese zone in the northern part (provinces of Boulkiemde and Sanguie) and the south Sudan region in its southern part (provinces of Ziro and border Sissili Ghana) (Guinko and Fontes, 1994). Map 2 shows the province of Sissili on the map and in the central west administrative region.

Food security in the IP area

The food security situation in the area of IP Leo is less worrisome than in the areas in the north of Burkina Faso. The cereal balance is often surplus. In 2013, the national cereal balance sheet prepared by the Ministry for Agriculture ranked the province of Sissili as the first surplus area nationally with 443% excess (MASA, 2013). In addition, the province is connected to Ouagadougou by a national paved road (National Highway No. 6), facilitating access in any season. Leo's requirement is for major food markets Burkina Faso (cereals and tubers). However, food security remains volatile from one year to another like the seasonal fluctuations (figure 1). Indeed, from 2005 to 2015, Leo good rainfall for three years (2010, 2012 and 2014), with an average of 1200 mm / year in 62-73 days of rain. The years of low rainfall were 2005, 2011 and 2015, with an average annual rainfall of 800 mm / year in 51-55 days of rain. This fluctuation in rainfall affects crop yields (especially corn), which is a sensitive crop to water stress.



Map3. Location of the province of Sissili on the map (MILLOGO, 2013).

Features of production systems

Agricultural systems of the province are dominated by mixed family farms, involving several cultures in a sometimes diversified farming. Animal traction is the primary source of energy for farm work. The main crops are cereals (millet, sorghum, maize and rice), cash crops (groundnuts, cowpea, sesame, soybean, cotton, yams, potatoes and cassava) and vegetable crops in areas where they are practicable. Over the period 2006-2012, cereal production was dominated by corn, with an annual output of 58656 tons. The lowest production was rice, with an average annual production of 5089 tons. However, the situation was reversed in terms of yield. Rice ranks first, with an average annual yield of 1932 kg / ha. Maize has seen the average yield improved in recent years, with 2065 kg / ha in 2012.

Cash crops are dominated by cotton, yam and sweet potato, with an average annual production of 16,297 tons, 14,964 tons and 14,95 tons respectively between 2005 and 2008 (Zongo, 2013). As elsewhere in Burkina Faso, livestock is the second largest economic activity after agriculture. Livestock is dominated by poultry and small ruminants (table 8).

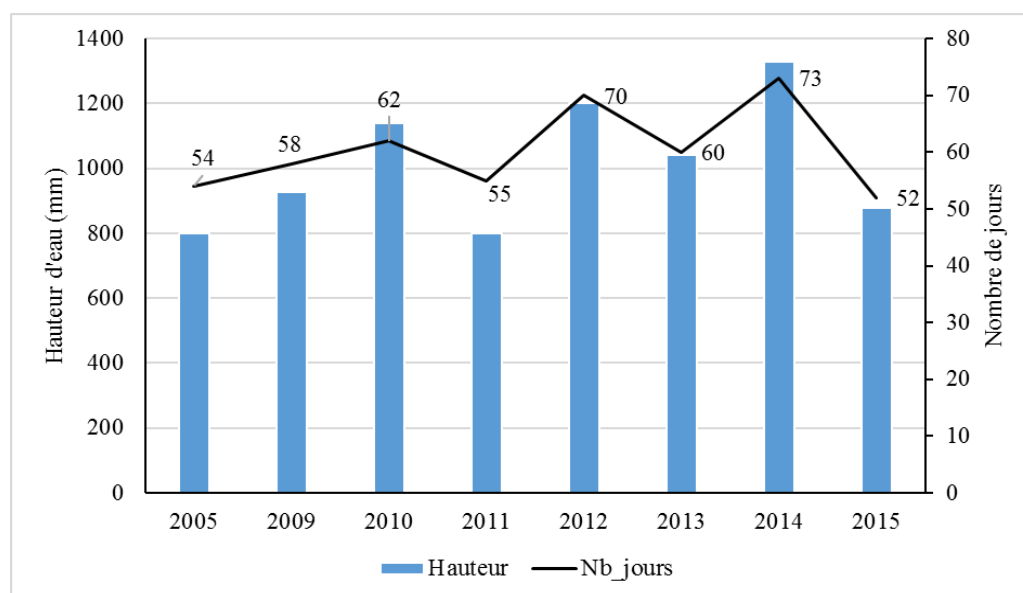


Figure 1. Location of the annual rainfall and number of days of rain in Leo

Table 9. Number of livestock in 2006 in the province of Sissili

Species	Cattle	Sheep	Goats	Pork	Donkeys	Horses	Poultres
Number	333,262	254,370	359,626	61,396	31,411	1,041	524,011

Source: Regional Centre West of Animal Resources, September 2007

The area is marked by a strong dynamic of pastoral resources. According to FAO (1996), the area of carrying capacity was estimated at 15-18 TLU/km², due to the existence of large areas with virgin vegetation. However, the area has experienced strong dynamic agriculture (agriculture and livestock), especially agribusiness development and hosting of a large livestock population, with consequences for a large increase in cultivated areas and grazing area regression. Husbandry practices are extensive, primarily based on natural pasture and crop residues.

Demography and livelihoods

Initially, the province of Sissili was populated by the major ethnic groups: Sissala and Wala. Due to low population density, the province of Sissili is a population migration cluster of farmers from the northern areas of Burkina Faso in search of arable land or pastures. Currently, the Moose, native populations of Central and North Burkina Faso, are the dominant population. The density of the population still remains relatively low compared to other regions, with 29.9 inhabitants/km² (Ouédraogo, 2010). The total population of the province of Sissili stands at 208,409 inhabitants, according to the general census of population and housing in 2006.

(INSD, 2009). It is composed of 51% women against 49% men. According to the same source, the annual population growth was 3.1% for the period 1996-2006.

The livelihoods of people in the area are provided mainly by agriculture and livestock. Indeed, the province realized a surplus of agricultural products that are sold on the local market to supply the city of Ouagadougou, located about 160 km north of Leo. This important commercial activity around the flood of products generates significant financial resources for the population, making the area one of the areas with a low incidence of poverty in Burkina Faso. Apart from these main activities, small trade, including the extraction of shea butter by women and charcoal by men, is an important source of livelihood. Leo weekly market is an important economic engine for the province.

Recent Shocks

From 1975 to 1996, Sissili was one of the favorite destinations for migrants. This period of migration was characterized by the expansion of scattered farmland, the regression of the savannah and the beginning of land degradation in correlation with the increase in population density from 17 to 30 inhabitants / km² during the period of 1986-2006 (according Ouédraogo, 2010 cited by Nébié, 2015). This high migration, combined with the expansion of rural entrepreneurship (called agro-business), resulted in pressing land issues in the area of Sissili and Ziro. This resulted in many conflicts related to the concentration of rural land in the hands of agribusiness men, multiple land transactions, and the confusion between agricultural and pastoral areas. This is compounded by the absence of legal and institutional mechanisms for land management and conflict management. To overcome these constraints, the law on land security was adopted in 2009 and is experiencing an implementation beginning with a land tenure security pilot project supported by the Millennium Challenge Account to Leo. In addition, with the proximity of Ghana, the area is witnessing the development of the cattle rustling phenomena and steering.

Agricultural Sources of Information

Before the establishment of the IP, the main sources of agricultural information came from technical services (agriculture, environment, farming, research). The IP provides a framework for information exchange, generation, sharing and dissemination of knowledge between groups of actors in the corn value chain. The integration of local media in IP allowed them to mix with the other stakeholder groups of the CV and thereby intensified their communication on agricultural subjects. The share capital of IP is based on the partnership between the different groups of stakeholders: producers/producer (FNZ), research institutions (INERA, IDR / UPB), extension officers (dismemberment of the ministry in charge of

agriculture, livestock, water and forests), input traders, and grain carriers and microfinance institutions.

Burkina Faso has been involved in a full communalization policy of its territory since 2006. According to the general code of local authorities in Burkina Faso, the province is a legal entity with a legal status and financial autonomy. It comprises an area of homes and a production space. It is organized by local authorities (municipalities) and is administered by a high commissioner appointed by the Council of Ministers. Each municipality is governed by a mayor elected as the head of a municipal council. In this context, the FNZ plays a leading role because of its strong grip on the provincial territory and its strong capacity to mobilize farmers through a network of 7 communal cooperatives. This has allowed the establishment of many trust relationships with partners, resulting in a strong financial resource mobilization capacity to finance its activities.

Access to financial services and credit

Many efforts have been made by the IP for the services needed to support corn production available to all actors of the corn value chain. Thanks to its lobbying, processors have benefitted from solar dryers and some producers began acquiring gins by their own funds and provide services to neighbourhood ginning. However, the need for agricultural outreach services arises in a more enhanced way, especially for preparatory works on mechanized fields, with insecurity related to the management of draft animals in farms.

Since its establishment, the IP has developed a partnership with the network of Caisses Populaires in Burkina Faso, which facilitated access to credit cooperatives and individual producers to finance the purchase of inputs (fertilizers, pesticides and seeds) of various agricultural equipment and maize marketing in the warrantage. This partnership was extended to other local microfinance agencies (Community Agency to Finance Micro-enterprise or ACFIME First Agency and Micro-finance Diebougou) and commercial banks (Eco-Bank and Orabank). These financial institutions have adapted and diversified as and when that trust has developed between them and their products to the needs of players (maximum amounts, interest rates and payment deadlines particular). The organization of the civil society was marked by the existence of many social and professional organizations (cotton producers group, association for the promotion of literacy, the groupement for wildlife management, FNZ, farmers groups, etc) and NGOs (OCADES, FEPAB, CIC-B, etc.) working for the welfare of the people. Under full communalization from 2006, the provincial territory of Sissili includes 7 rural communes and urban commune (Leo), headed by elected mayors.

Research activities in the IP area

Many research activities have been conducted in the area. They covered several topics ranging from natural resource management to agricultural activities. It served as field research for many students (Ouédraogo, 2010; Zongo, 2013; Nébié, 2015). The completion of this case study combined several methods including:

- A literature review that was made through the analysis of documents available, both general (Municipal Development Plan of the municipality of Leo documents - IAR4D approach) and/or specific (available agricultural statistics, various reports and similar case studies);
- Semi-structured interviews with stakeholder groups members of the PI-Corn Leo, through an interview grid following the drafting plane of the case studies structured around the following points:
 - Analysis of the foundation and of the IP environment;
 - Analysis of the implementation of IP (structure, membership, etc);
 - IP operation analysis (rules governing its functioning, governance, activities, leadership, facilitation and relations);
 - Analysis of the results obtained by the IP (achievements, relationships, development impacts);
 - Analysis of lessons learned from the IP;
 - Direct observation and collection of opinions and testimonies made during the meeting mentoring and coaching of IP;
 - A reflective analysis of the situation with proposals for improvement.

Background of the establishment of IPs

The creation of the PI-Corn Leo was instigated by CORAF / WECARD through INERA (Institute of Environment and Agricultural Research), as part of the DONATA research and development project (Dissemination of New Agricultural Technologies in Africa) to promote knowledge and dissemination of new agricultural technologies. This is an innovative approach that contrasts with previous projects that were either technical (e.g., extension) or economic (marketing), and did not take into account the entire value chain. In general, this sectoral approach did not allow the development of a transformation link to bring added value to the value chain of agricultural products. As an example, according PRESAO (2011), from processing to grain, the corn value chain is only 1%.

In the process of the development of IP, research has undertaken significant work to identify groups of actors in the chain of value of corn. Then they proceeded to their awareness of the need to establish a multi-stakeholder platform to address the major constraints to the development of maize production in the region despite significant potential (rich soils and high rainfall in particular). This idea has met the concerns of

the Provincial Federation of agricultural professionals in Sissili (FEPPASI, currently FNZ), which is resolutely committed alongside the search for the creation of IP. It was the first time a project that is more research-oriented was interested in linking production to the market, one of the major concerns of the FNZ. The process culminated on 22 July 2008 to the effective implementation of this IP.

The IP was installed during a stakeholders' workshop under the chairmanship of the High Commissioner of the Province of Sissili. On the occasion, the roles of different groups of actors present were identified and discussed. This was a rather diverse composition that was ideal for the proper functioning of the IP. Indeed, with the development of the production of maize grains, resulting in the problem of its marketing, this led to the establishment of a second specific IP commercialization. Then a third IP has been put in place to boost the transformation and increase added value. Moreover, the need to expand the IP to embrace equipment suppliers and agro-dealers was felt. This evolutionary process in the life of an IP is normal because it is dynamic and evolving in nature. Thus, based on certain constraints, other challenges may appear, such as the withdrawal of groups of actors when they feel their needs are not being met.

Before the establishing the IP, the value chain maize Leo was characterized by a lack of collaboration between the actors of the different links. A majority of producers were affiliated to the FNZ through its 7 municipal cooperatives. This IP was working to resolve constraints faced by the cooperative in the agricultural field. She also had a role of representation of the rural world in the province of Sissili. Support services (technical services, NGOs, microfinance, research, etc) maintained that there was only one-off relationship among them and with the FNZ. Actors in other links (processing and marketing) were not organized, so that there was little or no relationship with the organized FNZ.

