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PEASANT STRATEGIES FOR ANIMAL TRACTION FARMING IN FOOD CROP PRODUCTION IN THE KORHOGO DEPARTMENT, COTE D'IVOIRE

SAWADOGO épouse KOUYATE Zounabo [1,*], Seu KAMBIRE [1], KOUASSI Brou Guillaume [1], MANE épouse CISSE Djeneba [2] and YESSOH M'Boua Jean Marie [1]

[1] Laboratory of Agronomy, Forestry and Crop Protection, Joint Research Unit for Agronomic Sciences and Processing Technologies, Felix HOUPHOUËT-BOIGNY National Polytechnic Institute, PO Box 1093, Yamoussoukro, Côte d'Ivoire.
[2] Agriculture Department, Institute of Agropastoral Management, Pelefero GON COULIBALY University of Korhogo, PO Box 1328 Korhogo, Cote d'Ivoire.
* Corresponding Author

ORCID Details
SAWADOGO épouse KOUYATE Zounabo: https://orcid.org/0009-0004-5076-8891
Seu KAMBIRE: https://orcid.org/0000-0002-6715-1108
KOUASSI Brou Guillaume: https://orcid.org/0009-0004-8494-3811

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ABSTRACT

To reduce the strain of work and address labour shortages, animal traction is an alternative to motorisation for small-scale farmers. This study aims to analyse farmers' strategies relating to the use of animal traction food crop production in the Korhogo department. Data collected using questionnaires, interviews, and observations, before being processed using Excel software. The survey conducted on a sample of 346 farmers from twelve agricultural cooperatives practising animal traction in food crop production. The results revealed that farmers surveyed farms between one hectare and sixteen hectares. Their farming strategy is based on crop diversification, with a predominance of maize, rice and market garden crops. The draught oxen used are the local 'Peulh zebu' breed, acquired through purchase or hire using the farmer's own funds. Farmers put the animals to work for an average of 6 hours a day, feeding them fresh grass, rice bran, or maize bran. Most used implements for agricultural work are the plough, the "Canadian" and the seed drill, which either purchased or hired. However, although animal traction represents a solution suited to the economic realities of small-scale farmers, its effectiveness and widespread adoption depend on technical support, access to agricultural finance and local capacity building.

Keywords: Animal Traction, Food Crop, Korhogo, Cote d'Ivoire.

1 INTRODUCTION

Agriculture plays a strategic role in Africa. It employs more than 55 % of the working population [1]. In Côte d'Ivoire, agriculture accounts for nearly 22 % of gross domestic product (GDP) and provides a livelihood for more than two-

thirds of the working population [2]. Beyond its contribution to GDP, agriculture supplies local markets, promotes household resilience, and plays a key role in the fight against poverty.

According to the National Agricultural Investment Program (PNIA), more than 70 % of Ivorians depend directly or indirectly on agriculture for their livelihoods. Food crop production in Côte d'Ivoire is the dominant activity in the northern regions, such as the Korhogo department. In these regions, agriculture is based on family farms that rely on local labour and hand tools [3].

Furthermore, the use of animal power (cattle) to replace human labour in agriculture, introduced in Côte d'Ivoire in the 1970s by the Ivorian Textile Development Company (CIDT) to intensify cotton production in the savannah regions, particularly in Korhogo. Animal traction is more accessible than motorisation, and its implementation requires less technical knowledge, financial resources, and infrastructure [4]. It is well suited to small and medium-sized farms and represents an accessible solution for farmers with limited financial resources [5]. Thanks to support from various agricultural development program, animal traction has gradually become more widespread amongst smalls farmers [6]. However, its adoption remains uneven, and the associated practices vary according to local contexts.

Whilst owning a draught oxen has facilitated the transition to animal traction farming on holdings, this is not the only route to such a transition [7]. With the evolution of production systems and the need to increase agricultural productivity without systematically resorting to heavy motorisation, it is essential to gain a better understanding of farmers' practices and reasoning regarding animal traction cultivation to improve its adoption and dissemination. It is against this backdrop that the present study is set; its main objective is to analyse farmers' strategies for using animal traction in food crop production in the Korhogo department. More specifically, the study aims to determine the socio-professional profile of those using animal-drawn cultivation in food crops, to identify the technical characteristics of animal traction cultivation, and to analyse the associated farmers' strategies.

The originality of this study lies in the fact that the results obtained will help to document the smallholders' strategy for animal traction in crop food farming in the Korhogo department and provide useful information for its sustainability. It could also serve as a reference point for future studies on improving agricultural mechanisation in Cote d'Ivoire.

2 MATERIALS AND METHODS

2.1 Overview of the study area

The department of Korhogo is situated in the north of Côte d'Ivoire, approximately 600 km from Abidjan. It is the administrative center of the Poro region and the Savanes district. It has an estimated population of 536,851, representing an average population density of 42.9 inhabitants per square kilometres [2]. The department comprises sixteen sub-prefectures. It is limited to the north by M'Bengue department, to the north-east by that of Sinematiali, to the south-east by Niakaramadougou, to the south by Dikodougou and to the west by Boundiali [8] (Figure 1).

