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Perceptions about quality of public and private agricultural extension in Africa: Evidence from farmers in Burkina Faso

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Abstract: In a context of more involvement of the private sector in the provision of agricultural extension services as policy option in Burkina Faso, and since policy evidence is needed to better inform policy makers; a study was conducted to assess the perception of farmers under private and public extension systems about the quality of their services. Four services were assessed: facilitation of access to credit, facilitation of input provision, technical support and facilitation of access to market. Two groups of farmers were selected in the South Central Region of Burkina Faso; the groups included 136 farmers who received services from the public extension system; and 135 farmers selected from three localities covered by private extension services. A Likert scale was used to collect data on farmers’ perceptions and analysed with descriptive statistics. It was found that both two groups of farmers

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PUBLIC INTEREST STATEMENT

In Burkina Faso, while Government is encouraging private sector to engage in extension delivery, empirical evidence about the quality of extension already delivered by some private agencies such as Non-Governmental Organisations, farmer based organisations and also by public sector itself (performance of farmers and farmers’ perception about the quality of services received) is not available. Assessing the quality of extension services from the farmers’ viewpoint can help to know whether they are satisfied with the current extension services, what they want to be improved. This will inform the targeting of services to promote and the way to deliver them.
were satisfied with the quality of services provided. However, farmers under private extension system rated the quality of services they received better than farmers under public extension did. Therefore, government can promote private participation in extension delivery by creating a good business environment for the private systems to operate.

**Subjects:** Agricultural Economics; Agricultural Extension; Rural Development

**Keywords:** Perception of quality; private sector; public sector; extension services

1. **Introduction**

African agricultural production has increased, generally due to the increases in area cultivated and labour used. However, the productivity has stagnated compared to Asia or America (New Partnership for Africa’s Development (NEPAD), 2013). Indeed, performance of the agricultural sector in Sub-Sahara Africa (SSA) is constrained by governance problems, low soil fertility, poor access to inputs, insufficient storage, poor transport and marketing infrastructure, limited technical knowledge, lack of information to and resources to apply the knowledge, and weak information dissemination (Alliance for Green Revolution in Africa (AGRA), 2014).

In Burkina Faso in particular, the agricultural sector is very sensitive to climate variations hence agricultural output is highly volatile (Monitoring African Food and Agricultural Policy (MAFAP), 2013). In addition, farmers have low access to input (fertilizer, improved seed), new agricultural techniques or practices and information for commercial production of commodities. Although they have been efforts towards changing the situation, they have been insufficient (Direction Générale des Productions Végétales (DGPV), 2010).

The agricultural situation described above shows that the system of generating and disseminating agricultural information (about new or improved practices, opportunities for credit and marketing), meaning extension services is facing many challenges which need to be addressed in order to make the agricultural sector effective in achieving food security goals and in promoting sustainable development.

From late 1950 to 1960s until the post-structural adjustment period (2000s), many Sub-Sahara African countries delivered extension services through the Ministries of Agriculture (public sector) because many aspects of extension were supposed to have strong public good characteristics (Ponniah, Puskur, Workneh, & Hoekstra, 2008). Public extension implied centralised decision-making and priorities set at the top by government functionaries (FAO, 2008). The public extension has been criticised for not being relevant, effective and efficient due mainly to low staff morale and financial stress (Food and Agriculture Organisation, 2008). Therefore, governments were under pressure to demonstrate the pay-off to investment in extension and this situation led to exploration of alternative options (involving the private sector, local communities and producer groups) in the delivery of extension services (Food and Agriculture Organisation, 2008; Ponniah et al., 2008).

In addition, the growth of commercial farm sector and trade liberalisation around the world has led technology transfer systems to become progressively privatised since production technologies have become more and more private goods (Swanson, 2008). Farmers continue to express demand for information and may be ready to pay for it, provided that they perceive the information useful for their activities.