Initial capacity of IP

The entry point for the selected IP was maize in the province of Sissili. This choice was the fact that Sissili has a strong peasant organization likely to take the initiative, and early gains in technology had been recorded in the region as a sign of manifest interest in maize production. NEPAD, the African Union, ASARECA, CORAF/WE CARD identified priority technologies for developing the country, with financial support from the African Development Bank (AfDB). Innovative technologies on maize were adapted to promote improved varieties available and intensified by improved cultivation techniques related to culture, protection and conservation. As a pilot to practice the RAIPD African Francophone West, IP-Corn Leo was a rather slow start. This is why the focus was initially on production.

Decision-making IP

Membership in the IP was the principle of representation of stakeholder groups. It was free, voluntary and committed no membership fees. However, the IP has not developed operational rules relating thereto. It was interesting that the IP develops and validates a team contract that governs its operation. Given the pioneering nature of the experience, Leo PI-Corn has not provided an instance of formal governance. However, its daily operation was provided by a consultation between the project team, INERA, the FNZ and the office of Sissili. This type of governance is not sustainable, because it does not involve all the actors likely to profit from the IP activities. In this configuration, only the producers can make profits from the IP activities, the two others are in the public domain. When there is a lack of motivation, governance of IP will flounder.

Facilitation of IP activities was provided by INERA. But the IP contributed generally to the emergence of talents that make some individuals potential facilitators as long as they receive additional notions of facilitation and coaching PI. Only FNZ and research institutes could influence the agenda of the IP. The former in terms of its importance and influence in the PI, and the latter by virtue of the fact that it is the initiator, financier and facilitator. This situation, if it does not present a major drawback for now, could eventually limit the diversity of groups that make up the output link. In addition, this can constitute a threat to social equity within the IP and can prevent the accession of new stakeholders. On the longer term, it could undermine the sustainability of the IP and its achievements.

Conflicts that occurred during the operation of the IP were well resolved. The IP had no specific provisions for conflicts that exceeded an amicable resolution. However, it considered the participation of local political and administrative authorities in IP as helpful in reassuring stakeholders and appeasing the working climate of the platform. The presence of security forces alongside the authorities deterred activities that may lead to conflict.

Operation of IP

The operation of the IP was to organize consultative meetings, reflection, programming and evaluation of activities between all or some of the groups involved. Structurally, two regular meetings on the planning and assessment of activities have been scheduled each year. Apart from these meetings, extraordinary meetings are convened if necessary to approve the items on the agenda by the tacit committee of the platform control.

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As of today, the IP does not have adequate financial resources to support its activities. This shows that the exchange would only continue among the groups of actors (producers, traders, transporters, processors). Thus, the IP would be weakened by lack of resources at the end of the project. But it could keep its organizational capacity and strengthen its leadership through the organization of experiments in its network of advisors and endogenous monitoring agents. Similarly, it keeps its negotiation and advocacy skills that allow them to always answer calls for tenders for the supply of maize consumption (WFP and SONAGESS). Also, it has seen its capacities built through the coaching and mentoring of the GRAD team under coaching by WAAPP's major IPs. It is well equipped with a contract project team, an operational plan and a strategy for access to inputs and credit. To address such situations, the issue of sustainable funding should be well attended to.

To achieve the IP objectives, the following activities were implemented:

- Meetings and workshops: two formal annual planning meetings involving all stakeholder groups (early season) and balance sheet activities (end of season) were regularly convened;
- Experiments: display cases and many demonstration tests in farmers' fields have been set up through the network of producers (FNZ). They focused on the knowledge of improved varieties and appropriate crop management such varieties to form producers through practice and allow informed choices;
- Training: various sessions of specific training was provided to producers. Initially, a 7 endogenous advisors by county were trained on technical routes of maize production, organic fertilizer production and post-harvest management of corn and the development of an operating account research station of INERA to Farako-Bâ. Secondly, these advisors have trained in theory and practice field 50 indigenous leaders. Each of these endogenous animators trained in turn by the practice in farmers' fields 25 to 30 producers beneficiaries per season;
- Guided tours: each year, guided tours around the demonstrative tests were organized, enabling producers without previous experiences to participate.

IP activities have privileged internal extension network of FNZ composed of leaders and endogenous monitors. State extension agents have complained this fact which seems to denude them of one of their prerogatives. The analysis of this system shows that it has the advantage of being cheaper and more to bring agricultural technology users in terms of the reduced number of state employees and the state of destitution in which they are currently. In addition, it is an IP element of sustainability.

Learning and experimentation

During operation of the IP, the learning principle adopted was learning-by-doing, through demonstrative tests at the farms. Indeed, these tests were fully supported by the producers through their OP. The researchers made the kits (seed lots and fertilizers), while FNZ did the rest: choosing experimental producers through its cooperative network, as well as carrying out monitoring and evaluation activities through its endogenous agents. Better technical results and assessments collected during guided tours were circulated within the FNZ network with the resources of the federation. This success reveals the performance of RAIPD / IAR4D approach, which gives prominence to the beneficiaries in the research process. The approach allows a direct relationship between targeted technologies and end-users so as to facilitate adoption.

Through the network of member of FNZ and Gospel and Development Radio (RED), information relating to improved varieties and highly productive corn, appropriate production techniques, and reduction of postharvest losses was broadcast to a large number of producers in the IP area. Several guided tours were covered by RED. Through various programmes of interest to producers, the radio increased its audience and gave it official recognition among local authorities, leading to an award on the independence comemoration day of 11 December 2015.

The IP also used the Burkina Faso Information Agency (BIA) to cover various events at preferential rates. In total, the activities of the platform have helped to organize 300 days of guided tour, 12 shows in local languages from the FM radio (Gospel and Development Radio), and 6 articles in the state daily newspaper (*Sidwaya*). They contributed to the wide dissemination of two (2) maize varieties (Wari and Barka) and a hybrid (Bondofa).

Goals and Planning

The overall objective of DONATA programme was to promote the adoption of new technologies and impact on agricultural production through improved agronomic practices. The specific objectives were to:

- Analyze the value chains by establishing a link between the authors of new agricultural technologies and African farmers who want to adopt them in order to identify constraints to accelerate their adoption;
- Develop a kit/tool for extension workers to facilitate the selection of the most appropriate technologies for social, environmental and potential adopters' markets;
- Create links with other initiatives and programmes, including the FARA RAILS (information / communication).

To achieve these objectives, an annual business planning was performed. The activities were organized around the field schools, showcases, guided tour of the production of certified seed, and training and the organization of a mini agricultural fair in Sissili. This plan is approved each year by a programming meeting early in the rainy season. The results of its implementation are returned at the end of the campaign actors.

Trust and respect

As to the process, there was serenity atmosphere and confidence between members of the PI. This confidence helped give credibility to the members of the IP from its partners. For example, finance institutions and microfinance partners (EcoBank, Orabank, CaissePopulaire, ACFIME) finance increasingly the activities of members of the IP. Moreover, the producers claim that these institutions carry more considerations than in the past. Also, this confidence has allowed the establishment of other partnerships (UEMOA for grain stores, PAPSA warrantage stores and silos, PPAAO support for stronger IP protection).

This is a credit to the IAR4D approach. On analysis, this confidence could be leveraged by the IP to finance the implementation of paid services (tractor services, for example) at the community benefit, based on a business plan. The development and adoption of team contract is an element that will further strengthen the climate of trust and mutual respect.

Perception of ownership

In the opinion of members of the IP interviewed, there is a general feeling of belonging in the team, with collective responsibility for the success or failure of the activities. Indeed, the different actors involved were aware that only a united IP would help realize their objectives. Therefore, responsibilities are shared, each feeling accountable for the results. This perception could help sustainable the IP and its gains beyond the tenure of the project and sponsors. Therefore, it is safe to say that any opportunity that would come in the area would be captured by the IP for the development of the maize value chain.

Commitment and market orientation

IP Leo is located in the cotton zone of Burkina Faso. Hence, the actors have a market culture with the organization of the cotton industry (grouped suppliers of inputs, and marketers of cotton, for example). However, other agricultural sectors (cereals, pulses, tubers and animal products) are not organized. Their input supply and marketing of products take place in the informal local markets. This results in low

yields and poor access to quality inputs. These constraints are part of the IP's concerns. Thus, it works to improve the production and relate to the market through integrating with market players sometimes outside the town, to ensure the supply of inputs (AGRODIA, EcoBank, ACFIME , credit union) and the marketing of products (grain traders). This new context calls on producers to comply with market requirements. Thus, bids in tenders for the supply of maize must integrate quality requirements sought by these markets (WFP Catwell and SONAGESS). This spirit of the IP team led the players to engage in a win-win partnership.

In the context of IP Leo, corn production goes far beyond the consumption needs to being truly market-oriented. Communication around the IP is visible, with opportunities for maize marketing both inside and outside Leo area. Also, the relationship with processors allowed to initiate work in the direction of development of corn processing to create added value. This initiative funded by CORAF/WECARD is ongoing and there is a good chance that in return, the need for transformation guide the market towards varieties or qualities required for processing.

The development of the processing link will surely bring a new dynamic to the corn value chain by bringing to market new products. In addition, with the increase of intensive urban poultry to the needs of cities, recovery of maize grains in poultry feed represents a potential opportunity for additional market opportunity.

Acquired IP

Throughout the life of the PI, vested in terms of products, skills and lessons were garnered. The greatest contribution of the IP on the value chain is on the increase in production explained in part by improved yields as shown from the performance results of the producers related to strengthening their capabilities (training field, demonstrations, guided tours, radio information), and by the increase in area under maize in view of market opportunities created by IP around the CV-corn. Indeed, a study by Millogo (2013) indicates that the average yield of corn grain increased from 2.03 t / ha in 2008 (year of installation of the PI) to 3.9 t/ha in 2012. At the same time interval, the average area sown by the corn producers also increased from 2.7t/ha to 4.7t/ha, and the average output per producer has more than tripled (from 5.4t/ha to 18 t/ha).

In the same period, large investments in warehouses were achieved through lobbying and advocacy (IP with UEMOA and PAPSA partners). Seven stores (500 tons capacity, 2 x 250 tons and 54 silos of 500 to 1300 kg capacity) were acquired. These results include the considerable contribution of IARD4D in improving agricultural

production. The marking to market of this production has provided families with financial resources that enabled the improvement of their living conditions. This was corroborated by the stakeholders interviewed, by building new homes sometimes with solid materials, the acquisition of 4-stroke motorcycles and the purchase and development of urban plots. IP can be seen as a tool that promotes agricultural development. It reinforces the concept that any initiative made with producers is a carrier of success (Ela, 2001).

Lessons learned

The actors interviewed explained that the main lessons that can be learned from the implementation of IAR4D-PI approach include:

- A clear understanding that the inclusion of all stakeholders in the value through the IP chain improves the production and placing on the market.
- A compromised IP sustainability if its funding is based solely on a project or programme
- Administrative mutations do not promote capitalization of acquired IP at the political and administrative authorities. Between two successions resulting in a sort of floating.

From analysis of these teachings, we accept that the productivity approach that focuses on the promotion of the only production technology does not allow agricultural development. Also, putting the direct beneficiaries at the heart of agricultural research could be a safe way of agricultural development. The approaches undertaken with and for the beneficiaries will enable them to play a central role, and it is very likely that the results of this research do not suffer from lack of adoption. In terms of governance, it would be better that they are the direct beneficiaries who take the lead in the IP rather than administration and/or research.

Information and services

The IP operation required the flow of information at all levels of the links in the value chain. In particular, the link "Production" was central to this information based on the guided tours, refunds sessions of campaign results, radio and television programmes (RED and RTB), and the dispatches of the press (AIB / Sidwaya). In addition, IP has facilitated access to credit of its members with banks and MFI partners who have agreed to adapt their financial products to the activities of players in the IP. Also, to avoid selling off crops, a warehouse receipt system has been promoted by the PI.

The information and services are key to support the technical and organizational innovation created by the PI. However, the context of the Leo PI-Corn requires more services to support production such as plowing services, ginning, transportation, grinding residues that could integrate the link, particularly animal products in the IP. These actions should however be based on the principle of business from business plans. These services should be sufficiently motivating for developers and financially accessible to the maximum number of beneficiaries.

Relationship between Actors

The IP operations have strengthened the relationships between groups of actors, as well as created new relationships. Relations between actors have been strengthened by:

- Research and producers: in the context of IP activities, demonstrative testing of improved maize varieties and appropriate crop management production (land preparation, organic manure, appropriate dates and technical contribution of individual mineral fertilizers, crop management) were taken in the middle peasants by a network of producers committed to this task by the basic cooperatives (FNZ). Endogenous monitoring agents have followed up on these tests, which were the subject of guided tours to the place of all the cooperators. Results were returned in cooperatives which could judge the added value of these varieties and proposed producing technical routes.
- Local political authorities-Producers: the IP activities allowed producers, including their OP, to be closer to local political and administrative authorities. Thus, the High Commissioner, the highest administrative and political authority of the province, became a IP to the current partner that producers can directly and request hearings to submit their grievances;
- Producers-Financial and micro-finance institutions: Before IP establishment, financial and microfinance institutions available locally interfered very little in cereal value chain. Taking advantage of the PI, new financial products tailored to the context of agricultural production were developed and facilitated access. Currently, the producers-MFI partnership has diversified and has become competitive. Thus, producers have the option of negotiating with several MFIs and opt to engage with one that offers the most favorable terms. Credit Union was the first IP partner. It developed strategies for keeping a large portion of loans for producers dealing with ACFIME CREDO and First Microfinance Institution, the two microfinance institutions recently installed at Leo, as well as Ecobank. The latter multiplied exchanges with IP stakeholders to increase its volume of activities.
- Producers-Extension agents: farmers and extension workers have always worked together. However, the relationship in the IP framework has changed in

nature. The producers' position was strengthened by the fact they also have access and more direct access to researchers and research organizations. Thus, they can now discuss techniques with extension agents.

