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# Survey of the farm management, focusing on the regional difference and cattle farming in Burkina Faso

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**Key words:** Burkina Faso; cattle farming; farm management; regional difference

## Abstract

In Burkina Faso the history using of cattle as draft power for cultivation is not long. This study was conducted to investigate the farm management, focusing on the regional difference and the presence of cattle farming in the country. Interview was carried out on 30 farms from B Province in the Centre-West Region consisting of 8 non-cattle owners (BNs) and 22 cattle owners (BCs), and on 9 farms of cattle owners from H Province in the Haut-Bassins Region (HCs) in November 2013. The average household sizes of BNs, BCs and HCs were 16.5, 27.2 and 31.3, respectively. The ratios of BNs, BCs and HCs having income sources from livestock farming equivalent to or more than crop farming were 25, 50 and 67%, respectively. The average cattle number of BCs was 8.6 and that of HCs was 50.8. The average planted areas of BNs, BCs and HCs were 4.9, 12.0 and 7.0 ha, respectively. The BCs and BNs had large planted area of millet, rice, sorghum and peanut, on the other hand, planted area of maize, sesame seed, cotton and vegetables was large in HCs. The gross income from the crop farming of BNs and BCs were 95,000 and 114,000 FCFA/year, respectively, which were higher than that of HCs: 59,000 FCFA/year. The gross income and profit from cattle farming of HCs were twice and thrice as high as those of BCs, respectively. The ratio of the gross income from cattle farming to that from total farming of BCs and HCs were high, 72 and 80%, respectively. The results suggested that cattle farming contributed to the profit of farmers in B Province, who had a low profit margin of the crop and vegetable farming due to the constraints of soil condition and climate results from the limit of precipitation.

## Introduction

In Burkina Faso, an interior country of Western Africa, about 80 percent of population mainly engages in agro-pastoral, the country's primary industry. Therefore, as a driver of economic growth, the agricultural promotion has become the priority policy of the country (JIRCAS 2015). The history using of cattle as draft power for cultivation is not long in the country (Goe 1990). This study was conducted to investigate the farm management, focusing on the regional difference and the presence of cattle farming in the country.

## Study Sites and Methods

Surveys were conducted in the B Province of Centre-West Region and H Province of Haut-Bassins Region of Burkina Faso in November 2013. The B Province is located in Sudan savanna climatic zone and the annual precipitation in the area around 800 mm, and the H Province is located in Guinea savanna climatic zone and the annual precipitation in the area around 1,200 mm (World Meteorological Information 2020). Interview was carried out on 30 farms from B Province consisting of 8 non-cattle owners (BNs) and 22 cattle owners (BCs), and on 9 farms of cattle owners from H Province (HCs) using a questionnaire on a household size, major income sources, a farm management type, employment of labour, numbers of animals born, owned, purchased and sold, planted area (ha), crop production (ton/year), crop yield (ton/ha/year), and selling prices of animals, animal products and crops. The incomes from selling animals, animal products, crops and vegetables were calculated by the selling prices and number of animals or amount of the products sold. The expenditures for livestock farming were calculated by the buying prices of animals and feeds, numbers of animals and amount of feeds purchased. The profits from livestock farming were calculated by subtracting the expenditures for livestock farming from the incomes of selling animals and animal products. The profits from total farming were calculated by subtracting the expenditures for animal farming and the labour costs from total selling incomes. The results were analyzed using GLM procedure of Statistical Analysis System (SAS 1998). The mathematical model was  $Y_{ij} = \mu + F_i + E_{ij}$ , where  $\mu$  = the overall mean,  $F_i$  = farm type (BCs, BNs and HCs),  $E_{ij}$  = the residual error.

## Results

### *Household sizes, major income sources, farm management and employment of labour*

The average household sizes of BNs, BCs and HCs were 16.5, 27.2 and 31.3, respectively (Table 1). The ratios of BNs, BCs and HCs having income sources from livestock farming equivalent to or more than crop farming were 25, 50 and 67%, respectively. Although no farm managed for subsistence only but for cash to a greater or lesser extent, fully commercial farms accounted for 13, 27 and 44% in BNs, BCs and HCs, respectively. Eighty-nine percent of HCs employed labour, but labour employing farms accounted for 23% in BNs and 25% in BCs.

