

The Inclusive School of Collective Learning

Clément Gbêhi, Simplicé D. Vodouhè & Hariane Gbêhi

Ladicom/FSA/UAC

Simplicé D. Vodouhè, Ladicom/FSA/UAC

Hariane Gbêhi, Ladicom/FSA/UAC

ABSTRACT

How women actually are collectively learning new knowledge in practice, and the constraints they are experiencing? Based on an analysis of three contrasted small scale cassava processing cooperatives, this article traced how women allow and mediate emerging critical events when applying new measures and collectively learned about, by analyzing archives data, following and interviewing; and observing in real time those who are closely involved in collective learning processes. Evidence proves that collective learning women were experiencing with the traditional system of cassava processing have taken a new translation with the promotion of two days of cassava processing (instead of six or seven days traditionally assigned in cassava processing) and the use of improved garifyers. However, important critical challenges emerged. These are economic, technical and political support. Mediating these challenges did not pose serious problems since women deployed ideas and assembled social representations relevant to enforce arrangements. Collective learning then entails consideration and incorporation of the local socio-cultural models during the application of the new measures, and which require to be merged with emerging critical challenges. Further data analysis prove how women collectively change strategies that governed the puzzle of their life *vis-a-vis* cassava processing; and on the basis of which they considered emerging challenges and applied solutions.

Keywords: Cooperative, cassava processing, inclusive school, collective learning, knowledge, challenge, Bénin.

1. INTRODUCTION

This article reports on collective learning among women members of small-scale cassava processing cooperatives in Benin. It begins from the observation that women move between cooperative and private small scale processing industries; and work for both cooperatives and themselves. Along these activities, women spend relatively short or long time performing tasks as well as sharing ideas in concordance with the different steps during processing; but also they promote new technologies or research results acquired during training sessions. Linking women with different capacities and abilities expose them to collective learning opportunities, as they develop new behaviors and attitudes, and work together in solving emerging problems and supporting learning needs [6, 53, 58]. In this interaction, women assess information, and increasingly update and create new knowledge through dialogues or discussions, and daily practices. However, the tasks performed remain individual whether in private or in cooperative cassava processing industries. In this perspective, how collective learning actually emerges and to what extent does collective learning affect women's individual skills remain unanswered.

Recent studies have provided numerous insights on collective learning and the promising way to support new knowledge production and development. Some socio-anthropological and psychological researches have highlighted the participatory and demand-oriented models, and focused analyses on the arrangements in which women working in team or in group for common products learn from each other [11, 2, 39]. Because women are encapsulated in collaborative interactions and reflective dialogues, the exchange of information and the discussions during the achievement of activities foster collective learning, and induce changes in practices and beyond the space-time of agro-food processing cooperatives. Collective learning is also approached as dynamic relationships between women members of cooperatives in the construction of networks that create and increase available new knowledge and adapt it to local constraints and opportunities [28, 55, 54, 15].

Most of these studies analyzed collective learning as both a process and a product. For example, [2] studied collective learning and critical events which impact the promotion of new knowledge, approach and ideas across individuals who strive for joint or collective products that emerge from the process; [15] explored the various forms of social learning and provide insights to sustain collective learning where the intended outcomes and the processes are collective; and [28] examined the process through which youth cooperatives promote collective learning while generating collective knowledge, leading to new ways of thinking and action, and the effects of learning on the cooperatives. Core component of these analyses is the fact that collective learning takes place during interactions between economic agents, through dialogues, negotiations, organizations and managerial procedures.

Based on an analysis of three contrasted small scale cassava processing cooperatives, this article focuses on how women are collectively acquiring new knowledge in practice, and the challenges they are experiencing. As women in cooperatives are different in terms of dynamic, experience and knowledge management, skills in input and output market development [32-33, 69], collective learning is an inclusive school. In this paper, we critically examine the various resources deployed to build together and to make effective the promotion of the new knowledge in response to emerging challenges. We focus on collective learning in practice, disregarding individual learning in private small scale cassava processing industries which emerges in a different school.

Inclusive school is an alternative approach of collective learning that emerges from the late 1980s in the formal education systems [40, 69]. It is defined as the specific learning space in which participants with disabilities (also called novices or learners; see for example [48, 9, 44]), learn through interactions with others named “experts” in workplaces. It increases access, participation and opportunities to learn for the participants. Small-scale cassava processing industries are inclusive schools to strengthen the capacity and meet the diverse learning needs of all members of the cooperative including those with low level of proficiency of knowledge: the management system in place facilitates access to and improvement of new knowledge, and reduces knowledge inequalities between women, or what [14] calls “intellectual racism”. Inclusive school fosters motivation, autonomy, commitment,

participation and mutually constitutive and responsive interactions [1, 16, 61]. Because of its positive impact on behaviors, inclusive school is considered here to illustrate collective learning from the challenges of promoting new knowledge, and of incorporating social representations in the process and the outcomes of learning.