Therefore, even if the public sector remains important in supporting farmers, it is advised that private sector should increase its role in providing extension services in partnership with the public sector whose role would be to create a good legal environment for private entities to participate in extension delivery (Swanson, 2008; Virmani, 2013). FA (2018), taking Cameroon as a case study,
argued that we need innovative extension approaches to improve impact of extension services on agriculture and rural development. There is therefore a need to combine potentials of both private and public sector, in order to overcome the failures of past extension models. The need to bring private and public sector together to provide extension services, is also supported by Muyanga and Jayne (2008). Indeed, in a study undertaken in Kenya, they found that private extension targeted high potential regions for the provision of services, but mostly relied on public extension staff to be effective. In South Africa, Raidimi and Kabiti (2017) also found that public extension is limited by inadequate resources and many more constraints, hence the need to encourage the participation of the private sector. These studies show that across Africa, even if there is a need for private sector to participate in the provision of extension, the arrangements to make it real and effective are not clear, since efforts both from farmers and governments are needed. In fact, increasing the role of private sector in the provision of extension services requires, not only institutional arrangements, but also farmers’ willingness to make financial efforts, since better quality will imply higher costs. And the willingness to make financial efforts would be correlated to their perceptions about the quality of services they already received. The situation observed in these African countries is actually the same in Burkina Faso. By questioning farmers’ perceptions about private and public extension services, we hope the results could help to fill the gap and improve the debate.

In the case of Burkina Faso, extension services have been delivered by the national government since independence in 1960, with the financial and technical support of foreign governments or agencies (Aspfors, 2010). Besides the government, but still with the support of some foreign governments or agencies, Non-Governmental Organisations (NGOs), and farmers cooperatives are getting engaged in the delivery of agricultural extension activities such as facilitating access to credit, providing market information, promoting new farmer organisations, disseminating new farming techniques and training farmers to protect the environment and increase productivity (DGPV, 2010). However, the delivery of these services is not on a cost recovery basis, except the cotton sector, where three cotton companies are providing extension services on a for-profit basis (Direction Générale des Productions Végétales, 2010). Indeed, in the delivery of extension services, NGOs and farmer cooperatives are financed by some foreign partners (for example, Catholic Relief Services (CRS), Foreign Government Development Agencies such as United State Agency for International Development (USAID), Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)), which seek to improve rural livelihood. To select farmers who can benefit from their projects, these agencies generally rely on local authorities and farmer associations. Farmers are thus selected based on the type of crop they produce, their poverty status and the extent to which they could engage for project success. However and to ensure sustainability of projects, farmers are generally encouraged to financially contribute to the project, even if the proportion is very low. For the cotton sector in particular, since cotton is historically the main cash crop and the first agricultural export crop in Burkina Faso, there is room for substantial profit for all actors involved in that activity. That is why Government has fully privatised the sector, by leaving support to farmers to three private companies (even if one of them has been created with public funds).

In 2010, Burkina Faso adopted a national framework (policy) called “Système National Vulgarisation et d’Appui Conseil Agricoles (SNVACA)”\(^1\), to improve and expand extension activities with the objective of reducing the participation of government. The policy aimed at: (i) meeting the targeted and real needs of producers through a demand-orientated provision of services; (ii) expanding the set of choices of services providers available to farmers or farmer organisations (pluralism in extension services); (iii) increasing the participation and accountability of farmers or farmer organisation in the mobilisation and management of their resources and (iv) promoting the participation of farmers or their organisation in the management boards of public advisory services.

Farmers’ willingness to be part of such policy or to pay for extension on a cost recovery basis, depends on perceptions about the quality of services they received. Some studies that have compared public and private extension services in terms of effectiveness or quality found that
private extension is better than public sector extension in terms of farmers’ perception (Ali, 2013; Mengal, Mallah, Mirani, & Siddiqui, 2012; Naeem & Hassan, 2014; Onyenkazi & Gana, 2009; Rana, Reddy, & Sontakki, 2013). However in Burkina Faso, the situation is likely not the same since many smallholder farmers are generally enjoying fee-free extension services, even if they are private initiatives. In addition, there is no empirical study assessing farmers’ perceptions about the quality of extension services received and comparing public and private extension services in Burkina Faso. This study, therefore, aims at assessing farmers’ perceptions about the quality of public and private extension services using the South Central region of the country as a case study. Assessing the quality of extension services from the farmers’ viewpoint can inform policy makers whether they are satisfied with the current extension services, what they want to be improved and therefore give information about the services to promote and the way to deliver them.