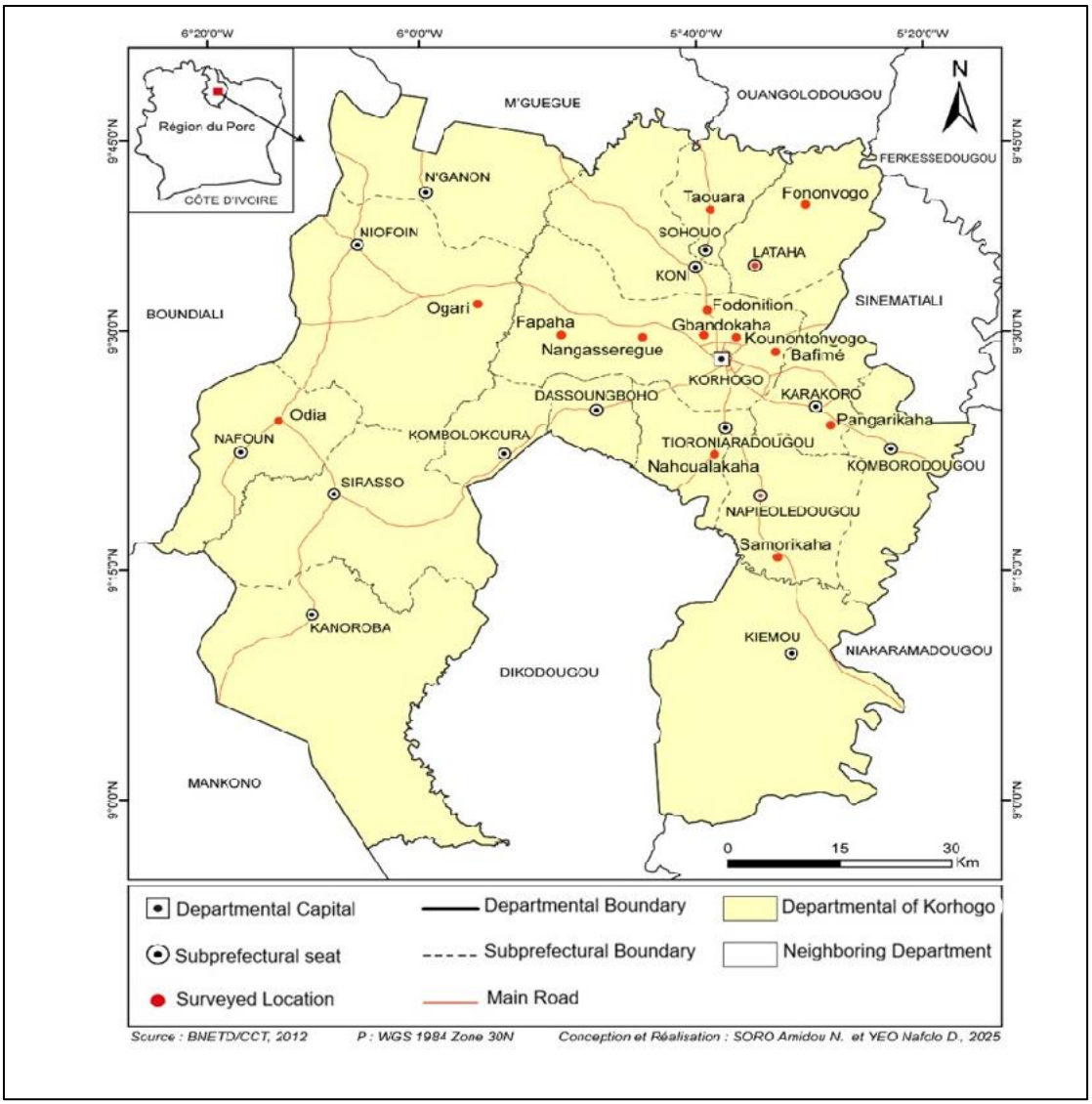


Figure 1: Map of the Korhogo department

2.2 Materials and methods

The technical materials used in this study comprised a questionnaire for farmers and an interview guide for the chairpersons of cooperatives. To prepare for the survey, meetings were held between 7 and 14 April 2025 with the various cooperatives. The survey sample realised from farmers who are members of the twelve (12) farmers cooperatives practicing animal traction to farming for food crops and located in fifteen localities in the Korhogo department. The list of these cooperatives obtained from the Poro Regional Directorate of the Ministry of Agriculture, Rural Development and Food Crop Production. The twelve (12) cooperatives to which the surveyed producers belong are UDECACI COOP-CA, SOCAK, SCOOP-CA-C.A.C. K, WOBATIN, COPASOKO-COP-CA, SCOOPS COSO CI, COPAWOTKO, COAEK, SCOOP CEPKOHO, COOP-SO-SK, NONTONWA and WOWELA. The sample size was determined using Formula 1 proposed by [9] as follows :

$$n = \frac{\frac{z^2 * p(1-p)}{e^2}}{1 + (\frac{z^2 * p(1-p)}{e^2 N})}$$

N = Population size
z = z-score or confidence level (for α = 5%, z = 1.96)
e = Margin of error (5%)
p = Standard deviation (often equal to 0.5)

Applying the formula to the total number of producers, i.e., 3,763, resulted in a sample of 346 producers to surveyed. The number of producers to surveyed were then allocated to cooperatives in proportion to their membership numbers

(Table 1). During the surveys, only producers practicing animal traction cultivation selected from within the cooperatives.

The field survey took place from 24 April to 20 June 2025. The interviews conducted individually at the production sites. The survey conducted by a lead interviewer, assisted by two "Senoufo" interpreter assistants to facilitate communication and enhance the quality and coverage of the survey. At the same time, interviews conducted with the chairpersons of cooperatives and observations of practices made.