We then demonstrate that collective learning involves the assessment of emerging constraints, the facilitation of meaning and shared understanding, and the implementation of appropriate solutions. [43] suggests that these processes be considered as translation of new knowledge, that is, a set of mediations produced in interactions through shaping and facilitating diverse ideas and interests, and which affect positively collective learning. In this, some entities felt the need to change their behaviors and attitudes [3, 44], displace and transform conflicting interests into opportunities [30, 43]. Lastly, they are able to reach new knowledge, act on behalf of, and advance other actors enrolled in collective learning [8, 47, 51]. In the small-scale cassava processing settings, women deemed necessary and relevant, the productive resources deployed (economic, technology, symbolic, social representations, etc.) and activities carried out that fit in easily with each other, are key elements of the dynamics of knowledge production and development, and collective learning.

The section that follows outlines the methodology. The focus is on the selection and the background on the small scale cassava processing cooperatives followed, and the changes in the conventional technological diagram. It also outlines the methods of data collection and analysis. The subsequent session presents the main findings, and ends with a discussion on the theoretical and policy implications in connection to the debate on inclusive school and their role in strengthening collective learning. It is assumed that these implications are not only important for policy-making in Benin, but also for most developing countries where women cooperatives are playing effective roles in processing activities and value chains of agricultural crops. This article concludes with suggestions on collective learning in small scale processing cooperatives and industries.

2. METHODOLOGY

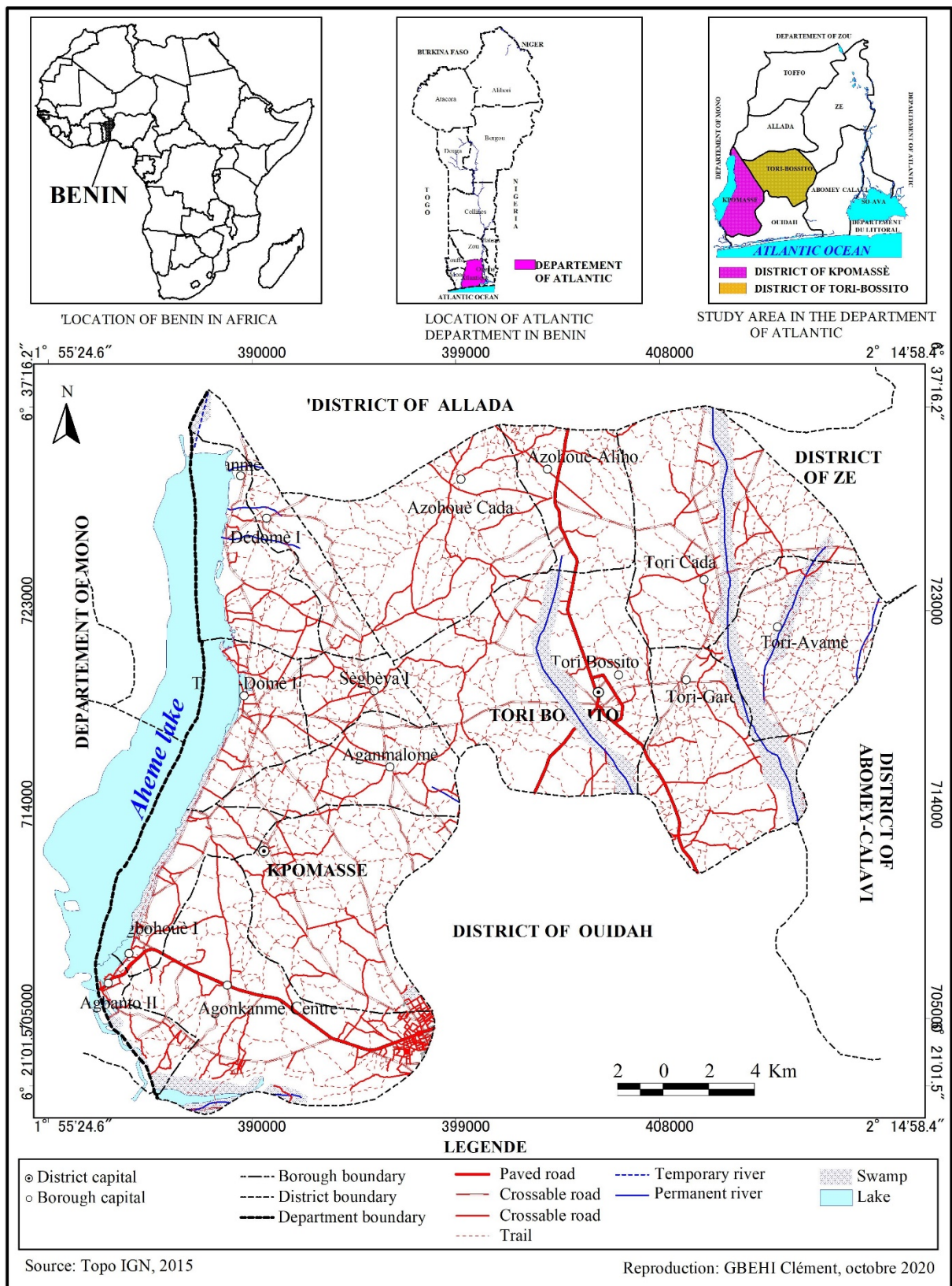
According to [34], in-depth understanding of collective learning implies the collection and analysis of data with regard to actors' ideas, shared interests and activities, and entails an approach that challenges biases such as the effectiveness and the boundaries of actors' own behaviors and skills. One methodological approach to deal with is to investigate and follow actors or those stated as main "actants" [7, 43]. As actors are considered to put into practice their own knowledge while completing activities, following them appears appropriate to observe how collective learning emerges through process of translation [66, 59]. Analysis reported here builds on this methodological approach.