- New relationships have been established:
- FNZ-merchants: the relationship between producers and grain traders was once based on mistrust. Many middlemen bought corn fields to provide collectors who are not necessarily in direct contact with the producers and their organizations. Taking advantage of IP activities, grain traders have begun to organize and to form themselves into IP partners for the marketing of maize. This resulted in the decision to ban the purchase decision to field edge and roads cereals. The only consensual marketing places are now the market towns and rural communities and the urban market of Leo. This helped resolve issues flights stocks that discouraged producers.

We realize that the IP has helped to build relationships with several networks and created the need of organizations in the links in the processing and marketing of maize to interface with other stakeholder groups. She also served as the basis of social innovations that have a secure farmers' productions and direct marketing to the benefit of all.

Shocks and surprises

During operation of the IP from 2008 to 2015, three high commissioners have succeeded at the head of the province of Sissili. These administrative changes are not without inconveniences, with the high commissioner presiding over IP. Despite this, the IP was able to function. These changes raise the question of the place of the administration in the governing body of the IP. The ideal would have been that these are actors who have a direct interest in the functioning of the IP (beneficiaries), who are empowered to pilot it, the administration can play the supporting role. In addition, the OP FNZ has itself changed direction in the meantime, electing a young leader at the helm. But fortunately, it did not also negatively impact the functioning of the IP.

Equity in the distribution of costs and benefits

According to IP stakeholders, it would have benefitted all groups of actors at different levels. The producers saw their incomes increase by improving production and commercialization conditions in particular, by increasing the yield (2.03 t / ha to 3.9 t / ha) and maize selling price (140 to 180 FCFA / kg). The end sales of corn (field-edge and edge-roads) also significantly reduced inventories of flights in the area. These have also benefitted the producers not involved in IP in the same way through the flow of information in the mass media and guided tours.

Merchants have seen their supply facilitated by a better organization of marketing as well as product quality. The transporters also said they received a marketing organization which increased the fill rates of their trucks. Finally, FNZ has been reinforced in its role peasant organization for agricultural development (technical capacity building, leadership and advocacy of human resources). The FNZ is sought increasingly by other IP to share its experience in the activities of a IP both nationally and outside the country. On analysis, it can be said that the distribution of benefits generated by the IP was fair to all points of view. Each actor has enjoyed the IP in proportion to its investment.

Durability

The existence of the IP is supported in part by FNZ, such that in the discontinuation of funding by AGRA/DONATA, the IP would continue to operate. In fact, there have been larger meetings of actors since the end of DONATA funding. However, the relationship between actors continued to be normal (with regard to market information system, credit access); sometimes, actors meet to address specific problems (such as negotiation between producers and traders on the prices of corn). Furthermore, discussions are underway to sustain the IP.

Analysis of the information collected on sustainability shows that there are yet untapped opportunities that could ensure the sustainability of the IP. This is among other regional chambers of the Central West Agriculture (CRA-West Centre), the Regional Centre of the Western Region Board (CR/ Central West), and many projects and NGOs active in the region (PAPA, PAFASP, WAAPP / WAAPP, PCSA) and interested in the development of initiatives such as the IP. Advocacy actions and lobbying at their level could afford to have their commitment to the sustainability of IP. This deficiency is not necessarily attributable to the IP because, as a pioneer, it has not been sufficiently prepared.

Practice of Integrated Agricultural Research for Development

The activities of the DONATA project have included the practice of the IAR4D approach described by CORAF / WECARD (2012). Indeed, the diagnosis made by INERA on the low valuation of high yield potential varieties was shared by the producers of the Leo area through FNZ. Also, research and OP (FNZ) pledged to bring together the most important players in the area in relation to maize production on a platform to enhance the production of this cereal. The partnership initially involved producers, extension agents and OP with regard to the development of activities, market participants (traders, transporters and processors) and local and regional political authorities. The result was a long learning process at all levels.

For producers, the IP has a good knowledge of improved varieties and production potential, with appropriate crop management through the Field Schools network. This enabled an improvement in the culture of these improved varieties and increased production. Human resources of the OP have been developed for training through practice based on the "farmer to farmer". This network of trainers and endogenous monitoring charge can be potentially valued for any agricultural programme in the area. The OP leaders have recognized the role of advocacy to support the development of agriculture and develop initiatives in this direction. For research, the IP was a springboard to a better dissemination of agricultural technologies in corn production. Traders have begun to favour of IP to improve the marketing of maize. Local and regional political authorities have also played their part in supporting the IP for a first experience in Burkina Faso.

The first impact of IP is that the farms that have seen their corn production increase in significant proportions. Improved marketing has provided families with financial resources that enabled the improvement of their living conditions depending on the players surveyed (construction of new homes sometimes with solid materials, acquisition of 4-stroke motorcycles, increasing the number of producers' savings accounts in MFIs and Eco-Bank, investment beginning in the city of Leo by the purchase and development of urban plots). The producers feel confident in their relationships with MFIs and banks they once were quite distant from. It is also noteworthy that the price of corn has seen a constant or a relative increase over the entire lifetime of the IP (140 to 180 CFA / kg).

Besides this scale, the guidance of IP in development of production and marketing of corn allowed the FNZ through its network of partners to seek and obtain support infrastructure in maize marketing, including the construction of 7 stores (500 tons capacity and 2 250 tons by the PAPSA funding) in support of warehouse receipt (4 stores) and a draft WAEMU as part of support for the marketing of maize. Fifty-four conservation corn and cowpea silos (500 to 1300 kg capacity) were acquired under the PAPSA grant. Maize marketing has experienced a strong momentum with the organization of merchants and involved grain carriers to Leo, but also submission to tender within the framework of the World Food Program markets (WFP) and society national security stocks management (SONAGESS).

In terms of human resources, the IP allowed the revelation of several peasant leaders aware of the advocacy of the peasant cause. It also strengthened the network of trainers and endogenous technical monitoring agents (FNZ) able to support any

approach to agricultural extension and training. The IP realized the need to expand linkages in processing to boost the production and marketing of corn in its area of intervention. Taking advantage of this, a project was set up to specifically support the development of this link that has received funding from CORAF / WECARD in this direction.

Future innovations and their impact

The operation of the IP during the seven (7) years generated many lessons. The process of multi-stakeholder innovation platform is an appropriate framework for agricultural innovation on a large scale if it is well managed. This good management is conceived both in terms of the duration of action and in terms of governance, including leadership. This success has been facilitated by the existence of a strong peasant organization, which had already cultivated an agricultural development ambition, whose IP was a springboard for easy carrying. The existence of the OP has helped in particular the producers to have confidence and to participate fully in guiding the activities of the platform so as to reap the benefits. The work of internal awareness of the OP enabled behaviour change with the adoption of new technology research (improved seed varieties and crop management).

This would also not be possible without funding from AGRA / DONATA, including the IAR4D option, based on the IP value chain chosen by the project for its implementation. Nevertheless, considerable room for progress is still possible with the corn value chain Leo, on all three links, such as production, processing and marketing. For the production, producers are halfway the production potential of seeds of improved varieties with the techniques proposed routes. The research and development is expected to continue to reduce this gap between potential yield and yields observed in the open farmers' fields.

For marketing, the volume of maize sold in bulk is currently only less than 5% of the production on the entire cooperative network of FNZ. To ensure remunerative producer prices and, above all ensure quality to the consumer, important actions remain to be taken in this direction to achieve traceability of products released for consumption in the market. The transformation remains the weakest link in the chain when a higher gain can be achieved. Urban markets particularly have more processed products applicants, for both human and animal consumption..

The issue of sustainability of IP could become an issue even after 2015, at the end of AGRA funding. It requires a change in the governance of IP and changes in institutional relationships. Indeed, Leo PI-Corn does not have a governance structure as such. It ran through a near-total control of the research that brought together

actors, programmed activities, conducted and evaluated the activities with the participation of other stakeholders. Such a scenario may not be sustainable because it is based on projects with a timeframe. It will have to develop a well thought out plan, driven primarily by the direct beneficiaries.

Institutional change requires consultations at the highest levels of government, to ensure consistency of roles and funding methods of the actors involved in the field of agricultural development. Indeed, the implementation process of IAR4D requires consultation of stakeholders for consistency of action. One actor usually cannot alone effectively manage agricultural development issues to the many implications. Also, these consultations are the most expensive component of the IP operation (fuel for the movement of partners, mission expenses and pauses). This issue could be resolved if each of the stakeholders took on itself the burden of its participation in the IP activities that are not different from those they were to lead individually. For example, the movement of regional political authority to bring greater visibility and moral support to the IP activities are significant costs that are not supported by the IP outside a draft accompaniment.

Stakeholder analysis is not exhaustive, with regard to their size and opportunities. They enjoyed the support of CRA and CR; meanwhile, the regional management of the economy and the Central West are planning regional political institutions capable of ensuring the sustainability of the IP operation—it is now priority project of regional agricultural development.

However, changes in mentality and institutional changes are needed to reduce the overhead of IP operation. It is particularly important to bring each participant to support its structure of origin because, in practice, the management of all participants (per day and travel costs) became *sine-qua non* to effective participation in IP activities; indeed, it increased the budget needed for its operation (approximately CFAF 10 million / year by INERA, 2011).

IP stakeholders have the will to further develop IP activities to support several aspects:

- Improving the governance of IP by providing it with a Steering Management Committee;
- The creation of a central marketing system of maize: the first stage of this action would target the market organization (physical space). The geographical grouping of corn traders enable better interaction between members of this

group of players, with maize producers cooperatives going on some kind of scholarship in Leo;

- The establishment of a sustainable IP system of financing by raising funds internally from contributions by different groups of actors and other actors involved in the PI;
- The establishment of an IP management committee priori, composed of actors with vested interests in the operation of the IP (producers, traders and processors in particular);
- Regionalization of IP to expand its coverage area by integrating the entire area with high potential for maize production in the Central West region (provinces of Sissili and Ziro);
- Strengthening the participation of suppliers (manufacturers of agricultural implements and post-harvest corn processing) in the IP to address the issue of mechanization of production;
- The development of sustainable services to members in the field of agricultural mechanization to improve the quality of maize grain product, facilitate land preparation operations and the processing and management of crop residues;
- The opening of agricultural insurance (corn yield) in the context of securing producers who commit funds increasingly important in the production (inputs especially) in relation to the Federation of Agricultural Professionals Burkina Faso (FEPAB).

Lessons learned from the implementation of the RAIPD (IAR4D)

The reconciliation of agricultural research to the OP and its endogenous FNZ network extension was marred by bad extension services in two ways. First, the extension workers felt that going out of its defined roles amounted to supplanting the producers. On the other hand, the network of local advisors and supervisors of the OP developed skills, which was a source of frustration on the part of advisers, especially as this experience was a first of its kind.

It can be inferred that the extension workers did not understand the change in attitude of research and OP within the framework of the implementation of the IAR4D approach. The extension workers were not able to seize the new dynamics created by the IAR4D approach. This could be explained by the hierarchical organization of these technical and administrative services officers at the base, still referring to the higher level on the one hand, and secondly by the lack of resources (equipment and operation). This means, therefore, that the linear extension of the approach (top-down) still persists in the extension reflexes. With these lessons comes the need for a

new thinking on institutional relations between the different actors in agricultural development to facilitate interaction at any level whatsoever.

Kilichi IP in Koupela

The livestock-meat sector occupies the 3rd place on the list of export products, after gold and cotton in Burkina Faso. It has an enormous potential, related to the herd number: 8.566 million cattle, 21.203 million small ruminants, 1.071 million donkeys, 2.21 million pigs and 38,637,000 poultry (MRAH, 2013). The existence of significant margins of improvement in productivity is shown by an estimated 25 000 tons of meat for the local market and about 800 000 tons for foreign markets, and the possibility of structuring regional exchanges in the dynamic area of UEMOA and ECOWAS. The bulk of trade in livestock meat falls within the more traditional sector. The lack of processing of the meat before export has a shortfall very important in the economy. Some handicrafts of meat processing are practiced in the region (kilichi, grilled meat, smoked meat, etc.). These techniques are facing health, energy and efficiency problems. Various other industrial processes exist (sausages), but not known by the small transformers. The main constraints of the livestock-meat sector are related to the extensive nature of traditional farming, overgrazing, resurgence of animal diseases, genetic erosion of local breeds, and low productivity. There is also the low professionalism of the actors and the low valuation of products. All these factors make farming an area of poorly exploited potential. This study was initiated as part of an agreement between Burkina Faso, through INERA and the African Forum for Agricultural Research (FARA) and the African Program for Research Innovation (IRAP). It is based on an inventory of innovation platforms, innovations and technologies with strong innovation potential in Burkina, with the choice focused on the "kilichi" of Kouritenga Province for an in-depth case study.