The data collected entered and processed using Excel software. This processing enabled a descriptive statistical analysis and a qualitative assessment of the key variables.

Table 1: Breakdown of producers surveyed by cooperative and locality.

Cooperatives	number of members	Number of selected members	Sub-prefecture	Villages
UDECACI COOP-CA	2 160	200	Lataha	Kounontovogo
				Gbandokaha
				Fononvogo
			Napié	Samorikaha
SOCAK	107	10	Karakoro	Pangarikaha
SCOOP-CA-C.A.C. K	20	2	Lataha	Lataha
WOBATIN	20	2	Niofoin	Ogari
COPASOKO-COP-CA	25	2	Napié	Napié
SCOOPS COSO CI	20	2	Sohouo	Tahouara
COPAWOTKO	52	5	Nafoun	Odia
COAEK	500	46	Korhogo	Fapaha
SCOOP CEPKOHO	200	18		Bafimé
COOP-SO-SK	75	7		Nangasseregue
NONTONWA	235	21		Fodonition
WOWELA	343	31	Tioro	Naouhalakaha
Total	3763	346		

3 RESULTS

3.1 Socio-occupational profile of users of animal traction in food crops

The socio-occupational characteristics such as gender, age, origin, educational attainment, producer status, marital status, and training considered in this study presented in Table 2. Several trends emerge.

The breakdown by gender shows a predominance of men amongst food crop producers, with 58 % men compared with 42 % women. The most represented age group is 31 to 50 years (58 %), followed by those aged over 51 (29 %) and young people aged 18 to 30 (13 %). A large majority of producers (92 %) are indigenous, compared with 7 % who are non-indigenous and 1 % who are of foreign origin.

The level of literacy is low. 90.91 % of producers have received no formal education, 7.10 % have completed primary education, and only 1.99 % have completed secondary education.

According to the survey results, most farmers (73 %) have received training in agricultural practices, whilst 27 % have received none.

Table 2: Socio-demographic profile of producers

Description	Arrangements	Staff Numbers	Proportion (%)
Gender	Mans	201	58
	Women	145	42
Age group	18 to 30 years	46	13
	31 to 50 years	200	58
	More than 51 years	100	29
Origin	Indigenous	318	92
	Non-indigenous	23	7
	Foreign	5	1
Level of education	Primary	23	7,10
	Secondary	4	1,99
	None	319	90,91
Education received	Yes	254	73
	No	92	27

3.2 Technical characteristics of animal traction in food crops

3.3 Introduction of animal traction in farming practices

All the farmers surveyed have been using animal traction in agriculture for more than ten years. Most of farmers (91 %) state that they learnt animal traction in agriculture from their parents, compared with 9 % who say they trained by the Ivorian Textile Development Company (CIDT) (Figure 2)..

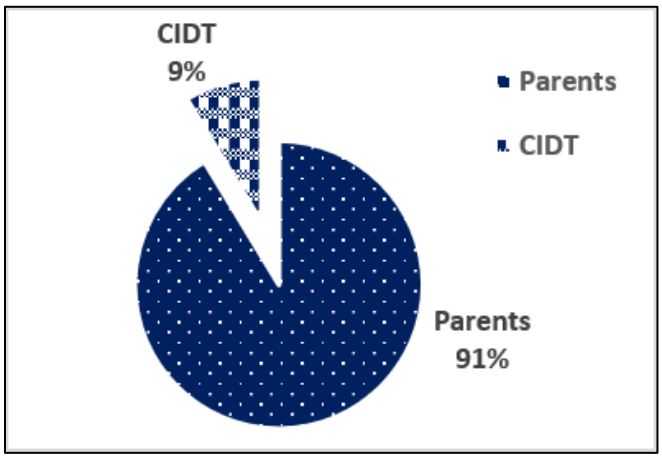


Figure 2: Proportions of learning sources of animal traction in food crops

3.3.1 Crops grown by farmers.

The survey results reveal a diversity of food crops grown by farmers using animal traction cultivation in the Korhogo department. Among these, the main crops are rice (26 %) and maize (27 %), which play an almost equal central role in local food systems. Next come vegetable crops (17 %), comprising aubergines, tomatoes, okra, cucumber, lettuce, cabbage, courgette, onion, carrot and sorrel; and other food crops (30 %), which include a variety of crops such as groundnuts, beans, sweet potatoes, millet, sorghum, soya beans and cassava (Figure 3).

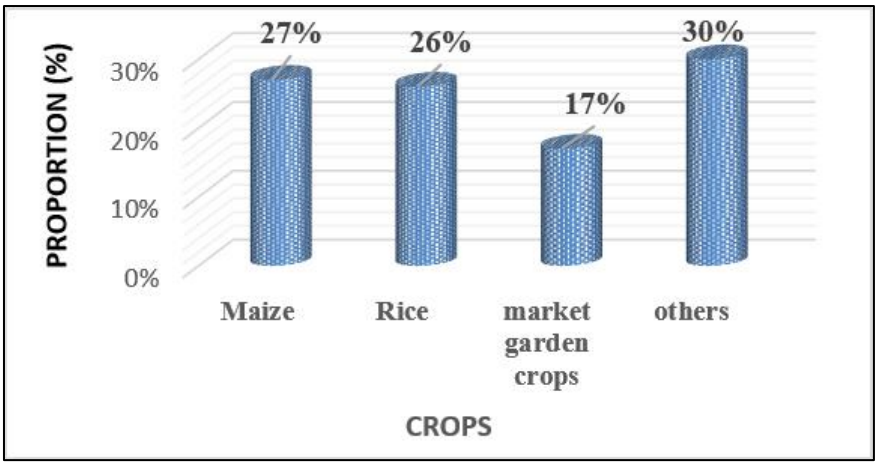


Figure 3: Types of speculation practised and their proportion.