2.1 Selection and Background on the Small Scale Cassava Processing Cooperatives

The first step in the methodological approach is to select which actors to follow for the tracing of their trajectories (Jackson, 2015; Fioravanti and Velho, 2010). "Actor" is understood not only as an individual, an organization, a group of persons, or an institution but also as a pattern of network of relationships, or an effect produced by such a network [8, 50, 45]. Thus, the strategy used fits in [59] supplemented with

[49] requirements for the selection of actors to investigate. In fact, to follow the role an actor can play during translation, [59] advises to consider “source actor” (being translated), “target actor” (being translated for) and “translating actor” (translates both source and target actors). Additional insights are gotten from Long who suggest to take into account not only the scientific concerns initially conceptualized - for example, participation in activities, shared resources and interests, taking responsibilities and control over changes, capacity to create new knowledge, development of interactions and relationships - but also the observed changes and the experiences of key stakeholders involved in the coordinated activities. [49] points out that selecting actors based on the later could allow the collection of relevant responses and even the reformulation of many initial questions.

We then selected three small scale cassava processing cooperatives, observed and investigated their trajectories when completing activities. The three cooperatives are *Toffa*, *Sedjro* and *Sonagnon*. These cooperatives are located in the rural towns of *Tori-Bossito* and *Kpomasse*, South-West Benin (See map 1). Institutionally, they are different: *Sèdjro* and *Sonagnon* were recently created in 2016 and 2014 respectively; and registered with regard to the new regulations of the “Organization for the Harmonization of Business Law in Africa” (OHADA). The first cooperative is a simplified cooperative society (SCOOP-S) with two committees, the “management” and the “board of directors”; while the second sets as a cooperative corporation with a board of directors (SCOOP-CA). Main activities developed involve the production of “*gari ahayoue*”, a high quality cassava flour valued by urban populations of Cotonou, Lokossa and Porto-Novo, Southern Benin.



Map 1: Study area.

In addition, cooperatives have partnered with “Alitech”, a local enterprise which exports *gari ahayoue* within West-Africa (Togo, Côte d’Ivoire, etc.), Europe (France,

Italy and Germany), USA and Canada [20]. To get access to Alitech market, women within the cooperatives are invited to introduce two major changes in the cassava processing: two days of cassava processing (against six days in the traditional system) and the use of improved garifyers made of stainless steel material. These changes can be successful as results of the creation and dissemination of new knowledge, if constraints are challenged (Figure 1).