2. Materials and methods

2.1. Empirical approach for assessment of farmers’ perceptions of quality of extension services

There are many philosophies behind the concept of agricultural extension, but all of them focus on providing education and technical support to farmers, in order to improve their agricultural activities and well-being (Bonye, Kpieta, & Jasaw, 2012; Dube, 1993; Novkovic, Vasiljevic, & Matkovic, 2013; Ponniah, 2008; Zivkovic, Jelic, & Rajic, 2009). Moreover, as Novkovic et al. (2013) have argued, agricultural extension services involve tasks which are divided into five groups including (i) two-way information (informing farmers and informing the state); (ii) providing services (legal advice, administrative services, business services, and technological services); (iii) education and training (technical, organisational, economic, etc.); (iv) experiments (direct transfer of modern scientific knowledge into the practice) and (v) connecting and collaboration (with processors, equipment producers, raw material producers, scientific institutions, educational institutions, etc.). Agricultural extension is thus beyond technology transfer, involving training, education, connection and provision of information to farmers in order to make them more efficient in their activities (which can include non-agricultural activities).

Based on the broadened definition of agricultural extension as stated above and the experience of Burkina Faso in the provision of extension services, we considered four elements of the service in order to ascertain farmers’ perceptions about the quality of services received from private and public sectors: (i) technical support or training; (ii) provision of input; (iii) facilitating access to credit; and (iv) facilitating access to market. These elements are consistent with the “must” and “can” functions of extension (FAO, 1985).

Extension involving training or technical support refers to activities related to technology and knowledge transfers in order to improve farmers’ skills and improve their farming techniques. It includes training in production techniques, organisation of visits to good farmers’ fields, organisation of training session with farmers from other regions for experience sharing. Extension related to provision of input means making inputs physically available to farmers and advising them about the quality and right use of these input. It includes advice about the right inputs to use according to crop cultivated and the right use of these inputs and making inputs physically available to farmers (transportation to farmers’ villages) Extension related to access to credit refers to either the direct provision of credit to farmers, or the technical support to farmers in order to increase their potential to contract credit. Extension related to access to markets refers to either the provision of market information (market prices, where to sell produce, where to get transport, transport prices, and preference of the market) or to make product available in the right quantity and on time.

A service or product quality can be understood in two different ways: actual quality (the merits of the real product or service which can be evaluated based on corresponding standards) and perceived quality (consumers/users’ subjective evaluation and judgment) (Zeithaml, 1988).
Perception itself refers to the process by which a person selects, arranges and interprets stimuli which are filtered and adjusted to become one’s own view of the world (Zeithaml, 1988). Therefore, two persons, experiencing the same situation in the same environment may not perceive things identically, especially since attributes differ across products, services and persons.

Quality attributes can include: assurance (the customers believe in the firm and feel safe with the service provided); reliability of the service (the firm provides its customers with the right service, at the right time and without mistakes from the beginning); empathy (the firm tries to solve its customers’ problems in the best way and always acts in the interest of its customers); responsiveness (the firm gives its customers proper service and is always service minded) (Aspfors, 2010; Buadi, Anaman, & Kwarteng, 2013; Zeithaml, 1988).

In this study, farmers’ perceptions about the quality of extension services are assessed using simple five-points Likert scale of measurement based on five quality attributes: (i) relevance (the service is relevant for farming activities in terms of addressing their actual needs); (ii) availability (the service is available for possible use of farmers at every time); (iii) timeliness (as soon as the farmer expresses a demand for a service, it is supplied); (iv) cost (the cost of the service is affordable), and (v) appropriateness of the delivery methods (information given through the service is easy to understand and capture). In the questionnaire, farmers were asked to state their level of satisfaction for each service and by attribute, by choosing one of the following five point Likert scale options: 1 = Very Satisfied, 2 = Satisfied, 3 = Undecided, 4 = Dissatisfied and 5 = Very Dissatisfied.

2.2. Analytical method

To analyse farmers’ perceptions, the responses were combined to create an attitudinal measurement scale instead of analysing individual responses. The data were further analysed with descriptive statistics; means to capture central tendency and standard deviation to capture variability of the 5-point Likert scale answers following Agbarevo (2013); Boone and Boone (2012) and Clason and Dormody (1994). An independent t-test was later performed to compare the means of satisfaction of the two groups.

Other tests were also performed to be sure of the goodness of measurements. Indeed, we assessed over time consistency (test-retest reliability) and internal consistency (across items) of measurements. For test-retest reliability, we first applied the questionnaire to 20 farmers (10 from public extension and 10 from private extension) 1 month before the main survey. And after the main survey, we compared the different responses related to the five quality attributes. Pearson’s correlation tests were then performed for each attribute and we found that r was comprised between 0.83 and 0.91 for all attributes. For internal consistency, we used Cronbach’ alpha coefficient and we found α = 0.9.