Rationale for IP Kilichi

The concept of innovation platform (IP) proposed in the 2000s by the Forum for Agricultural Research in Africa (FARA) offered to African countries the Integrated Agricultural Research for Development (IAR4D English) to adopt. It is an alternative to research/development to solve complex problems identified by a set of actors gathered around a value chain. The innovation platform (IP) takes into account the entire value chain of kilichi from the animal to the finished product, and pays particular attention to processes, product quality, organizational aspects of actors and market. In other words, the IP is a mechanism by which learning, experience sharing and communication between actors of the chain of cattle meat-value can be facilitated to promote joint action and stimulate innovation. Membership is based on the interest and needs of each actor to do business in the value chain in interaction with other actors.

The analysis of constraints and opportunities on meat livestock sector in the Kourittenga province allowed to update the existence of a traditional meat drying technology called "kilichi". Also, there are traditional processing units of kilichi, but as regards to the treatment, processing and packaging of the products, they remain undeveloped. The actors of this technology share the same vision, which is to increase sustainable incomes through better integration of production systems (animal fatteners, butchers and processors).

The completion of the case study combined several data collection methods, which are:

- A literature review: it was made through the analysis of general documents available (dashboard of the Central East region, the development plan of the town of Koupela, documents of IAR4D approach) or specific (analysis constraints and opportunities of kilichi PI, mapping the value chain kilichi, etc.)
- The collection of data from coaching services, particularly animal resources management and through investigations and during the IP meetings;
- Direct observations and collections of reviews and testimonials during the execution of the mission (meeting with IP actors, studio visits, etc);
- Semi-structured interviews with target groups of stakeholders, members of the IP and Koupela Pouytenga.



Picture 1. Interviews with processors in Koupela locality



Picture 2. Interviews with processors in Pouytenga locality

Location and boundaries of the IP area

The IP zone covers the rural communes and the Koupela Pouytenga, located in the Province of Kouritenga. The province is located in Central East region (map 3). It

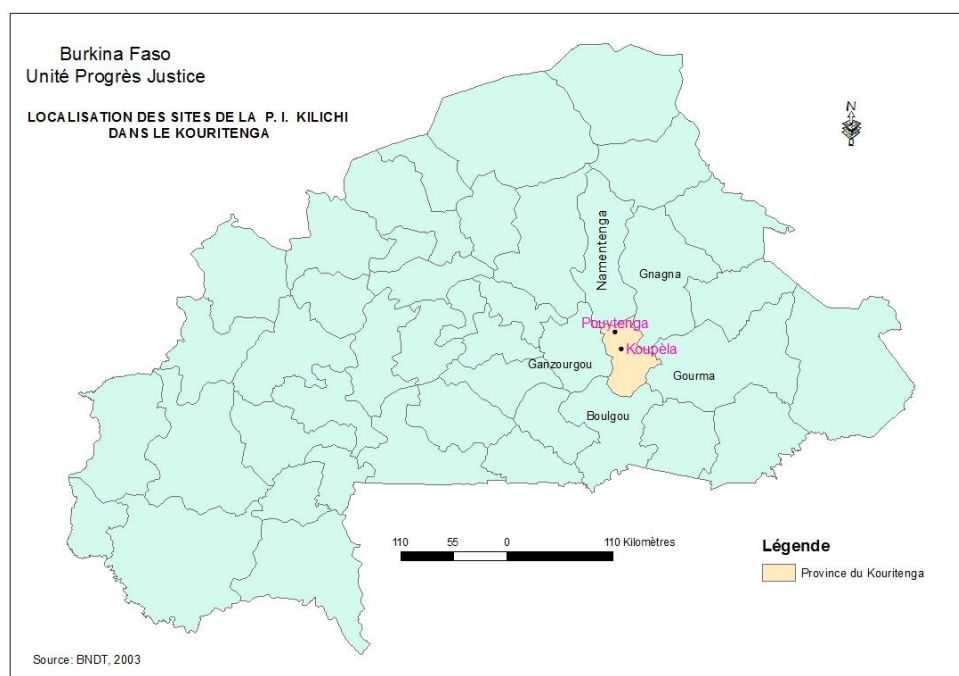
covers an area of 2738 km² and is bounded to the east by the province of Gourma, north-east by Gnagna, north by Namentenga, west by the province of Ganzourgou, and south by Boulgou. Kouritenga includes 221 villages, 7 rural communes (Andemtenga Department, Kando, Goughin, Baskouré, Yargo, Tensobentenga, Dialgayé Department), and 2 urban districts (Koupela and Pouytenga). The county town of the province is Koupela, located 145 km from Ouagadougou on the Ouagadougou-FadaN'Gourma axis.

Food security in the IP area

Agriculture is the main activity practiced by the majority of the populations of Kouritenga and Pouytenga. These towns are favoured by relatively good rainfall annual average of which is in the order of 800 mm and relatively fertile arable land. For the 2013/2014 crop year, grain production in the Central East region amounted to 356 362 tons. It increased by 19,828 tons or 5.9% from the previous season. The rate of coverage of cereal needs at the provincial level remains satisfactory for Koulpelogo, but has a slight deficit in Kourittenga and a chronic deficit in the province of Boulgou. However, this ratio hides another reality which is the management of production in time. Indeed, very often, the producers are selling their early production (end of season or on field) for social reasons (school year, funerals, weddings, traditional ceremonies), for which there is no adequate funding mechanisms. When grain prices are under considerable high (between July and September of each year so-called period of "welding"), the producers may find it difficult to meet dietary needs.

Characteristics of the production system

Agriculture is the main economic activity in the two municipalities. However, with the support of NGOs, projects and programmes, effort was made in terms of soil fertilization and agricultural equipment. These efforts included the construction of manure pits, and production of organic fertilizer and erosion control bunds, as well as the procurement of equipment (plows, draft animals and carts). This family-type agriculture is dominated by the cultivation of sorghum, which remained the main grain production, with 41.4% of production in 2013/2014. All farming operations are carried out by animal traction, except seedlings, which are still manual. The cereal needs coverage rate is below the national rate. This rate of coverage of cereal needs at the provincial level remains satisfactory for the province of Koulpelogo, but shows a slight deficit in Kouritenga. Regarding other crops, compared to the 2012/2013 campaign, cowpea, cotton and groundnut production increased by 6.9%, 38.6% and 1.2%, respectively.



Map 4. Province of Kouritenga

Demography and livelihoods

According to the General Census of Population and Housing conducted by the National Institute of Statistics and Demography (INSD) in 2006, the population is 198,496, with an urbanization rate of 17.5%. Increased concentration of people is stronger and more accelerated in the province of Kourittenga. The density varies from 48 inhabitants / km² in the province of Koulpelogo and 117.9 / km² in Kourittenga. The age structure of the population of the region shows that it is mostly young. In 2013, 65.5% of the people were 25 years old and 48.0% were under 15 years, while at the national level, 67.1% were under 25 years and 47.9% were less than 15 years old. In the youngest age group (less than 15 years), there are more men than women. In the 15 to 59, 65 to 69 and 69 and above, there is less men than women.

As it is with the livelihoods of rural communities, agriculture remains the main source of income and livelihood for women and men in the Koupela province. Red sorghum, white sorghum, millet, maize and rice are the main food crops. Livestock is the second economic activity of the population after agriculture. There are well-developed livestock feedlots in the province, thanks to the support of development partners (NGOs, projects, programmes and development associations). There is a

well-structured and very important cattle market in Pouytenga and less structured livestock markets in Koupela, Dassoui (rural commune of Dialgaye Department) and Sampangou (rural commune of Goughin). The major challenges identified for farming are the degradation of arable land, inadequate technical support, low self-promotion of farmers' organizations, and difficult access to agricultural credit.

The trade sector has developed considerably and provides significant livelihood in the province due to its geographical situation, and the town of Pouytenga recognized as an area of significant "traffic" nationally and sub-regionally. The capital of the province is located at the crossroads of national roads No. 04 (RN 04) Ouagadougou Niger border and National Road N°16 Koupela-Tenkodogo, Togo border which is an outlet to the port of Lome. This facilitates trade with Togo and possibly Ghana and Benin. Trade in that area mainly covers the fields of import-export, general trade and hotels. The presence of financial institutions facilitates credit access conditions for actors working in a cooperative, group or association.

Recent shocks

Recent years have been marked by the appearance of sufficiently large production units to justify the move to mechanization—which is a change in the adoption of new agricultural techniques, such as plowing, row planting, weeding, fertilizer and pesticide application. Following the great droughts of 1974 and 1984 in this area, pressure on natural resources resulted in increased degradation and decline in productivity on the one hand, and conflicts, on the other. Increasingly, the development of commercial activities and the practice of "traffic" has guided organisations closer to the trade at the expense of agriculture.

With regard to household access to sanitation, open defecation is more prevalent in Central East than at the national level, and it affects about 8 of 10 households. Therefore, the use of latrines is limited at 2 of 10 households. The situation is particularly acute in rural areas, where 9 out of 10 households defecate in the open, while 5 of 10 households are involved in urban areas.

The main sources of information are agricultural extension services and agricultural technical advisory support, research projects and programmes, GRAD producer organizations (groupings of agricultural producers, groups of farmers), the mass media (the area is covered by three private radio stations, a national radio and national television), IP and producers. Information actors on the financial institutions of the products include: credit unions, which make loans available; BOA, which makes available to breeders product on cattle fattening, and SOFIGIB, which offers trading opportunities that guarantee funds for investments.

Social capital and informal institutions

Modern administrative system overlap traditional system based on religious practices and customs. Traditional chiefs still occupy an important place in the city management. The partnership between the different groups of stakeholders (farmers/producers), research institutions (INERA, IRSAT, PPAAO), extension services (technical services, livestock, agriculture, and environment), traders of cattle meat (animal fatteners, butchers), is the capital of the PI.

Local leadership and governance

Local governance in both towns includes the high commissioner, the prefects Presidents special delegations (municipal authority), village consultative committees, groups of primary producers and departmental unions of producers, etc. Both local authorities are responsible for the management and development of their constituency. There is also facing many socio-professional organizations (Association of Agricultural Producers, Association for the Promotion of fattening). There is a need to sensitize and/or train the actors in order to cultivate the cooperative spirit and reach the bundling systems, possibilities of obtaining sizable contracts.

Access to financial services and credit

In both Koupela and Pouytenga, access to financial services and credit is provided by the microfinance institutions (local credit unions) and local banks (BICIA, BOA, UBA, Coris Bank). The area is covered by three private radio stations and the national radio station, which provide information to stakeholders on the products of the financial institutions (fattening loans of the microfinance institution "Caissespopulaires", the BOA has a product on cattle fattening). They also educate stakeholders on the existence of projects that accompany the actors (PASPRU: support programme and promote the private sector in rural areas, PSDP: programme to support private sector development, PCESA: programme for economic growth in the agricultural sector, FODEL : provides livestock development fund). The town of Koupela has more than twenty villages, many village chiefs and land chiefs, who have an important social role in the community. There are groups of agricultural producers, associations, professional organizations, breeders (OPE), etc.

Project Team activities in the IP area

The project team has been working for several years in this area on the improvement of agricultural production systems. We note the existence of a traditional technology, kilichi manufacturing and the presence of kilichi production units (WAAPP/WAAPP supported with entry point for the promotion of the local dried meat, "kilichi"). The Institute of Environment and Agricultural Research (INERA) and the Applied Science and Technology Research Institute (IRSAT) works together for better identification

of anchor points and the added value of innovation platforms. It has also asked the actors to establish a good synergy of actions between the activities of SIMPROMEAT project and those of the kilichi platform implemented by the WAAPP/ WAAPP to Koupela. The purpose of this IP is to improve the meat value chain through improved access to pastoral resources to reduce the vulnerability of animals, promoting rations optimized for fattening animals and improvement traditional processes of meat processing and marketing system.

Implementation and establishment of IP

The entry point is the promotion of the local dried meat, "kilichi". Initially, the IP was based on the Association of Producers of "kilichi". A meeting prompted by the WAAPP / WAAPP and the Provincial Directorate of Animal Resources, Kouritenga, consolidated all stakeholder groups of the meat value chain. They are: butchers, processors, research institutions (INERA / IRSAT), extension services of Kourittenga area (agriculture, livestock), the health service, local traders, the administrative authorities (High Commissioner), the credit union and the press. During this meeting, the benefits of being in the IP was well stressed. Thus, the multi-stakeholder Innovation Platform Kourittenga was established in 2013, with a clear and consensual statement of the roles of each stakeholder group.

The Forum for Agricultural Research in Africa (FARA), in partnership with the German Government, represented by the Research Centre for Development (ZEF), University of Bonn, under the initiative "One World No Hunger", has undertaken to implement the "research support program for agricultural innovations" (IRAP). The Programme of Accompanying Research for Agricultural Innovations (PARI) takes note of successful research initiatives and innovations in African agriculture, and taking into account the concept of integrated agricultural research for development (IAR4D) promoted by FARA, to build an independent programme accompanying the research to support the scaling of agricultural innovation in Africa and contribute to the agriculture sector development in Africa. IRAP is implemented jointly with the Agricultural Innovation Centres in the initiative, "A world without hunger."

INERA is empowered in Burkina Faso to provide the necessary support for the implementation of NRC activities:

- Conduct an analysis of the situation of agricultural innovations in Burkina Faso and produce a reliable report.
- Conduct a study to determine the scope of existing agricultural innovation platforms in Burkina Faso, and a synthesis of lessons learned from agricultural innovation platforms established by various initiatives in the country in the past decade.