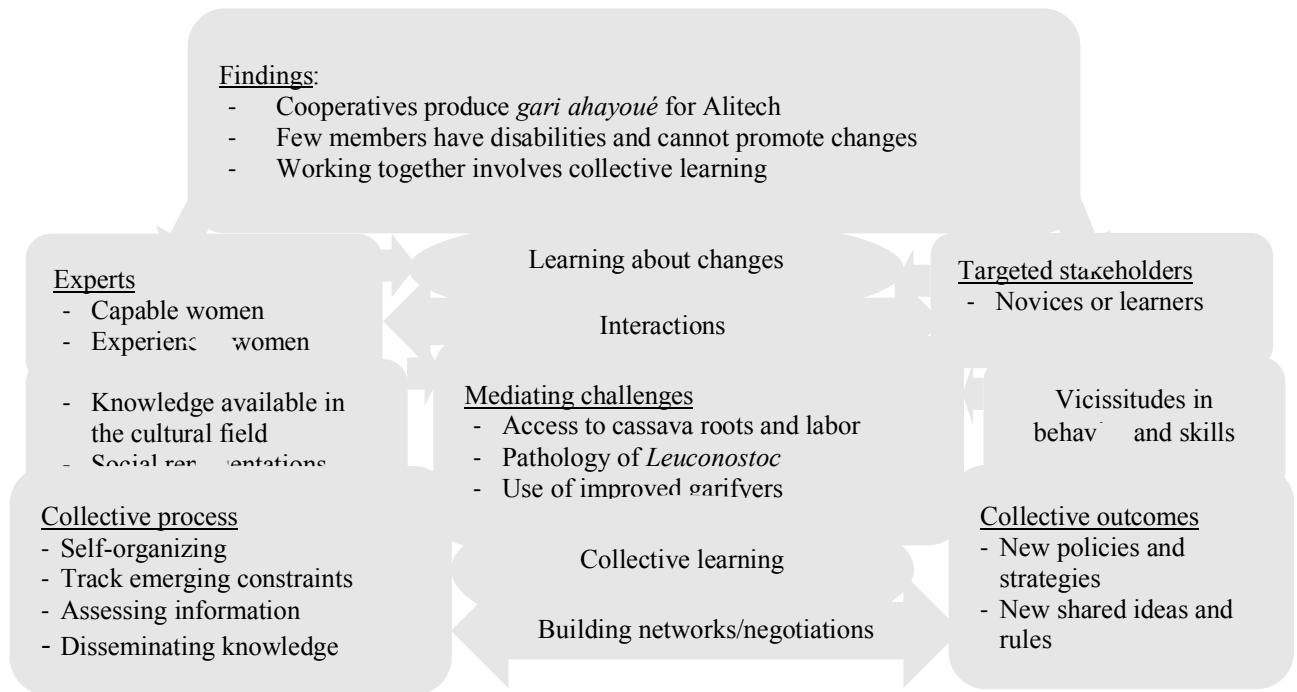


Figure 1: Conceptual framework for research findings and questions

Source: Authors.

2.2 Data collection and analysis

With this background in mind, we then traced how women allow and mediate emerging critical events when applying new measures and collectively learned about, by analyzing archives data, interviewing and observing in real time those who are closely involved in collective learning processes. These data collection process and sources are expected to enable following women and understanding the process of translation [56], and match with key requirements of qualitative research [65]. The following Table 1 details data sources used for this study. First, we collected and analyzed relevant documents such as diagnosis study reports, evaluation and progress reports of projects (2-Scale, US-ADF), meetings' reports, and records of accounts and human resources management of the cooperatives. Accounting and human resources management records are of particular importance as they provide data related to the socioeconomic characteristics of women; for instance, among others, age, educational level and years of experience in small scale cassava processing.

Table 1: Main data sources used in this study

Cooperatives	Interviews		Observations		Document analysis
	Number	Informants	Number	Phases	
<i>Toffa</i>	4	- One leader - One team-manager - Two other members	2	- Harvesting - Peeling - Grating - Fermenting - Pressing	- Diagnosis study reports - Project evaluation reports
<i>Sedjro</i>	10	- One leader - Three team-managers - Six other members	3	- Sifting - Garifying - Cooling - Sieving - Packaging - Storing	- Meetings' Reports - Accounting and human resource management records
<i>Sonagnon</i>	8	- One leader - Three team-managers - Four other members	3		

Source: Authors.

The analysis of documents was supplemented with the one of the contents from 22 in-depth interviews conducted with women members of the three cooperatives. Interviewed informants include leaders of the cooperatives, teams-managers, and the other members of the teams. The interviews focused on the mutual and competition interests (involve and fell responsible for collective decisions, responsibilities taken and effective control, exercise influence) and governance (right to speak or express viewpoints, management system), the arrangements for the application of gathered information (shared ideas, joint interpretations, consequences); particularly, the practices as well as the mechanisms for interpreting new knowledge that determine the effectiveness of the different phases of cassava processing, and the quality of the *gari ahayoue*. During cassava processing, as [57] put it, women consider and assess information on the high quality cassava flour and competitive markets, and then adapt their practices. Accordingly, informants are asked to expand on the information provided as they relate to the developed knowledge and collective learning.