3.3.2 Means of acquiring crop land

The several ways in which farmers gain access to land shown in Figure 4. Most farmers (52.60 %) acquired their plot through inheritance, whilst 45 % farm on a loan basis, 2 % of farmers rent their plot (sharecropping) and only 1 % have free access to land. The methods of land access remain dominated by traditional mechanisms (inheritance, loan), reflecting the prevalence of customary law.

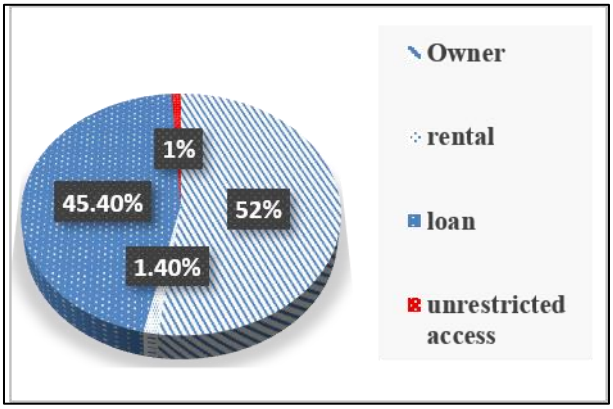


Figure 4: Proportion of producers by method of land acquisition

3.3.3 Area farmed by the producers

The data collected reveals considerable variation in the distribution of cultivated areas across cooperatives, localities, and producers (Figure 5 and Table 3). The results presented in Figure 3 show that 4.95 % of producers farm less than one (1) hectare, whilst more than half of producers (52.75 %) have a plot of land ranging in size from 1 to 5 hectares. More than a third of producers (34.13 %) farm an area of between 5 and 10 hectares, and only 8.17 % farm more than ten hectares.

The area farmed by the cooperatives varies considerably. The COPASOKO-COP-CA cooperative (Napie) farms the smallest area, at 7.50 hectares, whilst the UDECACI COOP-CA cooperative (Fononvogo) farms the largest area, at 343.5 hectares (Table 3).

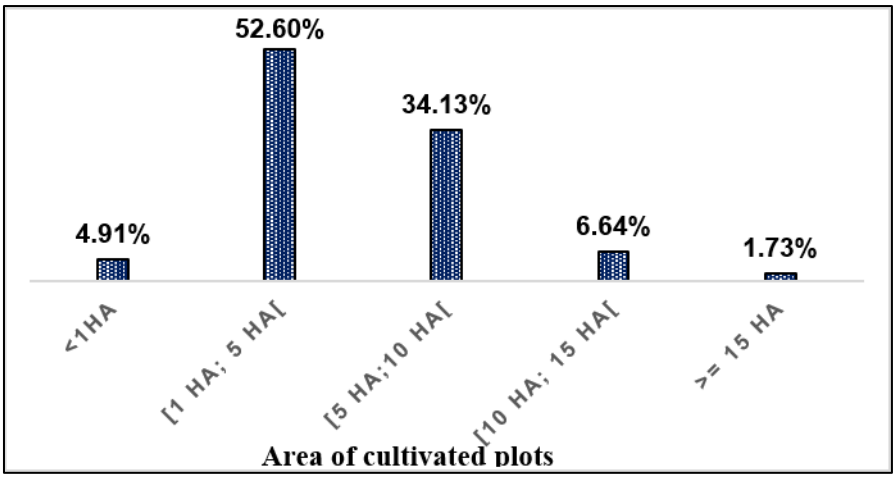


Figure 5: Area farmed by each producer

Table 3: Areas under food crops by cooperative and locality

Cooperatives	Towns	Area (ha)				
		Maize	Rice	Market gardening	Others crops	Total area per cooperative
	Kounontovogo	24,5	25,25	7,25	25	82
UDECACI COOP-CA	Gbandokaha	71,5	44,25	16,75	37,75	170,25
	Fononvogo	274	115,5	27	115	531,50
	Samorikaha	164,75	122,5	18,5	37,75	343,5
SOCAK	Pangarikaha	26	17,5	5,5	10,5	59,50
SCOOP-CA-C.A.C. K	Lataha	3	2,5	1,5	2	9
WOBATIN	Ogari	7	5	0,5	4	16,50
COAEK	Fapaha	80,5	68,5	5,75	38,25	193
SCOOPS COSO CI	Tahoura	12	6	6	2	26
COPAWOTKO	Odia	11	16	0	5	32
COPASOKO-COP-CA	Napie	2	3	1,25	1,25	7,5
SCOOP CEPKOHO	Bafime	35	29,5	10,75	18	93,25
COOP-SO-SK	Nangasseregue	18	16	1,25	5	40,25
NONTONWA	Fodonition	12,75	13,25	5,25	43,25	74,50
WOWELA	Naouhalakaha	45,75	25,75	5,75	6,5	83,75
TOTAL		787,75	510,5	113	351,5	1762,75

3.3.4 Methods used by farmers to acquire draught oxen.

Farmers in the Korhogo department use only oxen as draught animals. Figure 6 shows how farmers acquire these draught oxen. Two main methods stand out: purchase and hire. Purchase is the method used by 51 % of farmers, whilst 49 % opt for hire. Purchases are made in cash. Furthermore, the average age of the oxen used for animal traction is 4 years. The oxen used for animal traction are most often local breeds, the 'Peulh ox', also known as the 'Peulh zebu' or 'ivul Pheul'.