About the validity of measurements, we only assessed content validity. Indeed, we first checked whether the conceptual definition of the attributes fits with the measurement method (by reviewing the literature and discussing with extension agents). And we later checked whether all farmers interviewed during the two different periods of time, had the same comprehension of the questions about the attributes (by checking the feedbacks from enumerators).

The assessment was carried out with farmers receiving public extension services and those receiving private services. The NGO project staff and the regional extension service staff have agreed to supply services in different zones within the region. Therefore, farmers do not have possibility to receive both private and public extension services at the same time.

2.3. Sampling technique and study area

2.3.1. Sampling technique

The following formula is used to determine the sample size.
\[ N = \frac{z^2 p (1 - p)}{\text{ME}^2} \]  

(3.35)

where \( N \) is the sample size to be found; \( z \) is the z-score; \( p \) the proportion of population of interest; and \( \text{ME} \) is the desired margin of error.

The proportion of smallholder cereals farmers in the study area was evaluated at 80% of all farmers in the study area. Indeed, the agricultural sector in Burkina Faso is characterised by a dominance of smallholder farmers with about 72% having less than 5 ha, and 1% having more than 20 ha. For smallholder farmers, the yields are low and many of the commodities (except rice and cotton) are produced mainly for self-consumption because these farmers are facing challenges to increase their yield and they cannot rely on markets to make profit. The agriculture sector is also dominated by cereals crops, since farmers produce mostly for self-consumption (Direction de la Prospective et des Statistiques Agricoles et Alimentaires (DPSAA), 2011). The margin of error was assumed to be 5% and therefore \( z \) was equal to 1.96. Thus, the sample size was estimated at 246. This size was increased by 10% to 270, to take into account contingencies such as recording errors.

The private provider named OCADES-CARITAS (NGO) and the public sector extension services intervene in three different localities in the same area: Tiébélé, Gombooussougou and Zabré for the private sector and Manga, Po and Toécé for the public sector. Therefore, 135 respondents were randomly selected for OCADES-CARITAS (among the three localities covered with minimum of 45 for each locality) and 136 for public agencies (from the three localities covered with minimum of 45 for each locality) (Table 1). Farmers selected were interviewed face-to-face with a structured questionnaire. The questionnaire covered topics like socio-economic characteristics of farmers, farmers’ perceptions about the quality of services received, farmers’ willingness to pay for improved extension services and farmers’ performance in terms of production and productivity. To assess their perceptions, farmers were first asked to state whether they have access to the service indicated or not. If the response is positive, they were later asked to describe the way the service is delivered and to give their opinion about the quality of that service.

2.3.2. Study area
Burkina Faso has 13 administrative regions. Each administrative region has one to six provinces, each province is divided into seven to 47 departments and each department is divided into rural and/or urban communities (municipalities). The study sought to analyse extension services from private and public sectors. The private sector was represented by a Catholic NGO called Organisation Catholique pour le Développement et la Solidarité (OCADES-CARITAS) located in Manga. The public sector was represented by the provincial agencies of the Ministry of Agriculture. The Catholic Diocese of Manga includes localities from two administrative regions: Région du Centre-Sud (South Central Region) and Région du Centre-Est (East Central Region) as presented in Table 1.

Diocese of Manga has a total population of 762,632 and covers around 11,457 square kilometers (Institut National de la Statistique et de la Démographie [INSD], 2014). Agriculture is the principal economic activity of the area and involves around 85% of the regional active population. The South Central and East Central regions are respectively the eighth and sixth poorest region of Burkina Faso.

3. Results

3.1. Socio-economic characteristics of respondents
In the public zone, Table 2 shows that most of the farmers interviewed (52%) are of the middle age followed by young farmers and the old ones (respectively 35% and 13%). The sample consists of same proportions of most experienced and least experienced farmers, though the overall
distribution shows that farmers in the sample are very experienced in terms of years involved in agriculture (Table 2). Also, it was observed that the respondents were dominated by small-scale farmers (82%) holding at most 2 hectares for their major crop (Table 2). In terms of gender, men dominated the sample (Table 3), and non-educated farmers have the highest proportion in the sample (57%) compared to educated farmers, even if the gap is low. Also note that most of the farmers undertake off-farm activities and are members of a farmer-based organisation (respectively 85% and 83% of the whole sample). The land is generally a family or own land (respectively 85% and 14%) compared to leased land (1%). Maize is the major crop (37% grow the crop) in this zone followed by cotton (27%). Generally cereals are the most important crops grown in the zone (more than 50%) and mainly for consumption.