- Conduct a scientific study on the initiatives of national and international investments in innovation for the development of agriculture and food and nutrition security in Africa, and particularly in Burkina Faso.

In the implementation of NRC's activities, an inventory of agricultural innovations and agricultural innovation platforms were carried out in the Central East region, which includes the Kourittenga province. This report presents an in-depth case study of the kilichi platform in Kourittenga, Burkina Faso.

Starting points for action

The inventory of agricultural innovations and agricultural innovation platforms identified the constraints and opportunities for the transformation of local meat, and the starting point for action. The IP consists of the following players: animal fatteners, traders, processors, extension services, the health service, press and WAAPP/WAAPP.

Before formalizing IP Koupela, only local meat processors had gathered to defend their socio-professional interests. This organization does not therefore meet the criteria of a multi-stakeholder innovation platform. It therefore mobilized a portion of stakeholder groups of the link "transformation" of the value chain of animal production. The actors in livestock/meat, traders, the technical advisors (extension agents) were not associated so that the flow of difficulties in marketing of processed products were recorded and increased suddenly the vulnerability of transformers.

Decision-making IP

Membership of the IP was open to any group of players with similar interests around the processing value chain and upgrading of local meat. An IP member was a representative of a group of actors of a given IP. The common interest of the IP members was in their commitment to a given level of processing and value chain enhancement of local dried meat, to achieve the vision of the IP. The motivation of each IP members was its interest in the targetted channels. It was understood that the satisfaction of all of these interests led to the achievement of the overall goal of IP, which was to increase yield, improve production and profits to ultimately improve their living conditions. Members of the IP have very good rapport among themselves, on the one hand, and with cooperating producers and structures of organizations, on the other.

The IP members enjoyed the fundamental right of freedom of association. They may belong to other interest groups. Members also have the right to withdraw from the IP if they so wish. They also have the right to participate in decisions and activities

within the PI. The members, however, have many responsibilities. They have, among others, the responsibility to attend meetings, get involved in all IP activities, to return the results to their base and contribute to the sustainability of the innovation platform. The IP is in an interactive and participatory dynamics of a value chain approach, it is the responsibility of each player to effectively play its role. The decision to admit a new member is taken at a meeting of the PI.

After the establishment of the IP, the different stakeholder groups identified their constraints and opportunities, their needs for capacity building and defined their roles and responsibilities within the platform. Initially, the IP was organized by WAAPP/WAAPP, the Provincial Directorate of Kourittenga of Animal Resources and the research institutions (INERA/ IRSAT). Their internal organization enabled them to break down the invitations and information to members with the support of the project team. Initially, it was the high commissioner of Kourittenga who chaired the meetings. He proposed, thereafter, that the provincial director of Animal Resources Kourittenga should represent him because of his multiple occupations which does not allowg him to fully take part in the IP activities as the lead of the management committee. This committee comprises a chairman, a secretary, a treasurer and responsible communication. The roles and responsibilities of members of the management committee were defined by consensus of the meeting. Each member performs the tasks entrusted to him by the platform. The decision on any matter is taken by the IP in a meeting. Any decision taken by the leaders must be approved by all members of the IP by consensus or by vote of a simple majority. The IP had a total of nine (9) leaders (five (5) from Pouytenga and four (4) from Koupela). Each leader is responsible for three (3) approximately assets.

In reference to the terms of reference of the IP, all members of the IP enjoyed the same rights and prerogatives. There were no dominant groups of actors or players in the PI. All the stakeholder groups were equal. Proposed agenda from the management was always vetted by consensus or by simple majority.

Conflict resolution

The differences of opinion indicated that the actors had interests of the platform at heart. They were resolved by compromise, when the different groups of players were ready to defend their interests without jeopardizing the existence of the team, while recognizing the importance of complementarity between stakeholder groups. However, if there is a lack of compromise, it was expected that the facilitator ensures mediation between the parties. And for this purpose, it is stated in the team contract

rules of behaviour that "conflicts or misunderstandings among members must be resolved amicably through dialogue with the parties dissatisfied."

Functioning of IP

The resources for the management of the IP financial meetings was from WAAPP/WAAPP. The IP member organizations contributed through the provision of human resources for the implementation of activities. However, negotiation and advocacy skills are weak. All these capabilities have increased through strengthening leadership capabilities and negotiation skills obtained through the GRAD team.

Different actors of kilichi are organized and have a sense of belonging to the PI. They have already held two general meetings. The management committee is very active and has a capacity for consultation when needed. Attendance at meetings, joining the PI, accountability and respect for the roles defined in the IP are indicators that demonstrate its functionality. Note that IP is fairly recent, it has limited financial resources and membership dues are not yet effective. A transformer of kilichi benefited from PAFASP project, funding for the construction of a modern processing plant (Picture 3). This unit is an especially inspiring reference that will galvanize others to further development.



Picture 3. Construction of appropriate processing unit founded by PAFASP project

Relationship and networks

The operation of IP depends on the functional relationships that develop between the different stakeholders groups that compose it. They are grouped by targetted links in the value chain according to the following principles:

- All involved at various levels in the kilichi value chain play key and complementary roles in the process of processing and marketing;

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- All have interest in the development of targetted value chain (kilichi) and therefore are motivated and committed to contribute to improving their effectiveness, income and livelihoods;
- With the established relationships and interactions that are more likely to develop between members of the Innovation Platform, each group of players now know who to contact in case of need.

The whole process aroused great interest among the actors. Also, the results achieved (improving processing, consideration of hygiene, packaging kilichi, diversification of kilichi) are now being taught at local schools.

Trust and respect

As to the process, the IP established a serenity environment and confidence between members of the PI. There is a good atmosphere and mutual respect, especially respect for elders by the young people was observed. The older members play an important role in the IP, and are challenged to advise or resolve obstacles that hamper the functioning of the IP. This trust enabled the IP to obtain equipment from the WAAPP/WAAPP project to further improve the processing of kilichi.

Perception of ownership

Members of the IP have a sense of belonging to a team and have the collective responsibility for the success or failure in the implementation of its activities. The sustainability of the IP was taken into account in the choice of the urban commune with regard to the processing of dried meat. The dynamism of the transformers within their grassroots organizations and their commitment to materialize the vision of the IP is a favourable base for sustainability. Also, the apparent membership of the administrative authorities and technical services to the IP approach is also a sign of assurance as to their long-term support.

Market orientation and commitment

IP Koupela is located at the intersection of roads in the transit zone and livestock flow to external markets of Burkina Faso. Therefore, the actors have a market culture with the organization of the livestock-meat sector. However, other aspects such as processing and marketing of kilichi happen traditionally and in informal local markets. This often results in poor sale, lack of controls and occupations days, without leading to an impoverishment of transformers. These constraints are part of the IP concerns. Thus, it works to improve the processing and linking to the market through integration within it of market players sometimes outside the province for the distribution and marketing of kilichi. This new context calls processors to comply

with the market requirements to bring to the market place, products in quantity and quality to meet the demand. The spirit of the IP team led the players to engage in a win-win partnership. The IP management committee ensured compliance with the commitments towards each other, in order to build confidence and secure contracts. It is the perpetuation of the IP itself.

IP activities

The IP activities are right in line with the vision of the IP. They boil down to finding solutions to the constraints of development of the kilichi value chain. These are:

- Meetings and Workshops: 2 formal annual planning meetings and review of IP activities and extraordinary meetings as required (partners of visits, etc.);
- Training: they focused on the identified themes such as:
 - The training on good hygiene practices;
 - Good processing practices;
 - The use of sealed food packaging and conservation of kilichi
 - The use of professional welders;
 - The establishment of a provincial union kilichi label;
- The label of kilichi is created 100% natural.

Learning and experimentation

In pursuing the vision of the IP for sustainable intensification options for transforming the local dried meat, co-developed by the IAR4D paradigm of this process, many lessons have been learnt:

- Regarding transformers, IP has to be convinced that it is possible:
 - increase production, diversify and improve the quality of their product;
 - extend the relations fields;
 - to conduct study tours and participation in national fairs;
 - develop the solidarity and interdependence.
- For market actors, they discover through the PI, an ideal setting for promoting their products and services with confidence.
- With research, the implementation of the IAR4D approach enabled a paradigm shift highlighting the need to be in a more global framework of IP to develop innovations that have an impact on development. This will better target design technologies on the needs of stakeholders and doing so facilitates their adoption.

Planning and objectives

From the results of the census of agricultural innovations and analysis of the value chain, members of the IP identified the following bottlenecks: low productivity, low-tech, unorganized market actors. They then planned at a meeting, supporting

activities to production as one of the priority objectives. Meetings, workshops and demonstration tests (guided tours, various practical training) are appropriate frameworks for communication between members of the IP (exchange and sharing information). The different forms media are appropriate channels to support the IP, to make visible their actions on the one hand, and to disseminate the experience acquired in its activities to a wider audience. In this dynamic recovery and IP visibility, scientific papers were presented in workshops and articles for publication in the press of Burkina Faso.

The team of the Innovation Platform (IP) Koupela consists of a set of stakeholder groups, as well as the butchers, processors, WAAPP/WAAPP, research institutions (INERA, IRSAT), local administrative authorities (high commissioner), provincial departments in charge of agriculture and livestock, health services, media, microfinance institutions (CaissePopulaireKoupela), traders with a view to identify and seize opportunities to improve production, processing of the dried meat and its local market. Members of the IP were mostly men (few women are involved in Koupela) of different religious, cultural and socio-economic backgrounds. Each actor in the IP has a skill or expertise which were harnessed in the implementation of activities.

RESULTS

The success of a IP can be measured by the extent of the contribution made by its structure and processes in achieving the expected result. Although the level of achievement remains is still not definite, as IP kilichiis is less than 2 years old, we collected and analyzed information and data on IP structures and the process to be able to draw partial conclusions. The availability of coaching and agriculture and livestock extension technical services, the presence of producer organizations (OPE; transformers, animal fatteners, drovers), research institutions (INERA and IRSAT) and distributors were sources of intelligence and information to members. Their support contributed to a better quality of production. The connection of the IP media allows for information on processing techniques and the market.

The vision of the actors of the IP was to increase incomes through better integration of production systems (animal fatteners and butchers). They thus realized that synergy of action was the best way to succeed. All stakeholder groups gave bail to strengthening the platform approach. IP meetings created a climate of trust between the actor groups, which strengthened and reassured their relationships. This atmosphere was possible thanks to the good coordination of the IP activities, which

took into account the interests of all groups of actors. Graphic 1 shows the cartography of the actors of the Kilichi value chain in Koupela.

The diagnostics conducted early in the project guided the identification of the animal products and the promotion of local dried meat as flagship for the potential value chain, and the constraints related to the processing and marketing. Initially, the IP had initiated improvement actions with the support of players in the livestock-meat sector through the Association for the Promotion of Livestock. These actions convinced members of the IP of the margins of existence of progress to improve production by promoting research technologies at their fingertips.

There were intensive training workshops and capacity building with stakeholders, especially with different actors along the value chain. While supporting the processing, the IP started linking production to the market. This resulted in contracting and hygienic processing, compliance with quality standards and the establishment of contractual negotiations for the sale of kilichi with distributors and other shops and supermarkets

The introduction of the IP and its operation helped develop interaction between different groups of stakeholders, through meetings and guided tours on the conversion sites, and testing new methods. Thus, in using the IAR4D approach through a multi-stakeholder innovation platform, the capacity of different stakeholders were strengthened on issues related to the processing, trading, marketing, lobbying and advocacy. The actors also established a good synergy of actions in the activities of the kilichi platform implemented by the WAAPP/WAPP in the Koupela locality.

Learning by experience

The IP approach allowed all the actors to decide on their contribution and share their expectations and concerns with others. In addition, it facilitated the dissemination and adoption of technology. We can say that:

- The presence of actors or their local representatives was essential for the proper operation of the IP;
- The entry point was the promotion of local dried meat "kilichi";
- Coordination between the Institute of Environment and Agricultural Research (INERA) and the applied sciences and technology research institute (IRSAT) for better identification of anchor points and the added value of innovation platforms;
- The approach had a good influence on social capital through the construction and development of business relationships, which increases trust and synergy between the actors;

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- The approach allowed a frank expression of views of the stakeholders
- The IP approach was a framework for capacity building through training, information, experience sharing and dissemination of knowledge (scientific or local);
- A change in behaviour and mentality of the players following the logic of a win-win partnership;

The actors all agreed that the organization of meetings of the IP requires more or less significant financial expenses that were incurred by the OID project. However, given the benefits that IP provides each group of actors, they are thus committed to a sharing of the burden in terms of hopes aroused by the PI. The building of the production capacity actors made them more responsive to the market demands. And their linkage with agro-dealers helped organize the market. Now it is the market that dictates the production, which resulted in contracts to formalize the market for fattened animals and meat.

