



Impact of Farmers' Cooperatives on Socio-economic Living Conditions of Rural Households in North of Burundi

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ABSTRACT

The study aimed to assess the farmers' cooperatives impact on the socio-economic living conditions of their members in North of Burundi. A research survey was conducted on two farmers' groups such as a sample of 90 farmers randomly chosen in three main cooperatives and a control sample of 60 non-members. Data were analyzed with a comparative approach of descriptive statistics. Among six main food crops considered by the study, results show a significant contribution of the cooperative only on bananas' production ($P = 0.075$). Moreover, members gain a cost reduction of 50%/kg in maize milling or rice dehulling. Thanks to the multiple financial opportunities within the cooperative, members improve the quality of their houses (12%), subscribe supplementary health insurance (38%), pay easily the school fees for their children and equip themselves with household equipment. Finally, the value of solidarity among members enhances the spirit of confidence and cohesion in the community.

Keywords: Farmers' Cooperatives, Impact, Socio-economic Living Conditions, Rural Households

JEL Classifications: O22, Q12, Q13

1. INTRODUCTION

The cooperative model is present in most countries and sectors of activity as a response to imperfections of the state and market abuse (Birchall, 2004; Gentil, 1984; Giagnicavi, 2012; Mertens, 2010). While the world suffered from economic crises during the 19th century, the cooperatives played a major role in solving common problems such as poverty, social exclusion, unemployment and exploitation of women (ILO, 2002; Münkner and Shah, 1993; Porvali, 1993). Since then, the co-operation appears throughout the world as the only possible means of defense enabling the most vulnerable to cope with the unfavorable social and economic conditions (Braverman et al., 1991; Ellis, 2000). The particularity of cooperative compared to conventional companies is that it allows individuals to be together and pool their resources

to achieve a common goal that would be difficult for them to achieve individually (BM [Banque Mondiale], 2002). For example, a cooperator can produce, store and/or transform 10 kilos of a given agricultural product in the best conditions and taking advantage of economies of scale. In Burundi, as in most African countries, where the agriculture dominates the rural economy, farmers' cooperatives are associated in implementation of the national agricultural policies (Develtere et al., 2007; Scoones, 1998). In view of its importance, especially in rural community, the cooperative approach is often a major condition in the intervention methodology of the technical and financial partners. While the first Burundian agricultural cooperatives date from the colonial period, their particular recognition begins in 21st century during the implementation of the millennium development goals. While the national agricultural budget has never exceeded the

10% recommended by the Maputo conference's declaration, the farmers' cooperatives have therefore seized new financial opportunities to help members get easily access to a wide range of services, including access to low-cost agricultural inputs, markets, agricultural micro-credits, natural resources, training and information. The report of the Department of Cooperatives commissioned by the ILO (MINAGRI, 2012; Develtere et al., 2007) established an overall quantitative evolution of agricultural cooperatives in the order of 16 cooperatives between 1952 and 1967; 21 cooperatives in 1970; 26 cooperatives in 1973 and only 15 cooperatives remained at the end of the 1980s. With their revival between 1990 and 2000, around 689 cooperative groups around food crops were registered in 1998; 1,500 in 2013 totalizing nearly 63,126 members and more than 157,285 households in 2016 (GPV01/Région Afrique, 2016). However, despite an increase of membership in agricultural food cooperatives in rural areas and a strong support from various stakeholders, it is clear that the living conditions of farming households have not been improved. Indeed, the rate of monetary poverty, calculated with reference to the cost of basic needs, stood at 64.6% in 2014 without showing any difference with the ratio of non-monetary poverty (in living conditions), estimated at 68.8% (ISTEEBU, 2015). This precariousness of living conditions strikes harder in rural areas than in urban areas, regardless of the dimensions considered. According to the data on poverty, the non-satisfaction of basic needs affects 2.5 times more people in rural than in urban areas (ISTEEBU, 2015). In terms of living conditions, there are 11 times more poor people in rural areas than in urban areas (71.1% against 6.6%). Based on the aforementioned statements, the research question is formulated as following: Do the agricultural food cooperatives improve the socio-economic living conditions of their members?