Table 1. Localities of the Catholic Diocese of Manga

| Region | Province | Department | Extension zone | Sample size |
|--------|----------|------------|----------------|-------------|
| Région du Centre-Sud | Bazèga | Toécé | Public | 45 |
| | Nahouri | Pô | Public | 45 |
| | Tiébélé | | Private | 45 |
| | Zoundwéogo | Gomboussougou | Private | 45 |
| | Manga | | Public | 46 |
| Région du Centre-Est | Boulgou | Zabré | Private | 45 |

Table 2. Socio-economic Characteristics of Farmers (Continuous variables)

| Variable name | Frequency | Percentage | Mean |
|---------------|-----------|------------|------|
| Age | | | |
| 18-35 (young) | 47 | 41 | 34.56 | 30.37 |
| 36-59 (middle age) | 71 | 80 | 52.20 | 59.26 |
| 60-82 (old) | 18 | 14 | 13.24 | 10.37 |
| Total | 136 | 135 | 100 | 100 |
| Experience in agriculture | | | 24.17 (5.11) | 14.69 (4.81) |
| 2-11 | 39 | 62 | 28.68 | 45.93 |
| 12-21 | 24 | 46 | 17.64 | 34.07 |
| 22-31 | 34 | 19 | 25 | 14.07 |
| 32-60 | 39 | 8 | 28.68 | 5.93 |
| Total | 136 | 135 | 100 | 100 |
| Farm size | | | 1.54 (0.12) | 1.54 (0.04) |
| 0.12-2 | 112 | 133 | 82.35 | 98.52 |
| 3-5 | 20 | 2 | 14.71 | 1.48 |
| 6-10 | 4 | 0 | 2.94 | 0 |
| Total | 136 | 135 | 100 | 100 |

Source: Field data, 2016
As observed in the first group, majority of the farmers in the private zone, are smallholder farmers with land area not exceeding 2 hectare (98.52%) (Table 2). Most of the farmers interviewed are between 36 and 59 years old (60%) followed by young farmers who are between 18 and 35 years old (30%) (Table 2). Maize is the major crop cultivated by this group (52% of farmers) as for the first group. The second major crop is rice (13%) against cotton for the public service clients (Table 3). It was also observed that farmers in this group are least experienced in farming. Table 3 also indicates that the respondents were dominated by the female. The proportion of non-educated farmers, those involved in off-farm activities and in farmer organisations are high at 83%, 72% and 71%, respectively. Finally, the distribution of farmers by land tenure is 57% for personal property, 35% for family land and 8% for leasing (Table 3).

3.2. Assessment of farmers’ perceptions about the quality of extension services

3.2.1. Quality of facilitation of access to credit
Twenty-two percent of the 136 farmers in the public extension group interviewed; had access to the service related to facilitation of access to credit. They were undecided about the timeliness of the service (3.33) while they found the availability, accuracy, affordability and the relevance of the service satisfactory with mean scores of 2.87, 2.62, 2.45 and 2.25, respectively. As presented in Table 4, farmers under private zone expressed satisfaction about the facilitation of access to credit with respect to the five attributes: relevance (1.31), availability (1.26), timeliness (1.19), affordability (1.28) and accuracy (1.29). It is finally observed that, for each quality attribute, farmers in the private zone are more satisfied than those in the public zone, who even tend to be dissatisfied.

3.2.2. Quality of input provision
For input provision, farmers under public system find the relevance (2.37), affordability (2.41) and accuracy (2.92) of the service satisfactory (Table 5). However, they tend to be undecided about the timeliness (3.28) and availability (3.51) of the service. Input provision is also perceived by respondents in the private zone as very relevant (1.43), available (1.42), timely (1.36), affordable (1.45) and accurate (1.37). They are even very satisfied with timeliness, availability and affordability of the service since the maximum score for each of these options is 2.