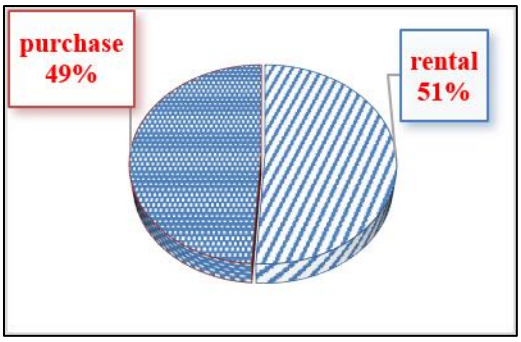


Figure 6: How draught oxen are acquired

3.3.5 Implements used for agriculture animal traction.

Table 4 highlights a variety of agricultural implements used for different farming operations. The implements used are the plough, the "Canadian", the seed drill, the ridger, the harrow and the weeder. Most used implements are the plough and the "Canadian", which used by 100 % of farmers. The seed drill used by 39.88 % of farmers. The harrow used by 28.03% of farmers. The ridger used by 26.58 % of farmers. The weeders, although less common, used by 14.16 % of farmers. Finally, the cart, a tool used for transport, is the least commonly used, with only 8.67% of farmers using it.

Table 4: Agricultural tools used

Tools used	Numbers of users	Percentage	Activities carried out
Cart	30	8,67 %	Transport
Plough	346	100 %	Ploughing
Ridger	92	26,58 %	Ridging,
Harrow	97	28,03 %	Harrowing
Seed drill	138	39,88 %	Sowing
Weeders	49	14,16 %	Weeding
" Canadian"	346	100 %	Canadian-style cultivation

3.4 Farmers' strategies regarding animal traction in food crop

3.4.1 duration of works hours for draught oxen

Data from the survey reveal that farmers using animal traction in food crops work between 5 and 8 hours a day with their oxen. Eighty-three (83) % of farmers use their oxen for 6 hours a day, 10 % work 7 hours a day, 6 % report working 5 hours a day with their oxen, and 1% state that they work 8 hours a day (Figure 7).

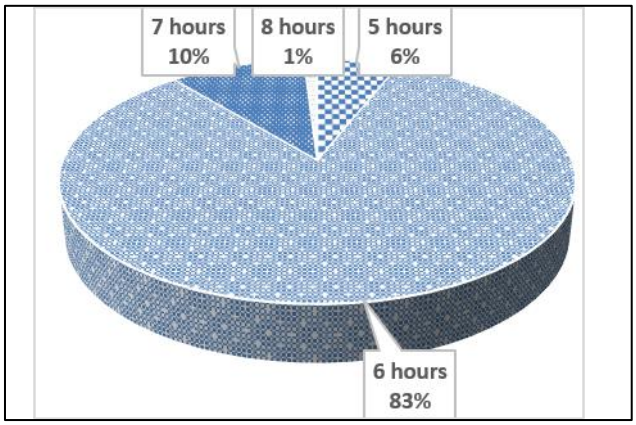


Figure 7: Proportion of producers for the animals' working time

3.4.2 Feeding of draught animals

The cattle fed entirely by their owners, who use fresh grass, rice brand or maize bran, and hay. Figure 8 shows that fresh grass is the most used feed, accounting for 52 %, followed by maize bran (25 %) and rice bran (20 %). By contrast, hay used little, accounting for just 5 %.

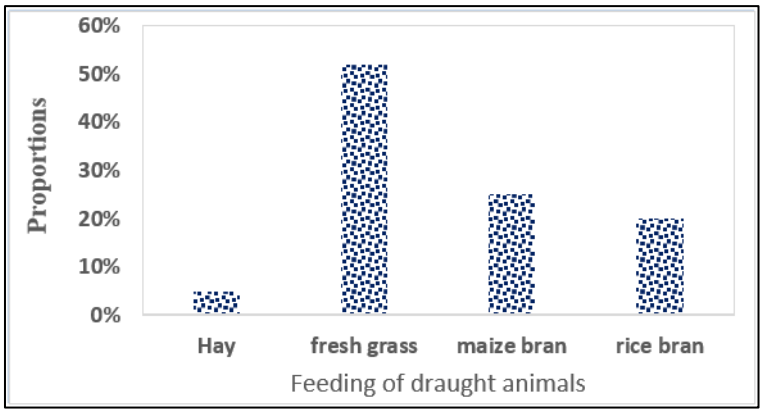


Figure 8: food used for draught animals

3.4.3 Training of animals and reasons for replacing them

The training of the animals conducted entirely by the producers themselves. The team is organised according to well-established criteria, such as the animals' age, weight, experience, and physique. Ageing, which accounts for 71.09 %, is the main reason for replacing draught animals, followed by an inability to perform the required work (26.58 %). Other reasons are marginal, accounting for 2.31 % (Figure 9).