The objective of our study is therefore to analyze their impact on the socioeconomic living conditions of rural households grouped into cooperatives. Even if many research works have already been done to study the impact of development projects on rural development in Africa (Baker 2000; Delarue and Cochet, 2011; Gertler et al., 2011), rare are the authors who introduced the notion of impact of an agricultural cooperative on the living conditions. This study tries to answer this question by considering the cooperative mechanism as a strategy or a development project whose impact corresponds to the changes obtained and actually attributable to the actions of the cooperative (Figure 1).

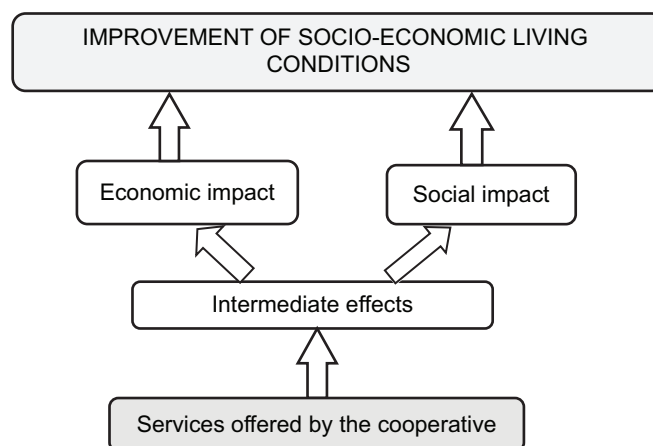
2. MATERIALS AND METHODS

The realization of this study covering a period from 2011 to 2017 combines three methods such as the documentary exploitation, surveys and interviews with different actors of the cooperative movement of Busiga and Gashikanwa communes in Ngozi province (6 representatives of cooperatives, 2 agricultural instructors, 1 representative of the Louvain Cooperation NGO and 1 provincial socio-economic adviser). The first survey was conducted on 90 members randomly selected in cooperatives of three main organizations present in each commune such as ADISCO (Support to integral development and solidarity on hills), Union for Cooperation and Development (UCODE) and CAPAD (Collective of associations of agricultural producers for development). The

cooperatives involved in our work are very active in supervising farmers around six main food crops widely present in households' food in this province (beans, maize, cassava and potatoes) and in commercialization as bananas and rice. At different levels, they also have related activities (storage and processing) and others activities such as access to credit and health insurance. The second survey was carried out on a comparison group of 60 non-members, who were selected by using the purposive sampling technique in the same social group and geographical area as cooperatives' members. The social group concept is approached according to Filmer and Pritchett (1998) conception, who define it as a class in which people with similar socio-economic characteristics are included. Then, in order to establish the similarity of living conditions of samples' farmers, before members joined cooperative, we have taken into account individual characteristics such as age, sex, marital status, educational level and socio-economic characteristics of the household (Baker, 2000; Ravallion, 2009; Leeuw and Vaessen, 2009).

Considering the latest characteristics, it is recognized that Burundian rural households consider themselves in particular material goods as agricultural production, housing quality, possessed durable goods, animal wealth and land. My study area was selected according to the purposive sampling based on its accessibility and the level of cooperative dynamism established by a study of the agricultural advocacy group (CTH, 2013) entitled "mapping of the intervention of farmers' organizations and support organizations (NGOs)." By coming in first position with a coverage rate in agricultural cooperatives of food products of 4.6%, the province of Ngozi has in this context benefited from a strong support from the technical and financial partners for historical reasons of recurrence of food insecurity and increasing poverty. The choice of Busiga commune for the criterion of strong cooperative presence and Gashikanwa commune for a low presence is intended to exploit the completeness of the information. The location of the two municipalities in the same natural region reflects their similarity from geographical, cultural and socio-economic considerations. The analysis of results was carried out according to the descriptive and comparative approach of socio-economic variables based on their mean, frequencies and percentages calculated with EXCEL and SPSS 16. Indeed, the

Figure 1: Analytical framework of the study



Source: Adapted from FAO (2012) and Ruette (2014)

current situation of cooperators was compared with the reference situation reconstructed according to historical data obtained from the government gazettes, monographs and reports of various actors of co-operation, as well as the publications of specialized agencies. That approach is particularly appropriate in the absence of an ex-ante evaluation (Durufle et al., 1988; Pamies-Sumner, 2014; Pellerano, 2011; Ravallion, 2008).

