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**Presenter Information**

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# Feed markets in the late dry season across agro-ecological zones in Burkina Faso

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**Key words:** Feed resources; Feed quality; Feed market; Ruminants; West African Sahel

## Abstract

Limited access to adequate quantities of high-quality feed is a major constraint to livestock productivity in smallholder systems in the West African Sahel. As a result of the increase in the livestock population and the associated growth in the demand for feeds, feed markets have sprung up in many cities and towns in the region. However, there is little available information on price variations for different feed types across agro-ecological zones in Burkina Faso. Information on feed price and quality is essential to developing strategies to match feed supply with demand. Surveys on the price and quality of feeds at nine feed markets in peri-urban areas across the four agro-ecological zones in Burkina Faso were conducted in the late dry season (March–May) in 2019. In each location, at least 10 feed sellers were interviewed. Samples of major feeds on sale at the markets were collected for laboratory analysis. Cowpea hay had the highest price of  $394 \pm 53$  FCFA per kg DM in Ouagadougou while the feed with the lowest price was sorghum straw, which was  $30 \pm 2$  FCFA per kg DM in Ouahigouya. For nearly all feeds, the prices were highest in Ouagadougou, which is presumably a reflection of higher demand. There was no correlation between price and quality (nitrogen concentration and *in vitro* organic matter digestibility (IVOMD) in the Ouagadougou market. However, there was a significant ( $P < 0.05$ ) positive relationship between price and nitrogen concentration in Dori, and between price and IVOMD in Bobo-Dioulasso and Ouahigouya markets. The results suggest that increasing demand for feed tends to drive up price particularly in the urban areas regardless of the quality. The findings in Dori, Bobo-Dioulasso and Ouahigouya indicate that there is opportunity to develop feed pricing based on quality.