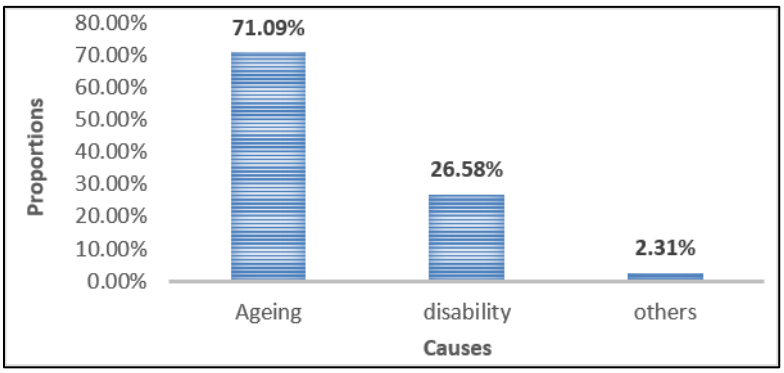


Figure 9: Reasons for replacing draught animals in Korhogo

3.4.4 Alternative uses of draught animals

Draught animals are used less for transport, a function which only 13 % of farmers still use. By contrast, 87 % of farmers do not use them for any secondary purpose. These animals are generally put out to pasture after the production periods, rather than being used for other tasks (Figure 10).

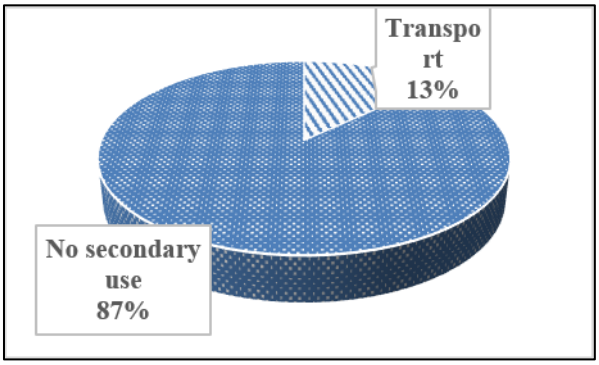


Figure 10: Proportion of farmers with secondary uses of draught animals

3.4.5 Animals care.

Figure 11 shows that most farmers consult vets (69.65 %) to treat their draughts animals, followed by the Fulani (30.34 %). The use of self-treatment (2.89 %) is very low.

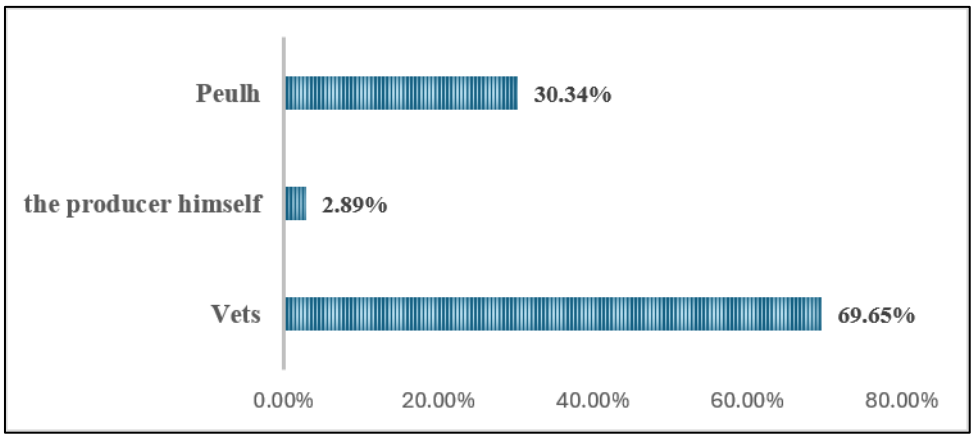


Figure 11: Breakdown of stakeholders involved in the care of draughts animals

3.4.6 Methods of acquiring tools used in animal traction.

The plough and the "Canadian" acquired through hire (51.15 % each) but also purchased (48.85 %) (Figure 12). 41.61 % of farmers purchase the seed drill, compared with 24.27 % who hire it. The remainder do not use them. Implements such as the ridger is acquired purchase, with 16 % of farmers, whilst 10.98 % rent them. The harrow and the weeder exclusively purchased with 14.45 % of farmers.