Table 1. Household sizes, major income sources, farm management types and employment of labour in three types of farms in Burkina Faso

Farm types	No. of farms	Household sizes	Major income sources <sup>1</sup>			Farm management <sup>1</sup>		Employment of labour <sup>1</sup>	
			Livestock	Crop	Livestock and crop	Commercial	Semi-commercial	Yes	No
BNs	8	16.5	1(13)	6(75)	1(13)	1(13)	7(88)	2(25)	6(75)
BCs	22	27.2	8(36)	11(50)	3(14)	6(27)	16(73)	5(23)	17(77)
HCs	9	31.3	6(67)	3(33)	0(0)	4(44)	5(56)	8(89)	1(11)

<sup>1</sup>Numbers of farms (% in total farms). BNs, farms of non-cattle owners from B Province in the Centre-West Region; BCs, farms of cattle owners from B Province in the Centre-West Region; HCs, farms of cattle owners from H Province in the Haut-Bassins Region.

### *Numbers of animals, planted areas, crop production and crop yields*

The average numbers of animals are presented in Table 2. The HCs owned large number of cattle than the BCs (males: 19.0 vs. 4.8, females: 31.8 vs. 3.8,  $p < 0.05$ ). The BCs and HCs had numerically more female sheep and goats than BNs. Table 3 shows average planted areas (ha), crop production (ton/year) and crop yields (ton/ha/year). The average planted areas of millet and sorghum in BCs were larger than those in HCs, and the planted areas of maize and vegetables in HCs were largest among the farm types ( $p < 0.05$ ). The total planted area of BCs was larger than that of BNs ( $p < 0.05$ ). Average production of maize was higher in HCs than those in BNs and BCs (6.89 vs. 0.55 and 1.05,  $p < 0.05$ ), and those of sorghum was higher in BCs than those in BNs (2.19 vs. 0.65,  $p < 0.05$ ). The HCs had the highest maize and sorghum yields among the farm types showing 1.81 vs. 0.99 and 0.92, and 1.41 vs. 0.47 and 0.60 for HCs, BNs and BCs, respectively ( $p < 0.05$ ).

Table 2. Average number of animals in three types of farms in Burkina Faso

Farm types	Cattle	Sheep	Goats	Pigs	Horses	Donkeys	Chickens	Ducks	Guinea fowls <sup>1</sup>
Males									
BNs	-	2.6	2.5	0.3	0.0	0.9	5.9	0.0	16.6 <sup>ab</sup>
BCs	4.8 <sup>a</sup>	2.5	4.9	0.9	0.1	1.2	19.2	0.1	33.5 <sup>b</sup>
HCs	19.0 <sup>b</sup>	2.0	3.2	0.0	0.0	1.0	6.6	0.1	6.7 <sup>a</sup>
Females									
BNs	-	5.9	5.8	0.9	0.0	0.3	19.9	0.0	
BCs	3.8 <sup>a</sup>	10.1	13.6	1.3	0.1	1.1	55.1	0.6	
HCs	31.8 <sup>b</sup>	12.6	10.1	0.0	0.0	1.1	36.3	0.8	

<sup>1</sup>Sexuality was not identified. <sup>ab</sup>Means in a column with different superscripts significantly differ ( $p < 0.05$ ). BNs, farms of non-cattle owners from B Province in the Centre-West Region; BCs, farms of cattle owners from B Province in the Centre-West Region; HCs, farms of cattle owners from H Province in the Haut-Bassins Region.

Table 3. Average planted areas, crop production and crop yields in three types of farms in Burkina Faso

Farm types	Maize	Millet	Rice	Sorghum	Cow-pea	Ground-nut	Bambara-bean	Sesame	Cotton	Veg.	Total
Planted area (ha)											
BNs	0.69 <sup>a</sup>	1.28 <sup>ab</sup>	0.39	1.39 <sup>ab</sup>	0.61	0.41 <sup>b</sup>	0.06	0.03	0.00	0.16 <sup>a</sup>	4.87 <sup>a</sup>
BCs	1.08 <sup>a</sup>	2.63 <sup>b</sup>	0.40	4.23 <sup>b</sup>	1.88	2.02 <sup>b</sup>	0.29	0.09	0.00	0.22 <sup>a</sup>	12.04 <sup>b</sup>
HCs	3.53 <sup>b</sup>	0.42 <sup>a</sup>	0.06	0.67 <sup>a</sup>	0.86	0.00	0.00	0.50	0.22	0.75 <sup>b</sup>	7.03 <sup>ab</sup>
Crop production (ton/year)											
BNs	0.55 <sup>a</sup>	0.64	0.22	0.65 <sup>a</sup>	0.17	0.33	0.01	0.00	0.00	NI	
BCs	1.05 <sup>a</sup>	1.02	0.59	2.19 <sup>b</sup>	0.69	0.92	0.10	0.03	0.00	NI	
HCs	6.89 <sup>b</sup>	0.41	0.22	0.97 <sup>ab</sup>	0.13	0.00	0.00	0.13	0.22	NI	
Crop yields (ton/ha/year)											
BNs	0.99 <sup>a</sup>	0.60	0.68	0.47 <sup>a</sup>	0.32	1.00	0.10	0.00	-	NI	
BCs	0.92 <sup>a</sup>	0.59	1.02	0.60 <sup>a</sup>	0.45	0.64	0.43	0.22	-	NI	
HCs	1.81 <sup>b</sup>	0.93	4.00	1.41 <sup>b</sup>	0.17	-	-	0.44	1.00	NI	