To improve our understanding and the quality of the research, additional data were taken from 8 participant observations, as one of the author participated to the cooperatives' activities for six months (from April to October 2018), observed and participated in day-to-day cassava processing. She also learnt and collected data about shared narratives on the different phases of cassava processing, women behaviors and attitudes in the social context, constraints they are coping with in applying the new knowledge and the changes promoted to overcome these problems. Critically, such supplementary information allowed us to triangulate with interviews and documents' analysis [63, 38], and fits in with the validity of the qualitative studies [22, 19].

The analyses are based upon the approach developed by [45], which focuses on the examination of the critical events; that is, events mentioned as important by several informants. First, actors and translation actants involved in collective learning are identified and interpreted. Second, plausible interactions and relationships and the negotiated margin of manoeuvre are described. In this, collected statements are reexamined, models of support are defined and stories about success and failures in collective learning are refined. All materials as well as analytical viewpoints are brought together around the journey of the collective learning, and feedback meetings are organized and discussed with members from the cooperatives.

3. RESEARCH FINDINGS

Women involved in small scale cassava processing have experienced many times the application of the new measures required to get part of Alitech market. They explained the demand and the incentive prices of *gari ahayoue* (0.50 \$ - against 0.25 \$ in the local markets) as central in stimulating their motivations. Furthermore, women argued the most important collective learning experiences since they partnered with Alitech, highlighting how they have created and disseminated new knowledge. In total, three experiences of collective learning are reported, including the shaping of a new technological diagram, the structuring background of information available in the cultural field and the building of expertise during the use of improved garifyers made of stainless steel material for the production of *gari ahayoué*.

3.1 Shaping New Technological Diagram to Conform to Two-Days Cassava Processing

Most women perceived the conventional diagram as part of their life. In this, each component has a greater or lesser importance, such as the productive resources (cassava roots, labour, knowledge and materials), the sequence of steps or operations and the duration which last six days; all these components fit in together to result into *gari ahayoue*. They mentioned that shaping new technological diagram through the adoption of the two days cassava processing is experienced as an event that disrupted the traditional processing system; but also as an opportunity that led to the development of new knowledge. Data analysis provides evidence that “shaping” could be understood as the process of conforming the conventional diagram to two-days cassava processing. The process was perceived by women as comparable to “collective learning” because they collectively questioned many of their usual behaviors and skills; and also, they deployed appropriate approaches that could match with opportunities to access labour and cassava roots.

Access to labour and cassava roots appeared to be a major challenge, as one respondent commented on, “it is a real concern in this sense that Alitech orders twice between March and September for 10 bags of 100 kg each to be delivered within two weeks. To fulfil such a quantity of *gari ahayoué*, the cooperative needs 2 ha of cassava fields and 40 man-day labours. In this period, cassava fields are scarce and expensive, and most women are in their fields”. As the results proved, women within the three cooperatives discussed this challenge and crossed with recommendations by Alitech management manuals. The most striking agreement that resulted was self-organising. One of them explained: “on the first day, harvesting as well as peeling, washing and grating are collectively achieved; cassava

mash should also be put into a clean bag and tied for fermentation. On the second day, work-teams of five women are formed: two women for pressing and activating the fire for toasting; one for sifting; and two for garifying". This approach deployed to ensure and facilitate effective participation of all in tasks completion, is similar to the one developed by women members of agricultural cooperatives for food crop fields, and reported by [12]. In this process, all women sometimes do things collectively; but other times, they put automatically in place team-works according to the tasks to be done, and accomplish either individually or together within the work-teams. This has implications for the collective learning models at work: individual learning within the collective or learning in social interactions.

Women within *Sèdjro* acknowledged learning in working teams as important in knowledge sharing behaviours and collective learning because the approach they discussed and put into practice emphasized collective delivery of the demand to Alitech through team-works. Established work-teams are headed by women with significant experiences. These women organized monitoring over the functioning of the work-teams to foster effective participation through discussing, sharing and applying knowledge, which is, according to [15], a suitable support for learning in social interactions. Members of the team-works recognised the prominent role the well-known women took, explained in part the success in tasks completion; except one woman who indexed individual expertise and collective coordinating. This exception consistent with observations by (2).

In *Toffa* and *Sonagnon*, it was the other way around. Interviewed women mentioned that the demand by Alitech was divided into proportion: 1/5 and 1/3 respectively were attributed to the cooperatives, and first of all achieved through team-works; while the other part was distributed among individual women. This suggests that individual responsibility dominated the delivery of the *gari ahayoue* in these two cooperatives. The reason why this strategy was adopted is that cooperatives themselves have limited access to labour and cassava roots. Paradoxically, individual women have the capacity to deliver in time *gari ahayoué*. Within *Sonagnon* for example, capable women shared information about labour, basically originated from their households, and available fields of cassava, which are considered; and quotas were consensually allocated based on accordingly. Similar procedures were adopted in *Toffa* with the difference that it is merely the leaders who take individual responsibility for the delivery of the *gari ahayoue*; but they mobilized mainly and hired experienced members of the cooperative.