In order to isolate the influence of exogenous factors, the situation of cooperators was also compared to that of the control group's members by using the comparison tests of means and frequencies (t-student and Chi-square) of the studied variables and the significance of their differences (P-value). The content analysis (verbal and textual) was used to confront many viewpoints of different actors of co-operation and to explain as much as possible the trend detected by the statistical tests. In this study, the variables used to analyze socio-economic living conditions are based on the indicators established in the report of the committee on the Measurement of Economic Performance and Social Progress (or the Stiglitz, Sen and Fitoussi report) which have been adapted to Burundian rural area situation (Olivier, 2010). It distinguished material socio-economic variables such as agricultural production, quality of housing, state of sanitation and access to safe water, possessed durable goods, wealth of animal livestock and immaterial aspects as mutual solidarity, initiative and entrepreneurial spirit, access to health care and children's schooling. This way of exploring living conditions is inspired by Mata (2002) conception that considers them as a set of material and immaterial means specific to a community and allowing it to exist and reproduce.

3. RESULTS AND DISCUSSION

3.1. Impact on Food Production

According to secondary data, the levels of main food production in Ngozi are ranked in the following order: banana (35%), cassava (27%), sweet potato (18%), beans (9%), potatoes (5%), corn (4%) and rice (2%). With regard to the figure below, the primary results indicate the same order of classification by also highlighting a positive evolution of production levels in the two groups of farmers.

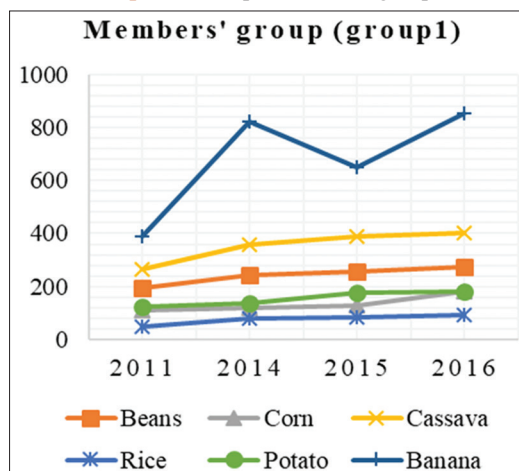
The upward trend of the quantities produced in the two groups of farmers does not, however, reveal any significant difference in their yields (in kg/ha), considering the two extreme years of the study period (2011 and 2016), exception of the 2016 banana yields ($P=0.075$), whose significance of the difference is however slightly pronounced (Graphs 1 and 2). Despite the absence or weakness of significance, it is important to mention that the 2011 yield differences between the two groups have almost tripled in 2016 for beans, quadrupled for maize and sextupled for bananas. However, the difference in 2011 cassava yields (41.9 kg/ha) almost reversed in 2016 (-40.2 kg/ha), while the negative differences of rice yields (-95.5 kg/ha) and of potato yields (-129 kg/ha) were reduced by five and twice respectively (Table 1).

The absence of significant difference for majority of the main crops studied does not mean that the cooperative has no effect on the

production level. The trend of productions evolution highlighted in the two groups is explained by the use of factors of production whose the cooperative is one of the providers. In Burundian rural areas, the cooperatives often facilitate access to agricultural training, mineral fertilizers and improved seeds.