Sustainability

IP Koupela has everything to perpetuate. It had a governance structure (management committee) and a team contract, which sets its vision and regulates its operation, and worked to secure the production and provided its connection to the market. The IP approach by groups of players in a team with a win-win spirit, gives them the power of decision vis-à-vis their expectations and concerns. The impact of the IP on development takes into account various aspects. The approach has resulted in:

- The broad dissemination of technologies that improve production;
- A pooling of efforts and contract farming that will increase the income and improve the living standards of the producers.
- A linking of animal fatteners to market players was initiated. The actors involved welcomed this by linking and promising to develop in the near future.
- The establishment of a supply circuit of quality meat, processing and marketing was launched. This activity has a significant potential for intensification of integration and promotion of livestock (beef-fattening). It was expected that the increased availability of quality products and increased revenue in particular resulted in the creation of added value processing link;
- Strengthening capacities of actors of the IP through training (technical, leadership, negotiation, marketing), information and dissemination of scientific knowledge;
- Financial autonomy of actors allowing them to operate from their home (schooling for children, health, clothing.);

- The creation of a new area of research (IAR4D and IP) more pragmatic and capable of valuing relevant search results for better development impact.

Future innovations

The vision of IP Koupéla was to sustainably increase the incomes of actors through better integration of agricultural production systems. For this, it will:

- Sustain, expand and formalize the contracting of the production of kilichi;
- Develop services which paid the benefit to producers for IP (assistance in processing);
- Establishing the infrastructure (cold room equipment and/or freezers);
- Establish a modern kiln drying system (gas or solar);
- Training of processors using the new equipment;
- Formalize relations with insurance companies to develop insurance products adapted to the context of producers Koupéla area;
- Form transformers on good hygiene practices;
- Use sealed food packages for the conservation of kilichi;
- Use professional welders;
- Establish the label, kilichi Kouritenga;
- Good manufacturing practices compliant with good hygienic standards;
- Develop rations fattening based on crop residues and local products;
- Set up a home of innovation as part of sharing information.
- Exhibition of inventions and strengthening the capacity of actors.

Practice of integrated research for development

The Innovation Platform is a new approach to research and development that improves the interaction between research and producers, and that opens links to other actors in the value chain. This approach has a broader view on the overall issue of animal products. It proved to be more pragmatic and capable of acceptance and transfer of research technologies, innovations and inventions for development.

Case Study: Milk Production and Marketing IP in Banfora

The multi-stakeholder innovation platform on the value chain of "milk" in Banfora in Burkina Faso was established on January 28, 2013, as part of the project "Sustainable intensification of Integrated Crop-Livestock Systems (ISIAE)," developed by the Association for the Promotion of Livestock in the Sahel and Savannah (APESS), which was funded by CORAF/WECARD-AusAID. It aimed to intensify production, improve collection, increase processing and develop marketing revenue for the benefit of the stakeholders. After more than three years of operation, the IP is at the stage of maturity in 2016, involving a variety of stakeholders from production to

processing/marketing of milk, through the local political authorities. Many gains have been reaped, among which is the establishment of a network of 7 points for collecting fresh milk, providing a link between farms and mini dairies based in the town of Banfora. In a win-win partnership, the actors were able to negotiate a price for the sale of standardized fresh milk from the farmers at a price of 300 CFA francs/litre in any season. Many services were also established for the benefit of the farmers to increase the value chain, such as the screening of zoonoses in farming (tuberculosis and brucellosis), shredding of crop residues for feeding cows, access to seed fodders and feed concentrates backed by collection points. In terms of perspectives, the IP is planning to cover the "**Cascades Region**" through the incorporation of the Leraba province, which also has a high potential to increase daily milk production, by improving the production potential of the cows and the development of a win-win partnership with financial institutions in order to increase production capacity, milk collection and processing.

The Banfora milk Innovation Platform is one of the local agricultural development initiatives in place after five years of operation of the first experiments (PI-Corn Leo grains) of the practice of integrated agricultural research approach for development (IAR4D) in Burkina Faso. The good results obtained necessitated the organization of an experience sharing hub for many emerging IPs. This is why it has been the object of this indepth case study. The goal is to learn about the process of innovation, by which knowledge and technologies generated by agricultural research were valued by the communities in the Banfora region and its surrounding for their development.

CORAF obtained funding from the Australian government through AusAID to contribute to food security in West and Central Africa. The implementation of this initiative was built around the application of the approach of integrated agricultural research for development (IAR4D). It was in this context that this project was formed. This project aimed to increase agricultural productivity, while preserving the environment. Milk was chosen as a value chain to develop.

The Cascades region is a high potential breeding area in view of the abundance of pastoral resources (natural pastures, water points, crop residues) and the organizational environment of producers marked by the existence of 'APESS and Burkina Faso's Breeders' Federation (FEB). APESS is a very dynamic ridge tile peasant organization represented on the entire territory of Burkina Faso and all the countries of the UEMOA. The combination of these two elements determined the choice of the Banfora locality for setting-up an innovation platform on the milk value chain (Milk-IP Banfora). Thus, the Milk-IP Banfora was set up on January 28th, 2013 to increase production, improve collection, increase processing and develop marketing to generate revenue for the benefit of stakeholders.

The operational tool of the approach of "Agricultural Research for Integrated Development (IAR4D)", through the Innovation Platform (IP), uses link players with a dynamic and systemic system based on reciprocity of interests. In other words, it is defined by the interactions and interrelationships between groups of actors with a common interest. The innovation platform is intended as a management tool for multi-stakeholder processes in the value chain. It promotes the practical reflections of several stakeholder groups to meet basic needs through a diagnosis of common problems and explore ways and means to solve them. The orientation of the platform is in a dimension of strengthening the capacity of actors to enable them to seize the existing opportunities and proffer useful ones for the society.

The IAR4D approach, through the IP, has the advantage of taking into account the needs of all stakeholders of a given value chain. It excluded the linear approach to agricultural extension and takes its basis for consideration after diagnosis: the constraints affecting production, marketing and sustainability on one hand, and the opportunities presented by the context in construction solutions on the other. One of the essential aspects of the IAR4D approach is its ability to bring together multiple stakeholders and provide them with a collegiate commitment to create innovation through the promotion and dissemination of agricultural technologies.

Bounded on the north by the Hauts-Basins region, south by the Republic of Côte d'Ivoire, on the east by the South-West region and on the west by the Republic of Côte d'Ivoire and the Republic of Mali, the Cascades region is located in the extreme southwestern Burkina Faso. It covers an area of 18 424 km², or 6.7% of the national territory. The region occupies a favorable geographical position for trade. Neighbouring countries such as Côte d'Ivoire and Mali are a huge potential market for these products. The county town of the region is the town of Banfora, located 85 km from Bobo-Dioulasso (second largest city), 450 km from Ouagadougou (capital of Burkina Faso) and 62 km from the border with Ivory Coast. It is a hub of trade of farming products with the rest of Burkina Faso on the one hand, and neighbouring countries on the other.

Food security in the IP area

The Cascades region has a food security situation that is less worrying than that of northern Burkina Faso. Indeed, it has a fairly good rainfall pattern, because of its location between isohyets 1000 and 1200 mm. During the last decade, the rainfall station in Banfora recorded an average rainfall ranging from 841 to 1200 mm per year. This high rainfall induces substantial resources in the surface and ground water, and made the region an area conducive to crop and livestock production. Average

annual temperatures range from 17°C (average minimum) to 36 ° C (maximum average). The region has a climate of the South Sudan type, characterized by a wet season from April to October and a dry season from November to March (Fontesand Guinko, 1995).

The cereal balance sheet prepared by the MASA in 2013 showed a surplus of 122% for the province of Comoe and 257% for Leraba. However, that food security remains volatile from one year to another because of rainfall variability within and between seasonal, which both upset the agricultural calendar and affects crop yields. Another cause of the fragility of food security in the region is the low purchasing price of grain producers to harvest, forcing them to "sell off" their products to satisfy their financial needs after suffering sometimes insufficient cereal at critical times of the season we said "hunger season."

Characteristics of the production system

In the Cascades region, farming is the primary source of income for most people. According INSD (2003), 89.50% of households in the Cascade region have a farm, which 88.20% operate their own. Agricultural practices are the extensive type, marked by a low equipment level of producers. The production is mainly rain fed and dominated by cash crops (cotton, groundnut and sesame), followed by cereal crops (maize, sorghum, millet and rice), legumes (cowpeas and bambara groundnut), fruit crops (mango, cashew), market gardening (onion, cabbage, tomato, pepper, eggplant, lettuce) and tubers (yams, potatoes and cassava).

Livestock is the second major economic activity after agriculture in the Cascades region. It contributes to food security and also provides substantial income to the population. However, husbandry practices remain extensive and based on rangelands and crop residues. However, there are suburban improved breeding of dairy cattle, pigs and poultry. In 2011, milk production was estimated at 252,125 litres, the eggs to 669,058 units and that of meat (controlled slaughter) to 1584 tons.

In the town of Banfora, there are four milk processing units for various dairy products that are booming. The cattle population in the region is estimated at nearly 704,000 heads, according to DRRA-CASCADES (table 9). A significant part of this population is made up of trypano-resistant bullfighting. This type of extensive farming is practiced by indigenous peoples and some migrant Fulani. The breeding is characterized by the mobility of the herd at the edge of the water points to enjoy the grass cover in the dry season. A good quality feed is also provided by the regrowth of perennial grasses after the passage of bush fires and the browse species. The most

difficult period for livestock is between February and April. At this time of year, feeding and watering become a major constraint for breeding.

Table 10: Number of livestock and main productions in Cascades region in 2011

<i>Provinces</i>	<i>Population by spece</i>							
	<i>Cattle</i>	<i>Sheep</i>	<i>Goats</i>	<i>Porcks</i>	<i>Donkeys</i>	<i>Horses</i>	<i>Camels</i>	<i>Poultry</i>
Leraba	41174	51903	45019	4431	225	95	0	231734
Comoe	587696	162027	159410	45692	1713	0	0	862482
Total	628870	213930	204429	50123	1938	95	0	1094216
Region								
Meat (carcass)	7874	4504	26529	12385	0	0	0	-

Demography and livelihoods

In the 2006 census, there were a total of 537,979 inhabitants Cascades region, composed of 261 368 men (49.1%) and 270,440 women (50.9%). This population consists of 6171 visitors and 531,808 residents. Compared to the total resident population of the country (14,017,262), the Cascades region accounts for 3.8%. The main ethnic groups encountered are Goin, Turka, Karaboro, senoufo, Toussian, Komono (who are aboriginal), Mosse, Dioula, Dagara, Lobi, Gan, Dogossè, Pougouli, Djan, Birifor, Bobo, etc.

The livelihoods of people in the area are provided mainly by agriculture and livestock. Indeed, the Cascade region realizes a surplus of agricultural products that are sold in local markets, to supply the cities of Bobo-Dioulasso and Ouagadougou, 85 and 450 km, respectively, west of Banfora. This important commercial activity around the flood of products generates significant financial resources for the population, making the area one of the areas with a low incidence of poverty in Burkina Faso. Apart from these main activities, the extraction of shea butter by women and charcoal by men are important sources of livelihood. In addition, there are many other income generating activities which help to reduce household poverty. The market in Banfora services the buyers and sellers in the area and those from the neighbouring provinces (INSD, 2009). Furthermore, the existence of industrial companies such as New Company Candy Comoé SN SOSUCO and Milling of Faso (MINOFA) offer hired labor jobs in the region.

Until the 2000s, the region was home to the last frontier of migration from Burkina Faso. In the Cascades region, a quarter of the population are immigrants. Men and women are substantially at the same level of migration and this is explained by the fact that migration in this region is usually whole family movement (INSD, 2006).

This migration has intensified following the Ivorian crisis, which caused the return home of many Burkinabe, from the year 2005. This created an organizational crisis of space. Fortunately, with the habit of planting in Ivory Coast, migrants have invested in cashew orchards and reducing the environmental impact of this migratory flow. However, the communal conflicts by especially farmers-ranchers, persist in the region, with increased pressure on natural resources.

In the last five years, with the development of mining (Gryphon) and gold panning, the region is facing a labour crisis for agricultural work and the rising cost of living. This has induced an increase in agricultural production costs.

Before the establishment of the IP, the main sources of agricultural information came from technical services (agriculture, livestock and research). Implementation of the IP provides a framework for information exchange, generation, sharing and dissemination of knowledge between groups of players in the milk value chain. The existence of the local media (Radio and Munyu RCT, TNB2 West) offers communication spaces to promote local dairy. These information sources are a channel to expand the marketing of these products to capture market opportunities (villages, cities, train stations, cafes and restaurants in the Cascades region and elsewhere). Moreover, these sources allows the IP to communicate on its production (breeding, insemination), collection, processing (milk processed products and derivatives) and marketing.

The integration of the local media in the IP allowed them to mix with the other stakeholder groups of the value chain and thus intensify their communication on the activities of the different links in the value chain, thus reassuring consumers about the quality of the local dairy. The share capital of IP is based on the partnership between the different groups of stakeholders: farmers / producers, APESS, research institutions (INERA, CIRDES IDR / UPB), extension services (technical services of the Ministry for Agriculture, livestock, water and forests), milk collectors, milk processors, transporters, retailers, micro-finance institutions and regional political authorities (governor, ARC, CR).

Burkina Faso is engaged in a full communalization policy of its territory since 2006. According to the general code of local authorities, the region is a legal entity represented provincially by another legal entity with a legal status and financial autonomy. It comprises an area of homes, a production space and a protection space. It is organized by local authorities (municipalities) and administered by a governor appointed by the council of ministers. The Cascades region is divided into two provinces (Comoe and Leraba) .Each province is headed by a high commissioner

appointed by the minister board. The province is subdivided into rural (14 in the region) and urban (3 in the region) communes, administered by elected mayors as the head of the municipal councils. Furthermore, there is a strong organizational dynamic of the rural communes, whose divisions of the CPF and APESS play the leading roles in the areas of agriculture and livestock.