Not only did capable women confront the short duration cassava processing, they also reached the target of the quality of *gari ahayoué*. One woman stated, "I experimented together with experienced women the two days cassava processing and succeeded; but my bags had already been rejected several times and returned; what I did was to sell in a local market, but at a price lower than what Alitech offers". Experienced women recognized that the strategy matched with their initial expectations; that is; collectively learning about the constraints imposed by the application of the two-days cassava processing. It also allowed saving times for other income generating activities. Yet, they could not clearly highlight if collective knowledge acquisition took place in a sense that they discussed and exchanged ideas and understandings. In this context where team-works did not reflect the common quality products, collective learning seems to be limited. This finding is interesting

as it questions the activity system which matches work-teams with social structures in which individuals learn and work together [48]. Evidence reveals that when compared to *Sèdjro*, collective responsibility appears to be critical for the effectiveness of collective learning.

3.2 Structuring Background of Information Available in the Cultural Field

While women in the cooperatives were progressively adapting themselves to the short duration processing, an important event appeared during cassava fermentation: the emergence of *Leuconostoc mesenteroides*. Both *Toffa*, *Sonagnon* and *Sèdjro* cooperatives were experiencing this pathology that disrupted women behaviours and skills. One capable woman stated: “the first time was unexpected because I had never experienced such a phenomenon: while the other members of the team-work and I should press and then sift and toast, we observed that the smooth mash presents a sticky appearance and yellowish color”. This situation was a constraint with respect to the short duration processing as well as the texture and organoleptic qualities of the *gari ahayoué*. When women compare to the traditional cassava processing that the grating is continuously dewatered during three to six days, they attribute this critical challenge in part as the consequence of the two-days cassava processing.

The approach developed to overcome this involved the background of information available in the cultural field. Women exchanged and discussed first information about this pathology. Capable and experienced women alike mentioned that it was only through these discussions that many learnt that this phenomenon emerges only from cassava roots collected during the dry season (between January and March); but more leaders read through fields where cassava stems are partially or totally burned by bushfire. [55] terms the latter as “pyrolysis”. Even if most respondents did not explain convincingly, they pointed out the denaturation of the starch contained in the cassava roots. According to [4], such a denaturation increases the sugar level by breaking the starch chains which gives some fractions of glucose, easily attacked by *Leuconostoc*, bacteria responsible for the glutinous nature of the grated mash. As Table 2 details, some structuring common-sense ideas are generated and applied.

Table 2: Structuring common-sense ideas generated

Component	Scientific names	Part used	Application mode	Level of use	Cooperatives
Oil palm + Hysop	<i>Elaeis guineensis</i> and <i>Newbouldia laevis</i>	Palm nuts + leaves	Introduced into the grated mash	+++	<i>Sèdjro</i> , <i>Toffa</i> <i>Sonagnon</i>
Pineapple + Hysop	<i>Ananas sp</i> and <i>Newbouldia laevis</i>	Leaves	Introduced into the grated mash	+	<i>Toffa</i> , <i>Sonagnon</i>
Alum	<i>Alum potash</i>	Mix alum and water	Spray the grated mash	++	<i>Sèdjro</i> , <i>Toffa</i> <i>Sonagnon</i>
Cowpea	<i>Vigna unguiculata</i>	Seeds	Introduced into the grated mash	+	<i>Sèdjro</i>
+++ : Strong; ++ : Medium; + : Weak.					

Source: Authors.

Women reported that “when they applied, grated cassava paste becomes less sticky and changes, and turns white (meaning that the pathology is challenged); while introduced leaves have a boiled appearance”. In fact, these were some forms of collective thought and knowledge oriented towards understanding and controlling the perverse effects of *Leuconostoc*, which is being challenged. Leaders within *Sedjro* and *Sonagnon* cooperatives commented on arguing the importance of the observations of the grated mash in which relevant information are collected and interpreted, for example “the roasted or boiled cassava tubers which look sticky the next day”. Similar clarifications were made on cooked meat as soon as it begins the rotting phase. In both case, solutions deployed to challenge these pathologies are one of those presented in table 2 above, with differences in terms of application modes.

With regard to findings of [5], these explanations suggest that the ideas generated are evidence of the interpretation of the experiences of everyday life; thus deriving effective solutions that help to face the disturbing trend. Women seemed to appreciate the knowledge developed that adds to their learning. One stated “...would certainly never learned from the diversity of solutions to this pathology if they were not working collectively”.