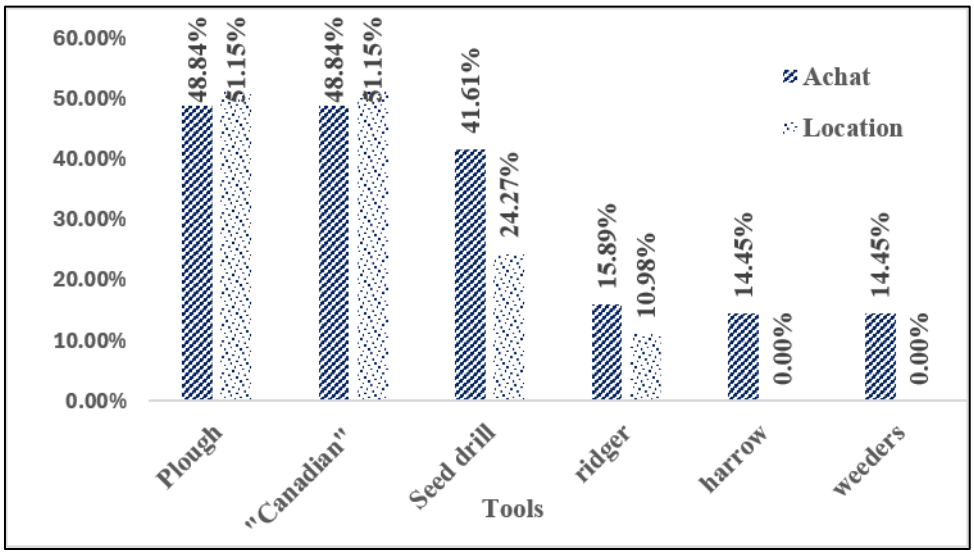


Figure 12: Comparison of methods of acquiring the working tools

3.4.7 Cost and availability of tools used in animal traction.

Farmers have two options (purchase or hire), which allow them to adapt their strategy according to their financial means and their specific needs. The purchase and hire prices for the various agricultural implements most used in draught-powered farming are set out in Table 5. The plough and the "Canadian" are the most implements, with purchase costs ranging from 50,000 FCFA to 170,000 FCFA and from 20,000 FCFA to 170,000 FCFA respectively. Their hire cost ranges from 6,000 FCFA to 10,000 FCFA per day. The seed drill is expensive to buy (70,000 to 250,000 FCFA) but can be hired for 10,000 FCFA per day. The ridger purchased for 250,000 FCFA and can be hired for 10,000 FCFA per day. The harrow costs 50,000 FCFA and is not available for hire, which limits access to it.

Table 5: Acquisition costs of horse-drawn equipment used in food crop farming.

Tools	Purchase cost	rental cost
Plough	50 000FCFA à 170 000FCFA	6 000FCFA à 10 000FCFA
Ridger	250 000FCFA	10 000FCFA
Harrow	50 000FCFA	0FCFA
Seed drill	70 000FCFA à 250 000FCFA	10 000FCFA
"Canadian"	20 000FCFA à 170 000FCFA	6 000FCFA à 10 000FCFA

3.4.8 Distribution of tasks according to the stages of the growing cycle

According to the surveys, 100 % of farmers state that animal draught power used at the start of the season for ploughing and sowing, to take advantage of favorable weather conditions. During the crop growth period, activities such as ridging or weeding conducted on an ad hoc basis, often manually or with additional tools such as the daba, hoe, pickaxe etc., as appropriate. Towards the end of the cycle, animal traction used less frequently, except for transport in areas where horse-drawn carts are available.

3.4.9 Maintenance of animal traction implements

The agricultural equipment used suffers from recurring technical faults, in particular the breaking of drawbars or the rapid wear and tear of certain parts. 100 % of producers entrust maintenance and repairs to local blacksmiths. The farmers themselves conduct regular maintenance such as cleaning, lubrication and proper storage.

3.4.10 Financing mechanisms

In the Korhogo department, the purchase of draught animals relies entirely on farmers' personal savings (100 %). No external financial support, whether from banks, the state or institutions, is utilised. Although cotton companies such as Ivoire Coton assist with the provision of draught equipment, they do not directly finance the purchase of draught oxen, either through credit or subsidies.

3.4.11 Cooperation practices among producers

Figure 13 illustrates cooperation practices amongst producers. These practices include the shared use of draught animals, which practised by 26 % of producers, compared with 74 % who do not share their draught oxen. The shared use of animals amongst producers is a frequent practice, promoting the optimisation of resources within farming communities.

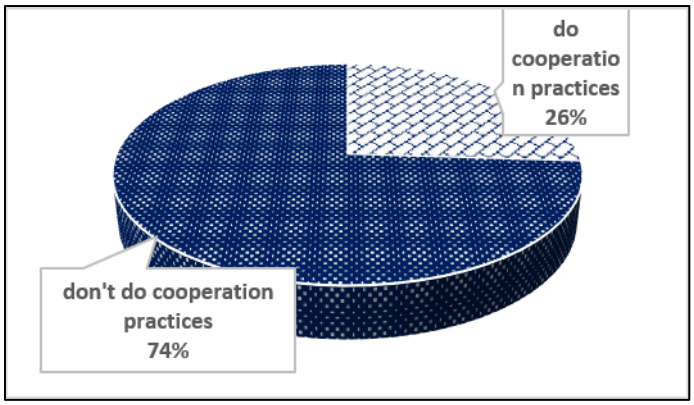


Figure 13: Practice of draught animals amongst farmers

4 DISCUSSION

The study reveals that men make up the majority (58 %) compared with women (42 %). Indeed, men have better access to land and agricultural equipment, which explains their greater representation in this sector. However, the significant presence of women indicates that they also play an active role, often in smaller-scale production units or in short-cycle crops. This trend confirmed by several studies conducted in West Africa. For example, Dossa et *al.,* [10], in a comparative

analysis conducted in Ghana, Nigeria and Mali, shows that men control on average 60–70 % of cultivated land, even in the case of food crops. Similarly, according to [11], African women account for around 43 % of agricultural activities, but have limited access to productive resources, particularly land, credit, and training.

Agricultural datas in the Korhogo department reveal an ageing workforce with low participation among young people, posing a risk of a generational gap. This trend is also evident in Senegal, where young people are turning their backs on farming in favour of urban sectors, jeopardizing the next generation of farmers [4]. The rooted connection of local communities to crop food farming systems in Korhogo reflects the family-based transmission of agricultural knowledge. This finding is consistent with observations made in West Africa, where animal traction farming has persisted in areas with a strong farming identity thanks to the intergenerational transmission of techniques [12].

Food farming diversified, with maize (27 %) and rice (26 %) being the dominant crops. This model of diversification aims to strengthen food security and cushion the effects of climatic hazards, as observed in Burkina Faso, where farmers are diversifying their crops to spread the risks more effectively [13]. Modes of access to land remain dominated by traditional mechanisms (inheritance 52 %, loans 45 %), reflecting the prevalence of customary law. These predominant modes of access allow both indigenous and non-indigenous people to have equal opportunities to access land. However, research in Niger and Togo confirms that whilst this form of access is common, it limits land security and long-term investment [14].