<sup>ab</sup>Means in a column with different superscripts significantly differ ( $p < 0.05$ ). Veg., vegetables; BNs, farms of non-cattle owners from B Province in the Centre-West Region; BCs, farms of cattle owners from B Province in the Centre-West Region; HCs, farms of cattle owners from H Province in the Haut-Bassins Region; NI, not identified.

### ***Selling incomes, expenditures and profits***

The average selling incomes, expenditures and profits are shown in Table 4. The incomes from selling crops in BCs were higher than those in HCs, and the incomes from selling vegetables in HCs were higher than those from BNs and BCs ( $p < 0.05$ ). The HCs had more incomes and profits from cattle farming than the BCs ( $p < 0.05$ ); twice and thrice as high as those of BCs, respectively. The profits from total farming were highest in HCs and lowest in BNs ( $p < 0.05$ ).

Table 4. Selling incomes, expenditures and profits in three types of farms in Burkina Faso<sup>1</sup>

Farm types	Selling incomes <sup>2</sup>				Expenditures		Profits	
	Cattle	Animals except cattle	Crops	Vegetables	Cattle	Labour costs	Cattle	Total farming
BNs	-	110(40)	95(35) <sup>ab</sup>	70(25) <sup>a</sup>	-	18 <sup>a</sup>	-	257 <sup>a</sup>
BCs	1588(72) <sup>a</sup>	316(14)	114(5) <sup>b</sup>	182(8) <sup>a</sup>	555	666 <sup>b</sup>	1032 <sup>a</sup>	1534 <sup>b</sup>
HCs	3336(80) <sup>b</sup>	114(3)	59(1) <sup>a</sup>	647(16) <sup>b</sup>	250	511 <sup>b</sup>	3086 <sup>b</sup>	3634 <sup>c</sup>

<sup>1</sup>1,000 FCFA/year. <sup>2</sup>Values in parentheses were percentages of total selling income. <sup>abc</sup>Means in a column with different superscripts significantly differ ( $p < 0.05$ ). BNs, farms of non-cattle owners from B Province in the Centre-West Region; BCs, farms of cattle owners from B Province in the Centre-West Region; HCs, farms of cattle owners from H Province in the Haut-Bassins Region.

### **Discussion**

The larger planting areas of millet and sorghum in BCs than those in HCs, and larger planting areas of maize and vegetables and higher production and yields of maize in HCs than those in BNs and BCs (Table 3) might be attributed to the differences of climate and soil condition between the sites; more rainfall and better soil for maize and vegetables in HCs. The higher incomes and profits from cattle farming of BCs and HCs than

BNs brought about the more total farming profits, might be resulting in larger household sizes in the farms (Table 1 and 4). The more number of cattle owned and of farms employing labour in HCs than in BCs (Table 2) indicated the difference of the purpose of cattle farming between the farm types; cattle were mainly for draft power and fed with crop by-products in BCs and mainly for dairy and beef grazing in common land in HCs. The results suggested that cattle farming contributed to the profit of farmers in B Province, who had a low profit margin of the crop and vegetable farming due to the limit of precipitation (World Meteorological Information 2020). Although raising large number of cattle for milk and meat would give the farmers incentives for the profits, several problems, concerning climate risk on crop-livestock systems and residue management and fertilizer use in smallholder farmers e.g., have been observed in the country (Rigolot et al. 2017; Henderson et al. 2018). It is necessary to propose appropriate number of cattle and land area for cropping and grazing, introduction of pasture and legume trees adapted to the environment, utilization of cattle excreta and manure for covering on and nutrient inputs in crop field etc.

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