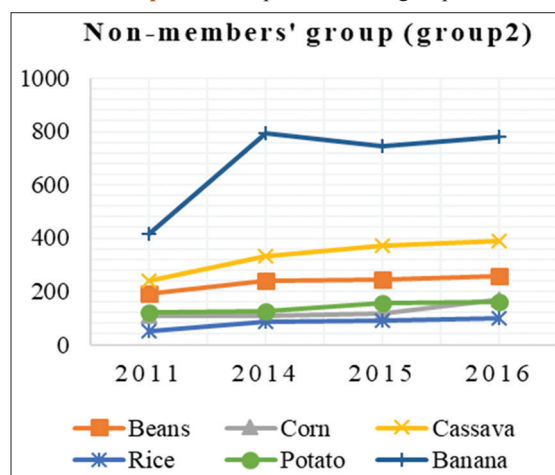
Firstly, although the government has mobilized farming trainers (one animator per administrative zone), the farmers say that they are rarely supported. According to the testimony of an agricultural instructor interviewed, the problem of technical means (means of travel, training manuals, lack of retraining, etc.) and financial means (delay of wages, logistical means) constitutes an obstacle on agricultural supervision. While 64% of non-members have never received agricultural supervision, more than 81% of cooperatives' members benefited from the support of an endogenous animator. In 2017 and 2018, we found that the organization of supervision in cooperatives is based on a system of training by an agricultural coordinator attached to the cooperative. To boost learning, an individual farm improvement plan is developed by each cooperator based on a demonstrative model field. In addition, a group of farming leaders selected from the cooperators are charged to assist in the accompaniment of their colleagues. Interviews

Graph 1: Food production in group 1



Source: Author, survey, 2017

Graph 2: Food production in group 2



Source: Auteur, survey, 2018

Table 1: Yield difference (kg/ha) and significance test (p-v) between the two groups

Years	Gap/P-value	Bean	Maize	Cassava	Banana	Rice	Potato
2011	Gap	25.2	7.7	41.9	87.5	(-95.5)	(-129.4)
	P-value	0.146	0.22	0.11	0.103	0.49	0.75
2016	Gap	82.4	31.8	(-40.2)	587.7	(-19.2)	(-55.8)
	P-value	0.201	0.55	0.91	0.075*	0.107	0.116

*Significant at 10% level ($P < 0.1$). Source: Author, results of surveys of 2017 and 2018

with non-members show that the cultural methods learned by the co-operators also reach them. Under the effect of a good neighborhood on the hills, the innovations are transmitted perfectly from house to house; so that neighbors copy the cultural model that seems the best (White and Phillips, 2012). Rousseau (2003) has explained this by indicating that the interactions between an individual and other individuals produce the externalities that may affect his economic situation.

Secondly, it is clear that the difficulty of chemical fertilizers supply is a great challenge that results in the problem of availability and access. With the establishment of PNSEB (Subsidy program for mineral fertilizers) by Burundian government, the collective purchase through the cooperative seems to be one of the privileged channels for a wide public access to mineral fertilizers. According to the survey, the use of chemical fertilizers has increased compared to the national average of 8 kg/ha/year, but without showing a significant difference between the two groups. In fact, while the members consumed on average about 33 kg/ha of the main fertilizer used in Burundi (DAP), the non-members used it for 30 kg. Moreover, there is no great difference between the proportions of the two groups' farmers using of chemical fertilizers. Indeed, DAP fertilizer is used by about 81% of the first group and 74% of the second one, 55% and 53% for urea; 32% and 27% for KCL in the same order. With regard to preceding arguments, the testimonies of the peasants interviewed admit that the non-cooperators acquire fertilizers also informally from neighboring cooperators who sell them a part of their purchase or pass an excess order to supply them. This was also confirmed by Niyonkuru (2018) in his book "Dignité paysanne" published in the collection of "books GRIP" where the author shows the revelations of non-members who say that they have no reason to integrate these organizations for the only reason that they enjoyed practically the same services as the cooperators.

Third, the survey show that households using improved seeds are less numerous in both groups (42% of cooperators against 35% of non-cooperators) and show a small gap between them. This small supply gap between the two groups seems normal because the phenomenon of "free rider effect" is not so excluded in the acquisition of improved seeds. As an example, we can mention the case of "elite" maize variety promoted in 2015 via ADISCO agricultural co-operatives in Gashikanwa by the USADF project, which has been widespread in non-co-operative households. The significant difference between banana productions is justified by the good banana management practices, from the selection of planting material to the harvest, taught to members of cooperatives, particularly UCODE Gashikanwa in 2016 and 2017. The non-members' households are mostly confronted with the lack of improved and successful plant varieties.