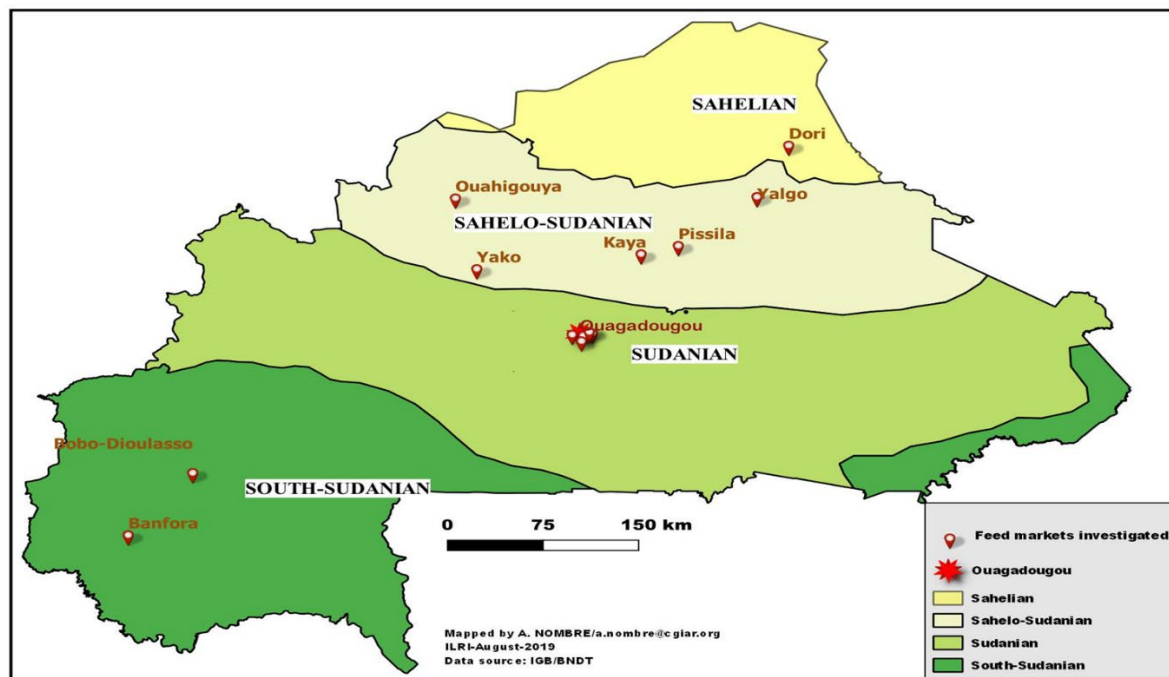
## Introduction

One of the major constraints to livestock productivity in smallholder systems in the West African Sahel is seasonal variability in quantity and quality of feed resources, and the shortage during the dry season. The feed gap in the region has also been exacerbated by the increase in livestock population (Ayantunde et al., 2014) which has driven growth in demand for feed. For example, cattle population in Ouagadougou areas increased from 156,000 in 2014 to 172,000 in 2018 (Ministère des Ressources Animales, 2019). Consequently, most livestock keepers therefore depend on purchased feeds, often at high prices and influenced by seasonal variations. In response to increase in demand for feed, feed markets have sprung up in many cities and towns in West Africa (Ayantunde et al., 2014). These livestock feed markets are usually located near livestock markets and they mainly sell crop residues, agricultural by-products such as cotton seed cake and cereal bran, and concentrate feed from the small-scale feed. However, there is little available information on price variations for different feed types across agro-ecological zones in Burkina Faso. Information on feed price and quality is essential to developing strategies to match feed supply with demand. The objectives of this study were to collect information on the price of livestock feeds at different markets across agro-ecological zones in Burkina Faso, and to assess the relationship between feed price and quality.

## Methods and Study Site

Surveys on price and quality of feeds at nine feed markets in peri-urban areas across the four agro-ecological zones in Burkina Faso (Figure 1) were conducted in the late dry season (March–May) in 2019. In each location, several independent feed sellers were interviewed. Specifically, 29, 25, 21 and 12 feed sellers were interviewed in total in Ouagadougou, Bobo-Dioulasso, Dori and Ouahigouya markets, respectively. At least five women were interviewed in each market except for Ouahigouya where no female feed seller was found. Samples of major feeds on sale at the markets were collected for laboratory analysis and were analysed for dry matter (DM), ash content, nitrogen, fibre components (NDF and ADF), metabolizable energy (ME) and *in vitro* organic matter digestibility (IVOMD) using the near infrared reflectance spectroscopy (NIRS) technique after grinding (1 mm sieve). The feed samples were scanned in spinning sample cells over the NIR spectral range from 800 to 2498 nm in reflectance mode by using a FOSS DS2500 F spectrophotometer with the WinISI II

software package. For data analysis, the data collected in Bobo-Dioulasso and Banfora were combined and referred to as Bobo-Dioulasso while data collected in Dori, Kaya, Pissila and Yalgo were combined and referred to as Dori. Similarly, data collected in Ouahigouya and Yako were combined and referred to as Ouahigouya. Data analysis was performed with SAS (1987) using Frequency and Means procedures for descriptive statistics while Pearson Correlation Procedures was used to analyse the relationship between price and quality of feed, specifically nitrogen content and IVOMD. Unless otherwise specified, the level of significance was set at  $p < 0.05$ .



**Figure 1:** Map of feed markets surveyed across agro-ecological zones in Burkina Faso

## Results

The average age of the feed sellers was  $50.0 \pm 2.28$ ,  $48.1 \pm 2.73$ ,  $44.2 \pm 2.89$  and  $47.1 \pm 3.82$  years in Ouagadougou, Bobo-Dioulasso, Dori and Ouahigouya markets, respectively. Cowpea hay was the most expensive feed at  $394 \pm 53$  Franc CFA (FCFA) per kg DM in Ouagadougou while the feed with the lowest price was sorghum straw, at  $30 \pm 2$  FCFA per kg DM in Ouahigouya (Table 1). Cowpea hay was the priciest feed in all the markets surveyed. Prices of cereal bran (maize, rice, millet and wheat) were similar in all the markets ranging from 94 to 128 FCFA per kg DM except for wheat bran in Dori which had a higher price at  $175 \pm 40$  FCFA per kg DM. The prices of cotton seed cake were also similar in all the markets ranging from 160 to 200 FCFA per kg DM in the late dry season. For nearly all feeds, the prices were highest in Ouagadougou, which is presumably a reflection of higher demand. There was no correlation between price and quality (nitrogen concentration and *in vitro* organic matter digestibility (IVOMD)) in Ouagadougou markets meaning there was no relationship between feed price and quality (Nitrogen:  $r=0.0936$ ;  $n=58$ ;  $p=0.485$ ; IVOMD:  $r=0.114$ ;  $n=58$ ;  $p=0.395$ ). However, there was a significant ( $P < 0.05$ ) positive relationship between price and nitrogen concentration in Dori ( $r=0.624$ ;  $n=13$ ;  $p=0.023$ ), and between price and IVOMD in Bobo-Dioulasso ( $r=0.368$ ;  $n=32$ ;  $p=0.038$ ) and Ouahigouya ( $r=0.598$ ;  $n=12$ ;  $p=0.040$ ) markets.