The areas farmed by producers range from less than 1 hectare to sixteen hectares per farmer. This diversity could be explained by factors, including household size, the types of crops grown, and the strategic choices made by producers. It does not necessarily reflect inequalities in access to resources, but rather the diversity of farming profiles within the study area. A comparative study conducted in Burkina Faso attributed this diversity in land area to household size [15].

The oxen used for animal traction are most often local breeds, the ‘Peulh ox’, also known as the ‘Peulh zebu’. Starkey and Faye [4] report the same findings in northern Côte d’Ivoire, where the most common draught animal is the ‘Sudanese Fulani zebu’, a medium-sized animal with short or medium-length horns, and the average age at which they are put to work is between three and four years.

Animal-drawn transport has used by 100 % of farmers for over 10 years. The Ivorian Textile Development Company (CIDT) initially introduced animal traction to boost cotton production in the north. After being trained by the CIDT, parents in turn passed on this expertise to their children. This highlighted in the study by Starkey and Faye [4], who explain that the development of animal-drawn farming in Côte d’Ivoire is linked to the intensification of cotton cultivation around 1970. This finding supports the idea that animal-drawn farming is sustainable, as it is rooted in local culture, as demonstrated in Mali and Burkina Faso [12].

The most used tools are the plough and the "Canadian" (100 %), followed by the seed drill (40 %) and the harrow (28 %). These rates of equipment use are comparable to those observed in Senegal, where the standardisation of oxen draught equipments encourages intermediate mechanised practices [16].

Most implements (except the harrow and the weeder) hired (51 %) or purchased depending on economic means. This flexibility in acquisition is consistent with the cooperative models observed in sub-Saharan African countries [4]. Equipment maintenance conducted locally by farmers or blacksmiths, thereby strengthening their technical autonomy. This is a key factor in the sustainability of animal traction in rural areas of Benin and Cameroon [12].The secondary use of animals for transport is in decline (only 13 %), confirming a regional trend towards the specialisation of draught animals in soil cultivation, as documented in South Africa and Ghana [17, 18]. Furthermore, the introduction onto the market and widespread adoption of tricycles used for transporting crops in the Korhogo department may explain this decline.

Most cattle purchased without external funding, relying solely on the producers’ own funds. This demonstrates financial resilience but also highlights the precarious nature of such investment. In Côte d’Ivoire, following the withdrawal of development projects, agricultural loans are scarce and producers rely on their own funds to purchase equipment. This situation is like that in Cameroon and Benin [19].

Veterinary care provided by veterinarians or Fulani herders. This reliance on local or traditional expertise is common in rural areas with limited veterinary coverage [20]. Furthermore, individual ownership (74 %) of cattle is the norm, but 26 % of producers share their animals. This mechanism of rural solidarity is observed in subsistence agropastoral systems [4] and strengthens the resilience of small-scale producers who lack sufficient resources to purchase draught cattle.

Farmers feed their oxen with local resources, which come either from farmers’ agricultural by-products or from the abundant vegetation found in the natural environment, such as fresh grass, rice, and maize bran. This natural diet

reduces the cost of maintaining draught oxen and, consequently, the cost of animal traction in production. The limited use of hay is due to its cost and availability. This reliance on local resources is frequent practice in animal traction in rural areas, as has also noted [18] in South Africa, where animal feed relies on cheap agricultural by-products.

The training of the animals is conducted entirely by the farmers themselves. This self-training reflects of the intergenerational transfer of knowledge, which reinforces the sustainability of traditional animal traction farming techniques, as observed in West African countries [12]. The organisation of the team is based on specific criteria (age, weight, build, experience), which enables the animals' work to optimised. This rigour in the selection and pairing of animals is a good indicator of local technical expertise, as also reported in studies on animal-drawn systems in Mali and Ethiopia [16]. The draught oxen is only renewed in the event of the animals' ageing or physical incapacity. This follows a logic of maximising their useful life but may also be influenced by certain sociological constraints. This behaviour also observed in extensive systems, where investment in new animals occurs only, when necessary, to avoid unplanned expenditure [4].

Equipment breakdowns are common but are dealt with locally: cleaning, lubrication and repairs by blacksmiths. This illustrates the producers' ability to adapt to a situation where access to formal maintenance services is limited, as also noted in [12].

5 CONCLUSION

This study highlights the importance of animal traction farming as a sustainable agricultural practice that is deeply rooted in subsistence farms in the Korhogo department. It reveals that animal traction remains a key driver for improving the agricultural performance of smallholder farmers in a context of low mechanisation. The intergenerational transfer of know-how, largely conducted by the farmers themselves, together with local adaptations in tool maintenance and animal management, reinforce the sustainability of this technique. Nevertheless, challenges remain, particularly in terms of access to land, equipment and finance, which limit investment opportunities and risk hindering the next generation of farmers. In short, despite the emergence of modern technologies, animal traction farming remains an intermediate solution suited to the economic and social realities of smallholders. Its preservation and development require sustained to strengthen local capacities, secure resources, and encourage more equitable participation by all stakeholders.

STATEMENTS ON COMPLIANCE WITH ETHICAL STANDARDS

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The authors declare that there is no conflict of interest regarding the publication of this paper.

Contributions from the authors

All authors have contributed according to their speciality to the work.

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