3.2. Transformation of Production

Post-harvest management of production is necessary to value it or not waste it. The most widespread processing in our cooperatives is maize and cassava milling, as well as rice husking. According to the results analysis and the testimonies, cooperators gain on the price of the milling or dehulling at the mill of the cooperative. The tariff shows that milling of maize was relatively cheaper in cooperative (40 BIF/kg) compared to the local private mill (60 BIF/kg). While not being unfair competition, it has been found that the endowment of co-operatives in clean mills or in husking machines has made it possible to destabilize or regulate milling or dehulling prices in the study area.

3.3. Habitat

Habitat is one of the units that determines family organization in rural areas and can be a telling sign of a household's well-being (Kalamou, 2014; Virendra et al., 2015). In Burundian rural area, habitat depends on the quality of housing (materials used), access to safe water and the state of sanitation.

According to Table 2, the statistical comparison test revealed a significant difference between the two groups with regard to wall construction materials at 10% level ($P = 0.077$). The group of non-members dominates for houses whose walls are built with wood covered of mud (18% of non-members against 4% of members). Contrariwise, members dominate for houses with walls in burnt bricks; they represent 11% against 5% of non-members. Although the difference is not significant for the flooring and roofing materials, non-members are numerous to have houses of earth floor (85% against 74% of members) and less numerous for a cemented floor (7% against 17%). Households whose their houses are covered with clay tiles or new metal sheets are also more numerous in members' group than in non-members' one. Knowing that decent housing is a determinant of hygiene and health of households by reducing the likelihood of exposure to disasters and diseases, that difference reveals the well-being of co-operators in terms of housing quality. According to the testimonies, the gap is justified by endogenous possibilities of access to small credits within the cooperative. Indeed, out of a total budget of 17,850,000 BIF (8,900 €) mobilized in 2016 by microfinance institutions partners (COOPEC, CECM, UCODE) and internal solidarity funds (IGG, MUSO and CEM) in the form of small loans to farmers, about 6% of the beneficiaries have allocated their credit to the construction or improvement of their houses.

According to Table 3, the statistical analysis shows a significant difference between the two groups in terms of access to safe water ($P = 0.080$) and quality of sanitation ($P = 0.092$). That gap in access to safe water is related to the distance effect between the home and the source of water. While about 32% of households in each group

Table 2: Housing quality

Components	Members (%)	Non-members (%)	t/x ²	dl	P
Wall materials					
Wood with mud	4	18	5.14	2	0.077*
Unburnt bricks	84	77			
Burnt bricks	11	5			
Roofing materials					
Clay tile	58	48	8.75	6	0.188
Reused sheet metal	26	38			
New metal sheet	13	7			
Grass/thatch	3	7			
Flooring materials					
Earth	74	85	4.84	5	0.236
Cement	17	7			
Wood	2	2			
Bricks	4	5			
Clay tile	2	2			

*Significant at 10% level (P<0.1). Source: Author, results of surveys of 2017 and 2018

Table 3: Safe water access and sanitation quality

Components	Members (%)	Non-members (%)	X ²	dl	P
Safe water					
Unimproved source	36	45	4.25	2	0.080*
Public tap	23	19			
Protected spring	41	36			
State of sanitation					
Traditional pit toilet	78	83	4.76	2	0.092*
Pit with slab	22	15			
Open sanitation	0	2			

*Significant at 10% level (P<0.1). Source: Author, results of surveys of 2017 and 2018

live at more than 3 km from nearest source of safe water, bicycle becomes the most popular means often used in water supply in the study area. According to the survey results, a household of members' group has on average 0.44 bike against 0.11 bike in non-members' one. Thus, it is obvious that co-operators are relatively more advantageous in water supply. WFP sees in bicycle as a productive good in Ngozi province (PAM, 2008); the non-possession can therefore be considered as a precarious index of households. Indeed, the consequence of not having a bike implicates the inaccessibility to safe drinking water. For the quality of sanitation, the difference is related to the sensitization in cooperative about the techniques of latrines construction and the daily practices of keeping them always clean. It is worth important to note that the precarious hygienic conditions can lead to the fragility of health (Velleman et al., 2013; WHO, 2004) and according to the previous arguments; many non-members are exposed to it.