3.3 Building Expertise During The Use of Improved Garifyer

Another important change that women learnt is the use of the improved garifyer made of stainless steel material. Most Alitech management manuals provided arguments that this improved garifyer drives the heat more easily and faster when the fire is activated. However, when women learnt about it, they came to differing conclusion: the improved garifyer reduces the heat more easily and shortly once the fire is turned off. In the first case, the *gari ahayoué* grills with black color, and therefore, of poor quality; whereas in the second case, it loses its crispy nature, presenting rather the appearance of fine flour, likened to powder. For women, there is no doubt, their preference is in favor of garifyer locally made by craftsmen, even if it is criticized for the presence of dust in the *gari ahayoué*. To further support its argument one of the women explained that, “if it is accepted that the intensity of the heat shapes the uniform size of the granules, then the improved garifyer do not allow an important quantity of *gari ahayoué*; while the garifyer locally made of clay is more muddy, drive moderately the heat, and more suitable to get good quality regardless of the intensity of the fire”.

However, as the use of the improved garifyer is a critical recommendation to get access to Alitech market, women within team-works developed ideas structured around the management of the heat throughout garifying. The first relates to the control of the intensity of the fire through the reduction of the firewood used as heat source. One experienced women explained that toasting is a critical operation that required the development of specific knowledge and expertise. They reported that the use of the improved garifyer makes roasting more difficult and painful when compared to that locally made with clay pans, because of the heat released and the smoke that women have to endure. Like the challenges above, women recognized the drive of exchanged information and shared ideas. The approach developed to manage the heat include basically a self-organization articulating two women for pressing whilst controlling and activating or turn-off the fire on demand by women who are stirred constantly the sifted cake with a wooden paddle.

Data analysis also reveals that depending on some observable characteristics, experienced women gradually adds small amount of crumbled cassava grater. Those women stated however that the addition is not automatic, and requires some exceptional expertise; that is; it is up to them to determine the appropriate moment, a moment that depends on for example the humidity level of the sifted cake being toasted, the color change from white to cream and the crispy hand feel of the grains. Women hammered with consideration that these characteristics must be well and constantly controlled in order to toast a high quality *gari ahayoué*.

4. DISCUSSIONS

4.1 Mediating Challenges and Implications for Collective Learning

From the analysis above, it appears that the three cooperatives investigated in this article are comparable to schools driving for collective learning, with women promoting changes in the small-scale cassava processing, and therefore creating, sharing and disseminating new knowledge. The main question that oriented the investigations was how women actually are collectively learning new knowledge in practice, and the constraints they are experiencing. In the following, we provide answer to this and discuss the findings.

First of all, it clearly appears collective learning has been the subject matter of renewed interest among agricultural scientist [52, 27, 39, 53, 17, 23]. Collective learning also afforded comparable prescription in the literature concerned with sustaining high quality in formal education system [67, 35, 36]. Like participatory diagnosis, network building, negotiations and flexibility, collective learning is linked to fresh insights on innovation effectiveness. Recent researches elsewhere term these processes as intermediation and communicative supports for bringing about effective knowledge production and development, and matching appropriate solutions to experienced constraints, catering for diversity, articulating the support of leaders and fostering co-evolution of technology change and institutional change, [26, 26, 24].

Evidence proves that collective learning is also a major concern for women within the three investigated cooperatives, particularly when they are coping with changes in their day-to-day practices, including behaviors and skills. This was evident in the testimonies of many women who explained how the adoption of the new technological diagram to conform to the two days cassava processing and the use of the improved garifyers have catalyzed their engagement in collective learning. As [46] highlighted with respect to the promotion of new knowledge, “not only do different matters become important, such as shared information on organizational and technical solutions, and the perspectives and positions of those involved; but also the effective application of the new knowledge requires feedback on the effectiveness of practices, as well as information on whether or not other follow the agreements and arrangements”. Moreover, awareness and interests shaping women’s behaviors and skills in collective work-setting are considered as critical dimensions.

Nevertheless, analysis suggest that when collective learning is considered as an intermediation process that supports knowledge creation and grants women with the opportunities to apply new practices, important critical challenges emerged. The

first is economic, mediated in terms of self-organising including the distribution in proportion of the amount of *gari ahayoué* demanded by Alitech through team-works or capable women who can mobilize in time the needed quantity of cassava roots and labor. These are recognized as determinants in cassava processing. Subsequently, a technical challenge has to do with the application of the two-days cassava processing and the use of improved garifyers. Lastly, a set of political supports arise and be translated through the incorporation of knowledge available in the cultural field to treat emerging pathology that results from *Leuconostoc* and constraints related to heat management during garifying. Mediating these challenges did not pose serious problems since women deployed ideas and assembled social representations relevant to enforce arrangements. In a retrospective testimony, women comfort the reliability of shared knowledge and challenges.