Access to financial services and credit

Many efforts were made by the IP to provide the services needed to support the production, collection, processing and marketing of milk available for all players in the value chain. Thanks to the lobbying of APESS, farmers have benefitted from an input supply and organization of the collection of milk for delivery to the processors. For access to credit, MFIs (Credit Union, first mutual agency microfinance) participate in the IP activities. As such, players in the value chain have access to credit facilities. For producers and according to the needs expressed, these transformations units also provide advances on supply of milk.

The civil society includes many socio-professional organizations (Cotton Producers Group, Association for the Promotion of Literacy, the Groupement for the Management of Wildlife, OP umbrella as APESS, FEPAB, CIC-B, FEB, etc.) and NGOs (OCADES, AfriqueVerte, etc.), working for the well-being and active participation in the ongoing development process in the region. From the perspective of social categorization, youth associations include mostly those of women. There are also corporatist associations, religious, cultural, associations for the elderly, etc. Under the participatory development of the town of Banfora, these associations are working not only to improve the living conditions of their members, but also for the social, economic and sociocultural development of Banfora. Among these associations, the most active are:

- The collective of associations and youth movements, Comoé (CAMJC), which works to improve the social, economic, cultural and sports of youth;
- The collective of associations and movements of women referred to as Namouna, which works for the development of solidarity and mutual assistance among women;
- The Mugnu association, working in the direction of improving the status of women.

For this case study, our approach was inductive and interpretive research approach to exploratory. Its objective was to explore new or neglected phenomena that may serve as an example for the whole country and provide for consideration of lessons learned. So we combined several data collection tools. To grasp the operation of the Milk

platform Banfora, a combination of tools was necessary. A qualitative approach was used as a research method. The tools used were mainly:

- Documentary research: it involved the analysis of the documents available on the socio-economic data of the waterfalls area.
- Maintenance guide: it was administered to members of the platform as a focus group. Individual and group semi-structured interviews were conducted with the president of the platform and the Regional Chamber of Agriculture (CRA) as resource persons.
- Direct observation: it was conducted through visits of processing units: "Kossam milk" and "milk Aïcha".

After three years of operation (2013-2015), IP Milk Banfora garnered many achievements across all links in the value chain. These achievements are the result of dynamism and commitment of all stakeholders of the IP. The Cascades region served as a reception area for a long time for nomadic herders in search of pasture and water points. Gradually the herds have settled permanently in the area making it a breeding area. The relative abundance of pastoral resources allowed a dairy but unfortunately undervalued production. It is in light of this potential APESS has established a regional office to promote breeding in general and dairy in particular. Taking advantage of the food security-building initiative in Africa (AusAID), APESS has made a site ISIAE project.

A project-based study confirmed the high potential of the chain of milk value for the improvement of living conditions of populations in the region. In implementing the project, the IAR4D approach was favoured and an innovation platform served as a springboard for its operationalization. Therefore, an important work of identifying groups of players in the milk value chain in the region was carried out. Then, these actors were sensitized on the need to establish a multi-stakeholder platform to address the major constraints to the development of the milk value chain in the region. Thus, this work culminated in the establishment on January 28, 2013 of IP Banfora milk, in order to make available the milk and milk products in Banfora in adequate quantity and quality throughout the year.

This initiative was accompanied throughout by APESS, which is resolutely committed alongside other players in the value chain for its successful conclusion.

Establishment and implementation of the IP

The installation of the IP was performed at a workshop under the co-chairmanship of the prefect of Banfora department of Animal Resources Regional Director of

Cascades on 28 January 2013. The groups of actors were members of the IP APESS compounds, breeders, technical services, research institutions, regional political and administrative authorities, media, microfinance institutions, representatives of milk processing units and input sellers. On this occasion, the roles of different groups of actors present were identified and discussed. The groups of actors forming the IP was quite diverse, which is ideal for proper operation.

Before the establishment of the IP, the milk value chain in the Cascades region was characterized by poor organization coupled with a weak collaboration between actors of the chain links of production and processing. Apart from the town of Banfora, the producers transformed and marketed on a very small scale milk production from day to day. This transformation was based mainly on the production of yoghurt and curd. Also, there was no formal framework between them. There also was no milk collection system and marketing of processed products.

Starting points for action

The entry point for the selected IP was milk in the Cascades region. This was justified by the fact that the region has a strong pastoral potential that comes with a strong peasant organization (APESS) able to take the initiative. Milk yogurt processing initiatives exist, but it was noted that the market was dominated more by the sale of milk. The existence of transforming actors was a potential for the organization and development of the milk value chain in the region, in view of the importance of the dairy potential. Indeed, there are many herds of cattle scattered throughout the region, which also has an abundance of pastoral resources (pasture, crop residues, and water points).

IP Milk Banfora is part of the series of IPs in place in Burkina Faso after the pilot IP Corn grain Leo- DONATA promoted by the project. The IP approach was at an infant stage and development actors lacked practical experience. This has induced hard IP beginnings despite the willingness and commitment of its actors. For example, all member producers of APESS-Banfora Association considered himself a member of the platform, creating an over-representation of producers, while the IP approach recommends a representation of different groups of actors.

IP decision making processes

Membership of the IP is based on the principle of representation of stakeholder groups. It is free, voluntary and commits no membership fees. However, for the sake of moral probity, membership of the IP is conditioned by sponsoring an active member of a group of actors to a given IP. Moreover, the IP established a team contract with the technical support of the Group for Research and Action for

Development (GRAD). This team contract specifies the operational rules of operation of the IP.

IP leadership and facilitation

Since the introduction of the IP, leadership was provided by APESS, with a concerted governance structure. The presidency of the IP Steering Committee is currently provided by a representative of the processors. It is almost getting to the time where the IP is controlled by direct actors. This configuration is favourable to action. Indeed, these direct actors, in terms of their interests, have the latitude to direct the actions of the IP and to challenge the indirect actors to resolve constraints that do not have a solution at their level. The Banfora Milk-IP hired the services of a professional facilitator, assisted by a facilitator of endogenous APESS. However, with the end of the ISIAE project, the IP activity is facilitated entirely by an endogenous facilitator also a member of the IP.

Conflict resolution

The principle of any conflict resolution that would occur during the operation of the IP is the settlement. The IP does not provide special provisions for conflict resolution that would exceed an amicable resolution. However, the analysis considered that the participation of local political and administrative authorities in the IP helps to reassure stakeholders and appease the working climate within the PI. The presence of security forces alongside these authorities helps deter any attempt that may lead to conflicts.

Functioning of the IP

The operation of the IP was to organize consultative meetings, reflection, programming and evaluation of activities between all the groups involved. Structurally, two regular meetings on the planning and assessment of activities were scheduled each year. Apart from these meetings, extraordinary meetings are convened if necessary to approve the items on the agenda by the platform monitoring committee. Moreover, this monitoring committee meets once a month.

IP Capacity

As of today, the IP does not have the financial resources to support its activities. This is what explains the decline in the intensity of the IP activities and the frequency of meetings of the Monitoring Committee. Thus, the IP has been weakened by a lack of resources following the end of the ISIAE project. The IP keeps its organizational capacity and leadership. Notwithstanding the lack of financial support, the IP continues its activities on the funds of different groups of stakeholders under the

leadership of the transformation link. Also, the capacities of IP was built through the coaching and mentoring of the GRAD team under WAAPP.

The IP activities was affected by the end of funding by ISIAE, despite the enthusiasm of OP ridge tile (APESS), the backbone of IP. However, APESS, with its advocacy capacity, continues to mobilize resources from both local and international partners for the benefit of the IP. However, to deal with such situations, the issue of IP sustainable funding should be subject to special attention. The own funds of financing initiative of the activities of stakeholder groups of IP milk Banfora needs to be improved to be an example to all IP.

IP activities

To achieve the objectives assigned to the IP, the following activities have been implemented:

- Meetings and workshops: two formal annual planning meetings involving all stakeholder groups (early season) and balance sheet activities (end of season) were regularly convened;
- Experiments: many farmers' fields have been used to carry out demonstration tests, implemented through the network of producers and APESS, in partnership with the research institutions. These tests focused on crop production for food and feed use, forage crops and grinding of crop residues for animal feeding. Power tests lactating cows and artificial insemination trials were conducted in farms;
- Training: various specific training sessions were provided for the stakeholders. This training involved knowledge of milking hygiene rules, collection and transport of milk and good herd management practices;
- Guided tours: each year, guided tours around the demonstrative tests were organized, enabling other producers to participate;
- The organization of the collection: a milk collection network was established, with the creation of seven milk collection centers (CDC), which prompted the birth of the link "collection" in the chain milk value in the Cascades region. This link appears to be a developing member and IP durability.

Learning and experimentation

The operation of the PI-Milk Banfora is marked by learning by doing and experimenting. This operation has enabled contacting producers with targeted technologies, which will facilitate their adoption. The establishment and operation of collection centers (CDC) is another source of learning and experimentation of great importance. In the same context, the establishment of a supply system concentrates for livestock in conjunction with the CDC is being tested. This level of success of IP

is an indicator of the performance of the RAIPD/IAR4D approach that empowers beneficiaries in the research process for development. Indeed, with the support of research institutions, players link the production of IP-led forage production testing to the rationing of lactating cows. Among these tests, the most promising were selected and are in large-scale extension courses (cowpeas dual-use, dual-use corn). These tests were mostly the subject of student dissertations of the University of Bobo-Dioulasso.

There is an interaction between the players in the milk platform. The sharing of information is most often by the mobile phone, which is the most effective means in this context. Community radio stations (Munyu, Horizon FM, RED) also participated in the dissemination of information to actors of different groups. The president of the IP, the communications officer and facilitator are the distribution centre of information. The milk collection network also contributes to the flow of information.

The purpose of the Milk-IP Banfora is to achieve a quick impact on improving the well-being of the Cascades region, intensifying the development of the milk value chain. The overall objective of the IP is to increase daily production and processing of milk from 750 to 1500 litres in the Cascades region in every season.

The specific objectives are:

- Improving the genetic potential, nutritional and health status of dairy cows;
- Increase the capacity of milk processing units;
- Improve the visibility and consumption of milk and milk products on the local market;
- Strengthen the technical and organizational capacities of stakeholders.

To achieve these objectives, an annual business planning was performed. The activities were organized around the field schools, showcases, guided tour of the days, training and the organization of an annual promotional day of local milk and its derivatives for Banfora. This plan is approved each year by a programming meeting early in the rainy season.

Trust and respect

As to the process, the IP established a serenity environment and confidence between members of the PI. This confidence helped give credibility to the members of the IP from its partners. This trust has allowed dairy farmers to deliver milk daily to the collection centres and expect to get paid at the end of the month, in order to receive a fairly consistent amount, making them "employees" in the words of President Kossam Comoé unit. The same climate of trust between the actors has strengthened

the bonds of collaboration with ARC-Cascades and the draft development of the agricultural sector (PROFILE).

However, this trust is difficult to instill in the finance and microfinance (MFIs) institutions, despite the significant need for funding. This fact is to be credited to the IAR4D approach. On analysis, this confidence could be leveraged by the IP to finance the implementation of paid services (baling and shredding crop residues, grouped supply concentrate feed) for the benefit of the community on basic business plan. The development and adoption of team contract is an element that could further strengthen the climate of trust and mutual respect internally.

In the opinion of members of the IP interviewed, they have the feeling of belonging to a team and have collective responsibility for the success or failure of the implementation of activities. Indeed, the different groups of actors involved are aware that only their union IP has helped them to acquire so much. Therefore, the responsibilities are shared, each feeling accountable for these results. This perception could contribute to the sustainability of the IP and its gains. Therefore, we can conclude that any opportunity in this area would be captured by the IP for the development of the milk value chain.

Engagement and market orientation

IP Banfora Milk is in a fairly affluent area in pastoral resources (pasture and crop residues). However, during the dry season, the poor quality of available forage mortgage availability of milk at this time of year. Taking advantage of the collection device, the ranchers perceive increasingly the importance of milk as a regular source of income. Also, farmers undertake the complementation of cows in the dry season, so to maintain the availability of milk for this season. In this dynamic, processors have agreed to keep the price of a litre of milk up to three hundred (300) CFA francs in any season.

Taking advantage of the development of IP-Milk Banfora, the family consumption of milk was significantly reduced in favour of sale, particularly in the dry season, when production is experiencing a decline. Milk, which was once under the control of women, is about to escape. The need for milk, yogurt and other derivatives in the Cascades region have increased. Despite this significant increase in supply in processed dairy products, processing units do not record any slump. It can be deduced that milk is gradually entering the food habits of people in the region.

IP achievements

Throughout the life of the PI, vested in terms of products, skills and lessons were garnered. The greatest contribution of IP-Milk Banfora is undoubtedly in the establishment of a milk collection system to supply the processing units members of the PI. In 2015, about 362,500 litres of milk were collected from the entire network of collection points (about 1000 litres of milk per day). This milk production represents a monetary value of over 108 million CFA francs paid to farmers in the region. In addition, the processing units significantly increased their milk processing capacity and diversified the processed dairy products. Picture 1 shows milk being sieved before processing.