3.4. Access to Health Care

Decent health is one of the signs of a household or community's standard of living that can be gained by the degree of financial and physical accessibility to health care (Ekman, 2004; Glouberman and Millar, 2003). However, accessibility has a cost that can be felt differently among the population. Firstly, physical (geographic) accessibility refers to the distance a patient travels to a health center, either private or public. Secondly, financial accessibility requires paying the bill for health services (consultation, medical examination, medication, hospitalization and health insurance). In the national health insurance policy, Burundi government has provided medical assistance through CAM system (medical assistance card), which enables population of informal and

rural area to benefit from basic health care reduced to 20% (Kamwenubusa et al., 2009). In some of the cooperatives studied, supplementary health insurance MS (community health insurance) was introduced providing insured persons with additional coverage (consultations, medication, hospitalization and minor surgery) and extended coverage (private sector services).

In both groups, the comparative study reveals disparities in financial access to health care (Table 4). The households of members and non-members do not feel in the same way the cost of health care. The first are numerous (60%) to say that it is "easy" to access to basic care, while the latter do not exceed 43% for the same mention. Contrary, fewer members (16%) experience "difficulties" in seeking treatment compared to 29% of non-members. The difficulties felt by the latter come from the significant costs they must endorse by buying medical services in private health centers or pharmacies. They are obliged to pay 100% for failing to find public structures nearby. Generally, consultations or hospitalization and medication are relatively very expensive in private health sector. In rural areas, the cost of consultation at private health center varies from 2000 to 3000 BIF (1 to 1.5 \$) against 1000 to 1500 BIF (0.5 to 0.7 \$) in the public for a non-insured. In this situation, households are obliged to draw on the budget that is intended for other items of family expenses (rent, food, schooling of children, etc.) or to sell food crop or property at a low price. Of course, the subscribing of the supplementary health insurance of an average amount of 22,000 BIF (11 \$) per household and per year confers to insureds an extended and complementary coverage even in private sector. In this regard, the first have indeed so many possibilities to be treated as well in the public health centers and in the private's due

Table 4: Financial accessibility to health care

Scale	Members (%)				Non-members (%)			
	Subgroup 1C (31)				Subgroup 1NC (41)			
	Cat. 1	Cat. 2	Cat. 3	Average	Cat. 1	Cat. 2	Cat. 3	Average
Never	0	0	0	0	0	0	0	0
Difficult	20	12	11	14	46	36	29	37
A little easy	20	17	11	16	29	29	29	29
Easy	60	71	78	70	25	36	43	34

1C: Cooperators insured at CAM and MS; 1NC: Non-Cooperators insured at CAM. Cat. 1: Low-income households; Cat. 2: Middle-income households; Cat. 3: High-income households. Source: Author, results of survey of 2017 and 2018

Table 5: Physical or geographical accessibility to health care

Scale	Members (%)				Non-members (%)			
	Sub-group 1C (31)				Sub-group 1NC (41)			
	Cat. 1	Cat. 2	Cat. 3	Average	Cat. 1	Cat. 2	Cat. 3	Average
Not available	0	0	0	0	17	17	33	22
Sometimes available	20	18	11	16	37	67	67	57
Often available	40	41	33	38	33	17	0	17
Permanently available	40	41	56	46	13	0	0	4

Source: Author, results of survey of 2017 and 2018

Table 6: Average farm animals per household

Pet	Average per household		Comparison test		
	Members	Non-members	t	dl	P
Cattle	0.63	0.23	-2.1	45	0.043*
Goat	1.04	0.58	-2.57	63	0.039*
Pigs	0.16	0.15	-1.65	10	0.302
Sheep	0.2	0.11	0.066	12	0.243
Rabbit	0.50	0.33	0.838	17	0.405
Chicken	0.43	0.42	-1.75	29	0.384