## Discussion [Conclusions/Implications]

The results that the prices of feed were higher in Ouagadougou markets than in other locations in Burkina Faso were also reported by Sanon et al. (2018) in their studies on an analysis of the feed value chain in Ouagadougou and Bobo-Dioulasso. The results of this study on prices of feeds in the surveyed markets in Burkina Faso are similar to those reported by Ayantunde et al. (2014) and Dan Gomma et al. (2017) from their studies on feed markets in Bamako, Mali, and in Niamey and Maradi in Niger, respectively. In their studies, it was also reported that the legume residues (cowpea hay and groundnut haulms) had the highest prices at the markets though the prices in Bamako in 2013 were more than 50% higher than the prices found in our surveyed markets in Burkina Faso in 2019 for the same late dry season. The prices of cereal bran and cotton seed cake found in

**Table 1.** Feed prices (Franc CFA/kg dry matter) in major markets in Burkina Faso in the late dry season (March - May 2019)

Feed	Ouagadougou		Bobo-Dioulasso		Dori		Ouahigouya	
	n	Mean±s.e.	n	Mean±s.e.	n	Mean±s.e.	n	Mean±s.e.
Bush hay	17	102±9 <sup>c</sup>	7	75±4 <sup>c</sup>	5	99±12 <sup>b</sup>	2	83±5 <sup>c</sup>
Cotton seed cake	4	168±28 <sup>b</sup>		200±13 <sup>a</sup>	9	167±10 <sup>a</sup>	10	160±5 <sup>b</sup>
Cowpea hay	5	394±53 <sup>a</sup>			3	173±22 <sup>a</sup>	5	292±32 <sup>a</sup>
Cowpea pod husks	11	209±8 <sup>b</sup>	3	145±44 <sup>b</sup>	5	130±18 <sup>a</sup>		
Groundnut haulms	16	338±32 <sup>a</sup>		146±6 <sup>b</sup>	3	103±4 <sup>b</sup>	5	244±11 <sup>a</sup>
Faiderbhia albida (browse)	2	108±2 <sup>c</sup>		132±2 <sup>b</sup>	2	153±2 <sup>a</sup>		
Maize bran	11	117±6 <sup>c</sup>			4	119±6 <sup>b</sup>		
Millet straw	4	115±39 <sup>c</sup>						
Concentrate feed ruminant			2	175±5 <sup>a</sup>				
Cotton grain			3	225±32 <sup>a</sup>				
Cotton straw			6	180±42 <sup>a</sup>				
Maize straw			9	97±11 <sup>c</sup>				
Rice bran			12	103±5 <sup>c</sup>				
Rice straw			2	170±18 <sup>a</sup>				
Sorghum bran			2	138±13 <sup>b</sup>				
Sorghum straw					2	65±45 <sup>c</sup>	6	30±2 <sup>d</sup>
Wheat bran			5	94±14 <sup>c</sup>	3	175±40 <sup>a</sup>	7	128±23 <sup>b</sup>

this study are also similar to the prices reported from a survey of the feed markets in Bamako, Mali reported by Ayantunde et al. (2014). This suggests that the prices of agro-industrial by-products (cereal bran and cotton seed cake) are generally stable as their availability tends not to depend on season compared to the legume residues and cereal straws. The high prices of cowpea hay and groundnut haulms in the markets we monitored were a reflection of the high demand for these feeds and not necessarily their quality as confirmed by the results of a lack of relationship between the price and quality of feed (nitrogen concentration and IVOMD) in Ouagadougou markets. This implies that consumers in Ouagadougou markets are paying more for these feeds than in other towns in Burkina Faso where the demand is not so high. A similar trend has been reported for feed markets in Bamako, Mali (Ayantunde et al., 2014). To address this disparity between feed price and quality, there is a need to create awareness among feed buyers by the extension services on the quality of what they are buying so as to have better value for their money. Also, the livestock producers in urban and peri-urban areas in West Africa should be sensitized on the nutritional value of agro-industrial products and concentrate feeds for ruminants whose prices are lower than those of the legume residues (cowpea hay and groundnut haulms) and are of comparable nutritional value as part of a balanced ration for ruminants. Besides, their availability is constant across seasons unlike crop residues. Sharing results from research on feed price and quality with key livestock stakeholders is essential to awareness building. The positive correlation between price and quality of feed sold in the markets in Dori and Ouahigouya could be a reflection of the knowledge of the nutritional value of different feeds by the buyers who are generally experienced livestock keepers, for example in Dori the buyers are largely sedentarized pastoralists. Based on previous work we would expect the price of feed to correspond with quality but this was not the case in the peri-urban areas of Ouagadougou and in many big cities and towns of West Africa where there is high demand for livestock feeds.

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