Evidence particularly reveals that promoting collective learning entails consideration and incorporation of the local socio-cultural models during the application of the new measures, and which require to be merged with emerging critical challenges. Mediation, understood here as “a flexible procedure deployed to solve emerging constraints”, appeared as a determining component in this process as well as in the re-examination of the initial positions of the novice women and the change in behavior. Obviously, there are numerous interventions in recent education, environment, human health, well-being and livelihoods studies that failed to proceed in this way, which explains in part the reasons why many technologies or new knowledge exchange collapsed [67, 31, 60]. Academics and policymakers alike considered the encapsulation of the local socio-cultural models as fundamental component in innovation effectiveness [12, 23, 39]. In addition, the new knowledge that came out and was shared by women in interacting with each other opened up new avenue.

Women recognized that these mediating challenges provided opportunities and acted as forces stimulating the creation of new knowledge which took place among them through interactions; however significantly affected their daily practices. They also argued the success of the application of the new technological diagram as the result in the changes of many of their values and norms that are underlying the conventional cassava processing. In line with findings from recent learning theorists [53, 28, 23], this result suggests that the transfer approaches could not sustain collective learning, as it distort knowledge from supporting women experiences and day-to-day practices. Instead, the result agrees with [48]’s assertion that knowledge creation and dissemination are modeled and shaped by the social environment support in which it has new understanding and meaning accepted by those involved. The result put into evidence how new knowledge is built out of the available local resources for cassava processing, in particular the social representations convened to reduce the impacts of emerging pathology and constraints. Further data analysis prove how women collectively change policies and strategies that governed the puzzle of their life *vis-a-vis* cassava processing; and on the basis of which they considered emerging challenges and applied solutions.

It is also important to observe that new knowledge production and development are not only configured in the cooperatives, but also that of individuals in cassava processing industries. For example, capable women within both *Toffa* and *Sonagnon*

cooperatives asserted that mediating challenges provided not only learning spaces generated about the two major changes promoted, but also the new tracked knowledge is reproduced and translated during the individual processing industries. The later appears critical on the eyes of the capable women who explained that they “*bathe in the smog*” with the improvement of the knowledge acquired during collective learning. Capable women hammered cassava processing as the first-order learning space or inclusive school, subject to less constraints. However, individual learning is not going to change collective learning, but it will add to it.

It was relevant to note here some evidences of translation [43], though some mediating challenges (mobilization of cassava roots and labor, pathology with *Leuconostoc*, use of improved garifyers) are ongoing while others emerge as one-off. The observation prove that leaders including experienced women become aware and track emerging constraints, and consider appropriate approaches to address them. Some discussions inside the cooperatives about such approaches are also fulfilled to establish shared interests and collective outcomes. Subsequently, they comforted and coordinated the commitments; and so mobilizing other members of established work-teams. Critical in these processes is the effort deployed by capable and experienced women who have sufficient opportunity and act as the representatives of the different working groups, and certainly the cooperatives. In this perspective, following [18], collective learning interpreted as mobilizing new support policies, organizational capacities, shared ideas and strategies, emerges and become effective through efforts deployed during interactions which led women novices or learners to transcend disabilities and take control over changes in behavior and skills.

5. CONCLUSIONS

In the run-up of data analysis, this article notes that collective learning is part of challenges whose mediation is regulated by leaders including capable and experienced women. Its effectiveness questions new procedures and technologies introduced in the cassava processing industries. Collective learning, crucial for reducing or closing the knowledge gap between leaders and novices or learners, therefore plays an important role in the production and development of new knowledge. It has motivated interests of women involved in the change of behaviors and skills. As the analysis has shown, the collective learning women were experiencing with the traditional system of cassava processing have taken a new translation with the promotion of two days of cassava processing (instead of six or seven days traditionally assigned in cassava processing) and the use of improved garifyers. Such a translation resulted from efforts deployed to develop a set of attitudes that improved technical and organizational skills.

The argument that collective learning among women involved in cassava processing cooperatives could be compared to practical learning is not so easy to understand. Similarly, collective learning required the assessment of emerging constraints, the generation of knowledge that match local institutions and policies, sharing of and application of such knowledge based on the understanding and meaning about the new technologies. On the contrary, however, collective learning is often implemented individually. Thus, the set of coordinated and applied knowledge to

address emerging challenges and improve productivity and quality also questions the diversity of experiences, perceptions of the emerging constraints; and interpretive mechanisms facilitating the achievement of situations consistent with local socio-cultural models.

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