*Significant at the 5% level ($P < 0.05$). Source: Author, results of survey of 2017 and 2018

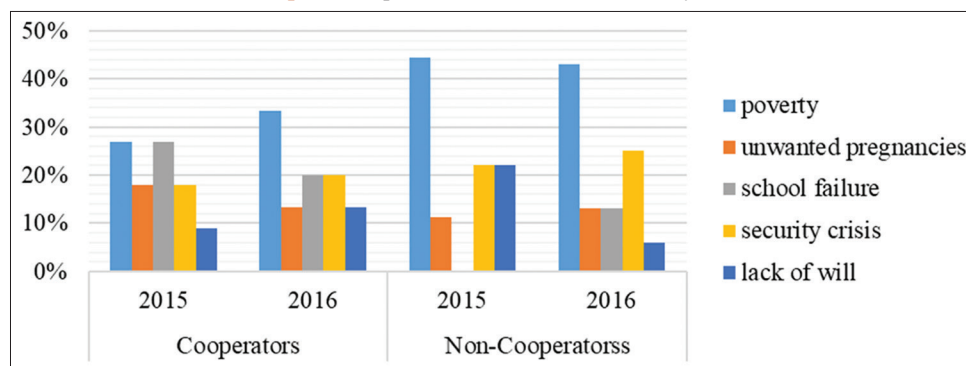
to the support of 60-80% by the mutual. The analysis based on the categories established according to the households' income shows that as the peasants have money, as much they could easily buy the services of health company of choice. Regardless of the category considered, the members are still ahead in access to health care. Their advantage is the possibility of borrowing a small amount of money from microfinance institutions by intermediary of cooperative or from mutual solidarity funds to meet health needs. The guaranty is the group solidarity based on relationship and mutual confidence between cooperatives' members.

Physical accessibility or geographical availability is understood as physical presence of drugs in the retail depot near the population for a period of time (Lagarde and Palmer, 2006; Powell, 1995). The survey shows that the geographical availability of drugs depends on group and category of households (Table 5). For members, the "permanently available" mention varies between 40% and 56% whereas it is 0-13% for non-members. This means that members have several nearby sources of supply that are favorable to their status. Having a supplementary insurance in MS gives them the chance to access to the medical services in health centers either public, private or community. Without supplementary health insurance, non-members benefit a little package of health care services. In this regard, having several alternatives of health structures consequently reduces geographical unavailability or physical inaccessibility (Ekman, 2004).

3.5. Possession of Domestic Animals

In Burundi, livestock farming is a major source of organic fertilizers and soil amendment for rural households. Moreover, it is a source of household income from the sale of animal. Traditionally, livestock is practiced for social integration and esteem to farmers.

In the study area, the animals most bred in the two groups are in this order: goats, cattle, rabbits and chickens (Table 6). However, the level of animal ownership differs between the two groups with a significant difference for goats ($P = 0.039$) and cattle ($P = 0.043$). On average, a member household has 1.04 goats and 0.68 cattle while a non-member household has only 0.58 goats and 0.23 cattle. The average number of goats exceeds that found at provincial level of 0.9 goats and 0.2 cattle. Goat farming is the animal whose meat is the most consumed in this province. According to the survey, about 48% of members have at least one goat against 37% for non-members. The level of cattle ownership is 34% in the first group and 26% in the second one. About 16% of members have no animals compared to 23% of non-members. This situation expresses a lack of opportunity for fertilization, wealth and social esteem, especially for non-members. The significant difference between the two groups for goats and cattle is justified by three reasons: The first reason is the sensitization campaign in cooperative to small income-generating activities and the use of credit (loan); this one is not easily accessible to non-members. Thus, the rotating loan obtained in mutual solidarity groups requires a definition of a reasonable small project reasonable; a second reason is the price of cattle or goat that is not accessible to everyone if you have not borrowed money. Indeed, a cow costs between 300,000 and 400,000 BIF and a goat is bought at about 100,000 BIF. Last but not the least is the distribution of cattle to the selected cooperative's members. About four members among UCODE farmers have acquired cattle through the FAO project "Food Support and Environmental Management" for the restocking of cattle livestock (UCODE, 2015).