3.2.3. Quality of technical support
For technical information for farming practices, it was found that farmers under public system are satisfied with the relevance (2.15), availability (2.87), timeliness (2.95), affordability (2.1) and accuracy (2.82) of the service (Table 6). Farmers under private zone assigned high scores to the five attributes. They also found the service relevant (1.49), available (1.36), timely (1.36), affordable (1.42) and accurate (1.34) (Table 6).

3.2.4. Quality of facilitation of access to market
Provision of services related to access to market in the public zone, is satisfactory for farmers in terms of relevance (2.72), availability (2.45) and affordability (2.72), even if they are close to being undecided on affordability. However, they cannot decide about the quality in terms of timeliness and accuracy (Table 7). For farmers under private zone, they are on average very satisfied with the relevance (1.26), availability (1.31), timeliness (1.27), affordability (1.19) and accuracy of the service (1.27) (Table 7).

3.2.5. Overall perceptions about the quality of services
When the different attributes are aggregated in order to assess the farmers’ perceptions about the quality, it is observed that farmers under public system positively appreciate services related to access to credit (2.71), input provision (2.90), technical support (2.58), and access to market (2.82). However, the scores for three services (access to credit, input provision and access to market) tend to be close to 3 (Table 8), suggesting that farmers tend to be undecided about the quality of these services. For farmers under private system, it is found that they are very satisfied with the quality of each of the services as the average scores of each service range between 1.25 and 1.41 (Table 8).
services related to input provision, it is found that all the farmers interviewed were satisfied with the quality of the service provided (maximum score of 2) whereas for the three other services, some are dissatisfied but none is very dissatisfied. Moreover, for each quality attribute and for aggregated attribute, the mean scores for farmers in the public zone, are significantly greater than the mean

Table 3. Socio-economic Characteristics of Farmers (Categorical variables)

| Variable name                  | Frequency | Percentage |
|--------------------------------|-----------|------------|
|                                | Public system (n = 136) | Private system (n = 135) | Public system (n = 136) | Private system (n = 135) |
| Gender                         |           |            |            |                           |
| Males                          | 117       | 35         | 86.03      | 25.93                     |
| Females                        | 19        | 100        | 13.97      | 74.07                     |
| Total                          | 136       | 135        | 100        | 100                       |
| Education status               |           |            |            |                           |
| Educated                       | 58        | 23         | 42.65      | 17.04                     |
| Non educated                   | 78        | 112        | 57.35      | 82.96                     |
| Total                          | 136       | 135        | 100        | 100                       |
| Participation in off-farm activities |           |            |            |                           |
| Yes                            | 85        | 97         | 62.5       | 71.85                     |
| No                             | 51        | 38         | 37.5       | 28.15                     |
| Total                          | 136       | 135        | 100        | 100                       |
| Membership of a FBO            |           |            |            |                           |
| Yes                            | 83        | 96         | 61.03      | 71.11                     |
| No                             | 53        | 39         | 38.97      | 28.89                     |
| Total                          | 136       | 135        | 100        | 100                       |
| Farm ownership                 |           |            |            |                           |
| Personal land                  | 19        | 77         | 13.97      | 57.04                     |
| Family land                    | 115       | 47         | 84.56      | 34.81                     |
| Lease                          | 2         | 11         | 1.47       | 8.15                      |
| Total                          | 136       | 135        | 100        | 100                       |
| Crop cultivated                |           |            |            |                           |
| Maize                          | 51        | 71         | 37.5       | 52.59                     |
| Peanut                         | 7         | 13         | 5.15       | 9.83                      |
| Cotton                         | 37        | 0          | 27.21      | 0.00                      |
| Bean                           | 1         | 3          | 0.74       | 2.22                      |
| Millet                         | 16        | 11         | 11.76      | 8.15                      |
| Sorghum                        | 13        | 1          | 9.56       | 0.74                      |
| Sesame                         | 11        | 18         | 8.09       | 13.33                     |
| Rice                           | 0         | 18         | 0.00       | 13.33                     |
| Total                          | 136       | 136        | 100        | 100                       |