Thus, the milk collected in 2015 was transformed into pasteurized milk (13.3%), yoghurt (86%), cream (0.5%) and cheese (0.1%), according to the statistics provided by actors of the IP. This performance was made possible through the lobbying of the IP on the purchase price to producers of fresh milk, which rose from 100 to 150CFA/litre to 300CFA/litre in any season. The IP has initiated and facilitated, with the support of APESS and its local partners, since 2014, a promotional day of local milk in Banfora.



Picture 4. Milk beingsievedbeforeprocessing in one processing unit

Lessons learned

The actors interviewed explain that the main lessons that can be learned from the implementation of IAR4D approach through the Milk-IP Banfora include:

- A clear understanding that the inclusion of all stakeholders in the value through the IP chain improves the production and placing on the market;

- A need to initiate links or services indispensable for the functioning of the value chain (the milk collection network);
- An IP sustainability assurance when direct beneficiaries play a leading role in structuring IP (presidency assured by a transformer).

The IP operation required the flow of information at all levels of the different links in the value chain. In particular, the "transformation" link has been central to this information based on the collection points. The network of departmental representatives (APESS) with intermediaries in villages and farming hamlets were also constantly mobilized as an information tool. In the media, radio "Mugnu" Banfora has also been asked to broadcast the necessary information.

In terms of service, the milk collection system in place allowed the birth of another category of actors that are collectors. Their role has been instrumental in the operation of the IP, especially the relationship of small producers to the market. Indeed, in the past, women farmers sold their milk door to door or from market to market. Currently, all women converge at collection points with their milk to supply collectors. These provide transportation of milk to the collection points to the processing units.

Other services provided to the members are mainly the supply of concentrates for the complementation of lactating cows in the dry season and grinding of crop residues:

- For the supply of food concentrates, lobbying IP allowed to access cottonseed cake SN-CITEC and molasses SN-SOSUCO to make available to producers to support milk production. The transactions are done at collection points where producers have the option to pay in cash to collectors, or to authorize a levy on the price of milk delivered. Although the quantities of concentrates mobilized remain low for now, the process itself is already an important step towards the establishment of a clean supply system to the IP;
- With respect to the services, this is the moment to promote grinding crop residues including sorghum straw. To do this, the IP has received two versatile grinders from its partners, which are used to grind sorghum stalks at breeders. If this grinding service that has the advantage of optimizing the use of crop residues is to continue, it must be organized and intensified with private operators in the milk collection business run by rural youth. These services should be sufficiently motivating for developers and affordable for maximum profit.

In any event, it follows that the information and services are key to support the technical and organizational innovation created by the PI. This tandem is an advantage for this PI.

The operation of the IP has allowed to strengthen and create new relationships between groups of actors. The relations that have been strengthened are:

- Research institutions-producers: the IP gave a new vision of relations between the research institutions and the producers. The producers feel more empowered and the research institutions capture and/or pass a greater flow of information. Thus, in the context of the IP activities, demonstrative testing of improved varieties of dual objectives and appropriate technical itineraries of production (land preparation, organic manure, appropriate dates and technical contribution of individual mineral fertilizers, harvest management.) were taken by the middle peasants by a network of producers committed to this task throughout the APESS networks.
- Local political authorities-producers: the IP activities allowed producers, including their OP, to be closer to local political and administrative authorities. Thus, the prefect of Banfora became a regular IP Milk Banfora thanks to the good relations with the farmers of the department. Now, the communication passes easily between farmers and decentralized administrative authorities. The regional chamber of agriculture Cascades has become a full partner of PI-Milk Banfora, for which many pleas has been made towards technical and financial partners for support.
- Producers-financial and micro-finance institutions: Before the IP, the financial and microfinance institutions available locally interfered very little to the financing of livestock-related activities. Taking advantage of relations with the PI, this category of actors became interested in the activities of breeders. Assurance was given to their availability to support the IP and its actors. A reflection on the adaptation of their products to the IP activity is ongoing.
- Producers-extension agents: breeders and veterinary workers have always worked together in the field of animal health. However, the relationship in the IP framework has changed in nature. The position of farmers has been strengthened by the fact of collaboration. The IP has become for extension agents, a credible tool for the regular collection of statistics on the quantities of collected and processed milk. This gave a relative importance of IP in their eyes.

New relationships have been established:

- Producers-milk processing units: the relationship between farmers and leaders of milk processing units are the backbone of IP-Milk Banfora. It sets an exemplary win-win relationship between the two parties. This had the effect of facilitating access to forms of non-official credits to solve social problems in the individual cases through the collectors on the basis of milk production delivered to dairies;

- Producers-cow-milk collectors: the birth of the link collection was a major element of innovation. Indeed, it relieves women of long marches and improves the quality of the product collected. This is a daily relationship of trust between the collectors and breeders.

The IP has helped to build relationships with several group of actors, the most important is that of the group that links production to processing. It has a socio-technical innovation with the birth of a real chain of milk value throughout the Cascades region.

Shock and surprises

The majority of IP known to date experienced lethargy after the cessation of activities of projects that have put them in place. Banfora Milk-IP is an exception to this rule. It continues to live even after the end of the ISIAE project, though its functional intensity has somewhat decreased. The meetings are now more circumscribed between groups of direct actors (producers, collectors and processors) who meet regularly enough

Equity in the distribution of costs and benefits

According to the IP stakeholders, it would have benefitted all groups of actors at different levels:

- Producers saw their incomes rise and their welfare improve by establishing the "collector" link in every season by the recovery and stabilization of the milk purchase price to the producer (CFA 300 / litre in all season) and by the existence of the opportunity to receive advances on delivery to meet social imperatives. These various advantages have attracted many farmers settled in the area to join the APESS network and IP-Milk Banfora;
- Transformers receiving regular milk could increase over time the quantities of milk processed and consequently their revenues and profits;
- Resellers (shops managers, power supplies and kiosks) that regularly increase their turnover;
- The public carriers that distribute dairy products to secondary cities in the region and the city of Bobo-Dioulasso;
- Consumers who continually receive various dairy products enhance their dietary habits and improve their nutrition;
- Finally, the regional office of APESS was strengthened in its role of peasant organization for the livestock development through the strengthening of its technical capabilities in leadership and advocacy. APESS has a good reputation and is well sought after increasingly by other PIs to share its experience at both national and sub-regional levels.

On analysis, it can be said that the distribution of benefits generated by the IP is fair to all points of view. Each actor has enjoyed the IP proportion to his commitment and objectives.

Sustainability

Any multi-actor innovation platform sets goals to achieve in its operation process. These objectives may appear at some point, but satisfactory sustainability of benefits can be thwarted. Experiments have shown that when the platform is introduced by a project, it has a certain dynamism to the end of the project. This dynamism can sometimes disappear at the end of project activities. This is explained by the fact that the project has a maintenance fund operation (management fund), unlike a platform that is supported by the actors themselves. With regard to the sustainability of the platform, the following were noted: a) the need to develop a system of "wage" for farmers, b) the participation of members involved in the IP in various activities without requiring a disinterest from the IP, c) the quest for improving the daily production of cows, d) development of a system of collection and transport of milk, e) the establishment of a flexible loan scheme to support IP members in major social events (weddings, baptisms, funerals).

Future innovations

IP allowed the birth of a true milk value chain in the Cascades region. Also, in order to intensify the development of this system, players are considering the establishment of a network of dairy farmers that serve as examples to farmers in the area. They also intend to develop a supply system of feed concentrates annexed to milk collection points.

Practice of Integrated Agricultural Research for Development

BanforaMilk-IP is an experience of successful implementation of the IAR4D approach promoted by FARA and stimulated by CORAF / WECARD. In this business, actors have learned to fully play their roles by focusing on their mutual interests, while respecting the interests of others, allowing the IP to realize the necessity of raising a link and integrate within it. All links in the value chain benefit from the fruit of research and bring back the knowledge to do. PI-milk is considered by stakeholders as an instrument of local milk value chain governance in the Cascades region, and as a revenue generating instrument (producers, breeders, processors and transporters) for dairy products (the consumers).

Conclusion and Recommendations

After more than three years of operation, the results of the Banfora milk IP are convincing in terms of positive impacts on beneficiaries. The milk Banfora platform presents an acceptable and copy operation. This operation contributes to improving the living conditions of members of the platform, due to the increase and stabilization of milk selling prices. Indeed, the milk selling price per litre was between 125 CFA and 150 CFA before the platform. But with the platform, the price rose to 300CFA throughout the year due to the growth observed in production costs and the expression of needs resulting in strong demand.

The platform could establish a "salaried" system for milk vendors through a monthly financial plan. Thus, based on the minimum amount of 5 litres of milk per day, the producer may receive 45,000 CFA as salary per month. Also, beyond the mandatory 5 litres, the producer may, without waiting for the end, recover revenue surplus to its needs. Some of them sometimes receive a salary of 100,000 to 150,000 CFA in periods of high milk production. This performance of the platform even debauched the largest producer of milk in the 2014 campaign (SN-SOSUCO). This SN-SOSUCO worker opted to focus on the development activities of the platform, which are much more profitable and less hard-wearing and painful compared to his position at the sugar company. The president of the IP also confesses that large milk producers have reached a certain economic ease as they prefer to receive their full due monthly just as public sector workers. According to the results of the focus groups and direct observations, one can say that the living conditions of the beneficiaries have relatively improved. This resulted in the acquisition of motorcycles, weddings, baptisms, improvement in the quality of food, the construction of houses and improving working facilities for processing units (utility vehicles, drilling, equipments). There should also be noted the creation of new jobs to support the increased load of work in the processing units.

IP Milk Banfora can rejoice today to have introduced a system employed in trade between processors and milk producers. This innovation was not an original idea of the IP, but was born with the strengthening of knowledge and experiences of members of the PI.

IP Milk in its operation considered acquiring vaccinators for its members. In the area of partnership, it intends to formalize contracts with financial structures to finance the development of the links in the value chain. Then the development of a contract with carriers to convey milk collection points to the processing units, and to supply back collection points and wholesalers of processed products is underway. Finally, to allow the start of an economic boost to the community, discussions are underway to

expand the market. In fact, a significant room for improvement exists in increasing milk production by improving the feeding the cows and their production potential, by improving the quality of milk and finally the expansion of dairy market with the label "PI-milk Banfora."

In terms of outlook, we note that the current vision of the IP does not give it a high level of professionalism and innovation. The IP through its actors are trying to climb the ranks of confirmed platforms. This update on results gives the following prospects:

- Regionalization of the IP to expand its coverage area through the incorporation of the province of Leraba, which also has a significant dairy potential;
- The creation of additional collection points across the region to facilitate the dissemination and adoption of these innovative initiatives;
- Establishing mechanisms with the assistance of researchers to increase daily milk production by improving the production potential of the cows;
- Improving the quality of milk by training farmers and modernization of processing units;
- The development of a win-win partnership with financial institutions in order to increase production capacity, processing and milk collection;
- Finally, the development of exchange of expertise with other IP in the sub-region to be both efficient and effective.

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Appendix

IP Name	Kilichi of Koupela	Maize	Milk
Entry Point or VC	Kilichi	Maize	Milk
Innovations (technical or social and economic innovations)	Technico-economic	Socio-technical	Socio-technical
Location	Koupela/Kourittenga	Leo/Sissili	Banfora/Comoé
Intervention areas (regional/province /district)	Kourittenga Province	SissiliProvince	Comoé Province
IP webpage:			
Participating villages	All villages from the Kourittenga Province	All villages	All villages
Date of IP establishment	2014	2008	2012
Institutions setting up the IP	INERA, IRSAT	INERA/DONATA	APESS
Funding agents	WAAPP	AGRA	WECARD/AusAID, APESS, PAPSA project
Number of years of activities on the ground	3	8	4
IP is still active or not	Active	Active	Active
Facilitators (names and contacts)	KERE Alphonse	Korhogo Mahamoudou, +226 76 46 82 17, mahamoudou_korgho@yahoo.fr	Tall Idrissa, +226 76 24 70 00, tall.idrissa@yahoo.fr
IP members (regrouped by VC actors and sectors)	Extension agents, breeders, Kilichi processors, microfinance (Caisse populaire, Bank of Atlantic), WAAPP project, local policymakers, input dealers	Producers, transporters, traders, advisors, research, processors, policymakers, Finance & micro-finance (Caisse Populaire, EcoBank, Atlantic Bank)	Producers, traders, technical advisors, research institutions (INERA and University), milk processors, local policymakers, inputs dealers, finance and micro-finance (Caisse populaire)
Opportunities addressed	Market issues for valorization of the high potential of meat in the Region	Market issues for valorization of high potential maize production in that area	Market for locally produced milk
Achievements to date	Improvement of Kilichi packaging, credit access facilities, capacity building on hygienic aspects, visit in Niger	Farmers trained on good agricultural practices, warrantage for maize ranting system, infrastructures	Setting up milk collection network, guaranteed milk price, capacity building, cows diagnosis for brucellosis and tuberculosis diseases

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Challenges	Contractualization with animal fattners, market access improvement, quality label	Financing actors meetings, development of maize grain processing, efficient insurance system for maize production	Breeders capacity building on quality fodder production and management, milking cows management, internal resources mobilization, infrastructures and equipments issues
Sustainability issues	Local actors engagement	Dynamicfarmers' organization (FNZ ex-FEPPASI)	APESS involement, strong leadership of the milk processors and regional agricultural chamber
Phase in IP process (initial, maturity, independent)	Initial	Independent	Maturity vs independent