Graph 3: Dropout rate and causes in the study area

Source: Author, results of survey of 2017 and 2018

3.6. Schooling of Children

Universal schooling is one of the priority actions of Burundian government. Since the 2005/2006 school year, schoolchildren are exempted from registration fees that may prevent them from not attending primary school. However, paying tuition fees is not the only way for parents to fund schools. Schools charge them for operating, caretaking, maintenance or minor repairs. The comparison to be made between the two study groups focuses on the level of school dropout and its causes.

In both groups, the results show that the major cause of defection of schoolchildren is poverty in households (Graph 3). More than 27% and 33% of member's households have children out of school due to poverty in 2015 and 2016 respectively. Households of non-members are more affected with proportions of 44% and 44% for the same years. The parents told us that they do not bear the various expenses required by the school. This has been noted particularly in low-income households or households with more than four school-age children. Secondary causes are unwanted pregnancies and security crisis. As previously mentioned, the dropout gap is mainly related to poverty. To understand it better, we pushed the study by asking respondents for the ability to accede to school fees. About 77% of members find "easy" to pay tuition fees compared to 52% of non-members. By contrary, more than 22% of non-members' households find them "inaccessible" compared to 4% of members' households. This proves that members' households are better able to find school fees for children. The small endogenous structures of solidarity initiated in cooperatives allow members to solicit an advance to pay school fees. Three members of cooperatives testified about loans from endogenous solidarity funds:

- (1) "It is within the IGG that we can realize our dreams. There are people who can never have a pet at home or make money if they have not joined the self-help groups. For me, the IGG allowed me to continue to pay the school fees of my children after the death of my husband" (2) "My family has six children. With MUSO, I took out a loan of 200.000 BIF (120 \$) which allowed me to buy three goats and five chickens. It helps me cope with everyday family emergencies and find school materials and school fees."

Other opportunities arise when people are associated. The "Ntunjujutane project" in local language or "does

not become illiterate" initiated in 2012, 2013 and 2014 in UCODE Gashikanwa and Busiga under the support of CARE International is an illustration of this. At the start of the school year, households receive an advance of 10,000 BIF to pay for school materials.

3.7. The Social Effects of Cooperatives

In Burundi, one of the defining elements of life in rural areas is the solidarity that has developed since the ancestral period. As mentioned above, solidarity is reflected in the systems of pooling health insurance (via community health insurance), solidarity financing (via the MUSO and IGG solidarity funds) and in the practices of rotating aid in field plowing. In this respect, members learn to trust each other in a virtually neutral atmosphere. A member testified that IGG solidarity fund is a place of socialization and expression of mutual solidarity."

4. CONCLUSION

According to the study results, agricultural cooperatives contribute in increasing of food production of either cooperatives' members by easy access to agricultural training and chemical fertilizers or non-members due to the effect of positive externalities. Through the credit obtained by intermediary of cooperative or from endogenous financial solidarity, the members have improved the housing quality (sustainable materials used) and hygienic conditions (drinking water and sanitation). They also have bought goats and cattle, which is for them a form of saving and a source of fertilizers. Moreover, these financial opportunities allowed members to subscribe the community health insurance initiated in some cooperatives, which provides them with greater financial and physical access to health care than non-members can. The school dropouts, largely caused by poverty, are relatively less numerous in members' households. This indicates a spirit of trust reinforced by mutual help in the happy or unhappy events. However, the strong mobilization of Burundian government on promotion of cooperative movement since 2018, especially on the eve of elections (in 2020) could have a partisan stakes; which would compromise the autonomy advocated by the universal principles of Rockdale. Thus, it would be important to study in future research the extent of impact of that generalization of cooperative movement.

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