Source: Field data, 2016
| Quality attributes                      | Public system (n = 24) | Private system (n = 95) | t-value | Prob  |
|----------------------------------------|------------------------|-------------------------|---------|-------|
| Affordability of the service           | 2.46                   | 1.28                    | 6.88    | 0.00  |
|                                        | (1.21)                 | (0.58)                  |         |       |
| Appropriateness of the delivery methods| 2.58                   | 1.29                    | 7.56    | 0.00  |
|                                        | (1.33)                 | (0.52)                  |         |       |
| Availability of the service            | 2.87                   | 1.26                    | 8.69    | 0.00  |
|                                        | (1.51)                 | (0.51)                  |         |       |
| Relevance of the service               | 2.2                    | 1.32                    | 5.24    | 0.00  |
|                                        | (1.29)                 | (0.59)                  |         |       |
| Timeliness of the service              | 3.33                   | 1.19                    | 14.08   | 0.00  |
|                                        | (1.17)                 | (0.46)                  |         |       |

Classification: 1. Very Satisfied, 2. Satisfied, 3. Undecided, 4. Dissatisfied, 5. Very Dissatisfied
Source: Field data, 2016

| Quality attributes                      | Public system (n = 39) | Private system (n = 87) | t-value | Prob  |
|----------------------------------------|------------------------|-------------------------|---------|-------|
| Affordability of the service           | 2.41                   | 1.45                    | 6.25    | 0.00  |
|                                        | (1.23)                 | (0.5)                   |         |       |
| Appropriateness of the delivery methods| 2.92                   | 1.38                    | 10.14   | 0.00  |
|                                        | (1.57)                 | (0.55)                  |         |       |
| Availability of the service            | 3.51                   | 1.42                    | 14.31   | 0.00  |
|                                        | (1.12)                 | (0.52)                  |         |       |
| Relevance of the service               | 2.37                   | 1.44                    | 6.92    | 0.00  |
|                                        | (0.94)                 | (0.56)                  |         |       |
| Timeliness of the service              | 3.28                   | 1.37                    | 13.02   | 0.00  |
|                                        | (1.17)                 | (0.48)                  |         |       |

Classification: 1. Very Satisfied, 2. Satisfied, 3. Undecided, 4. Dissatisfied, 5. Very Dissatisfied
Source: Field data, 2016

| Quality attributes                      | Public system (n = 40) | Private system (n = 96) | t-value | Prob  |
|----------------------------------------|------------------------|-------------------------|---------|-------|
| Affordability of the service           | 2.1                    | 1.42                    | 4.54    | 0.00  |
|                                        | (1.15)                 | (0.58)                  |         |       |
| Appropriateness of the delivery methods| 2.82                   | 1.34                    | 9.63    | 0.00  |
|                                        | (1.26)                 | (0.54)                  |         |       |
| Availability of the service            | 2.87                   | 1.36                    | 11.74   | 0.00  |
|                                        | (0.94)                 | (0.54)                  |         |       |
| Relevance of the service               | 2.15                   | 1.49                    | 5.20    | 0.00  |
|                                        | (0.97)                 | (0.58)                  |         |       |
| Timeliness of the service              | 2.95                   | 1.36                    | 10.63   | 0.00  |
|                                        | (1.20)                 | (0.54)                  |         |       |

Classification: 1. Very Satisfied, 2. Satisfied, 3. Undecided, 4. Dissatisfied, 5. Very Dissatisfied
Source: Field data, 2016
scores for those under private (prob = 0.00); meaning farmers under the public system are less satisfied compared to those under private system.

4. Discussion and conclusions

For farmers under public extension services, results related to their perception about the quality of services are mixed. Indeed, even if they expressed satisfaction for some services with respect to the five attributes, the scores they indicated were close to 3 meaning that they tend to be undecided about the real quality of these services. One can attribute the tendency to be undecided about the quality of extension services, to the fact that services are generally provided at a very low level in terms of availability. Indeed, the difficulty to have physical access to some public extension services caused some displeasure from farmers when they were asked about the quality of services they receive; but the desire to be faithful to public extension agents could have led them to generally answer “undecided” to the question asked. Although farmers hesitated about their quality perceptions (tend to be undecided), and based on the assumption made about their fairness to extension agents, we can conclude that majority of them were not actually satisfied. This is consistent with the findings of Sathish, Chandargi, and Meti (2016), Egbe and Eze (2014), Agbarevo (2013), Qtaishat and Al-Sharafat (2012) who found that public extension delivery was

| Quality attributes                      | Public system (n = 11) | Private system (n = 26) | t-value | Prob |
|----------------------------------------|------------------------|-------------------------|---------|------|
| Affordability of the service           | 2.72 (1.19)            | 1.19 (0.63)             | 5.13    | 0.00 |
| Appropriateness of the delivery methods| 3.00 (1.26)            | 1.23 (0.65)             | 5.64    | 0.00 |
| Availability of the service            | 2.45 (0.93)            | 1.31 (0.68)             | 4.19    | 0.00 |
| Relevance of the service               | 2.72 (1.27)            | 1.27 (0.67)             | 4.59    | 0.00 |
| Timeliness of the service              | 3.18 (0.98)            | 1.27 (0.67)             | 6.90    | 0.00 |

Classification: 1. Very Satisfied, 2. Satisfied, 3. Undecided, 4. Dissatisfied, 5. Very Dissatisfied
Source: Field data, 2016

| Variables                                          | Public system | Private system | t-value | Prob |
|----------------------------------------------------|--------------|----------------|---------|------|
| Perceptions about quality of technical support      | 2.58 (0.55)  | 1.39 (0.48)    | 12.67   | 0.00 |
| Perceptions about quality of facilitation of access to credit | 2.71 (0.92)  | 1.27 (0.42)    | 11.29   | 0.00 |
| Perceptions about quality of facilitation of access to market | 2.82 (0.73)  | 1.25 (0.62)    | 6.67    | 0.00 |
| Perceptions about quality of facilitation of input provision | 2.90 (1.26)  | 1.41 (0.43)    | 16.25   | 0.00 |

Classification: 1. Very Satisfied, 2. Satisfied, 3. Undecided, 4. Dissatisfied, 5. Very Dissatisfied
Source: Field data, 2016
not very effective or was of low quality from the farmers’ view-point respectively in India, Nigeria and Jordan, respectively.

All farmers interviewed during the survey having accepted to answer the questions, we can say that farmers in the public zone, compared to the private one, were less reached in terms of making services available to them. As stated in the introduction, the situation can be the consequence of government financial constraints. These constraints hinder public extension services to adequately reach a large proportion of farmers for the two services most provided. In addition, government focuses its intervention on activities that can have a direct impact on production and productivity levels (input provision and technical support), in order to achieve food self-sufficiency goal. That could be the reason why facilitating access to credit and access to market were the services less provided in the public zone in terms of number of farmers reached.

Moreover, it appears that in the two zones, farmers have less access to services related to access to markets than any other service. The reason could be due to the consideration given mostly to food crops when supporting farmers, while food crops in our context are generally subsistence crops of farm families. It can also be concluded (comparing the scores from the two groups by service type) that farmers under private extension system are more stratified with the services they receive than farmers under public extension system. Compared to public extension, Ali (2013), Nnadi, Umunakwe, Nnadi, Chikaire, and Okafor (2012), Sarker and Itohara (2009) also found private extension delivery very effective and of good quality respectively in Pakistan, Nigeria and Bangladesh. The reasons given are related to the good management system of the private sector, availability of financial resources, reliability of private sector interventions, and accountability of all actors involved in extension activities (providers and beneficiaries).

In conclusion, the study shows that provision of extension services needs resources (human, material and financial) which are not always available or sufficient, mostly in the zones covered by public services due to financial constraints. Indeed, in Burkina Faso, Government is financially constrained and that led to a progressive involvement of private initiatives in the provision of extension services. The study shows that private extension was more appreciated by farmers than public extension, even if both groups of farmers expressed a minimum level of satisfaction for the services received.

Findings of the study lead to two major recommendations. Firstly and since farmers served by public extension are less satisfied with the provision of the services, compared to those served by the private sector, government can take two measures: (i) encourage more private sector participation by making the legal and business environment attractive; (ii) improve public sector services with better reach so that farmers will have the incentive to contribute to the cost of services they receive. This recommendation is based on the fact that those receiving private extension do pay for services.

Finally, the study aimed at assessing the quality of extension services from the farmers’ view-point. This study, by highlighting the level of satisfaction of farmers with extension services, gauges the quality of services from farmers’ viewpoint. It reveals the strengths and weaknesses of the extension systems delivered in Burkina Faso, and therefore informs policy makers about what to improve and promote as extension services. As it has been argued in previous sections, the challenges that extension services are facing are almost the same in developing countries. Therefore the recommendations could be suitable for other developing countries, based on additional studies.
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Competing interests
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Notes
1. National agricultural extension and advisory system.
2. This figure represents the number of farmers in the public zone among the 136, who stated having access to facilitation of access to credit.
3. Mean value.
4. Standard deviation value.

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