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Diversity of work organization patterns in Africa: the family farm in question

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Introduction

Agriculture is the economic sector that employs the largest number of people in the world (Losch, 2022; Malanski et al., 2022). The number of agricultural workers (both family and wage workers) was estimated at 1.3 billion in 2023 accounting for 27% of the global labour force (Dedieu et al., 2023). Countries in the Global North and in the Global South differ in their dynamics of structural change, particularly concerning labour on farms. The countries in the Global North are characterized by low agricultural labour share in the economy especially due to a significant mechanization and enlargement of farms, while developing countries have a relatively high share of the labour force engaged in agriculture (Losch, 2022) coupled with low mechanization in the sector (Baudron et al., 2019; Daum et al., 2023) and less opportunities for enlargement due to the demographic trends and lack of capital.

In sub-Saharan Africa, the working-age population is expected to grow by more than 450 million people by 2040 (UN-DESA, 2022). In most African countries, the process of urbanization has not been accompanied by significant industrialization of the economies (Gollin et al., 2016). More than 60% of the workforce remains engaged in activities linked to the agricultural sector, and the majority of the population will remain rural for the foreseeable future of work in agrifood (Christiansen et al., 2021). A number of studies characterize the distribution of jobs across the agri-food sector and clearly demonstrate that the bulk of workers remain on farms, even though job creation in downstream activities is growing strongly (Davis et al., 2023). Thus, creating decent employment will be decisive for a transition to a more sustainable development model for the region (Jayne et al., 2018; Losch, 2022). The challenge is at farm level to provide good working conditions for all the types of workers : family workers, permanent and temporary wage workers.

Work duration and work organization can be barriers to more attractive working conditions and decent employment in African family farms. The work is low mechanized and rely mainly on manual work from family and wage workers (Daum et al., 2023). Several studies analyze the determinants of labour allocation on farms in Africa (Benali et al. 2018; Ruml and Qaim, 2021) but they do not relate them to the tasks performed and farming systems.

To better understand employment issues in the agricultural sector, this article suggests that it is necessary to better understand working duration and work organization at the farm level. To

contribute to this knowledge gap about work organization and duration on African farms, this article considers work as an interaction between workers (with various statuses: farm managers, family members, permanent and temporary wage workers) and tasks (especially related to agricultural activities) to be performed all along the agricultural production process.

1- Methods

1-1- Data collection on work duration and work organization on farms in 5 African rural contexts

The data used for this analysis were collected from datasets compiled by the collection teams' leaders within the TPP Viability project (Documenting and Evaluating the Socio-economic Viability of Agroecological Practices across Africa) (Table 1). Data on family farms were collected in 2022-2023 through the QuaeWork method (Hostiou and Dedieu, 2012) which aim is to assess and characterize work organization (who is doing what and duration) on farms at yearly scale. This method collects information on the duration of work tasks (livestock and crops) and the distribution of these tasks among various types of workers. It was used for the first time in rural African contexts. The main principles are the following. The method considers different categories of workers e.g., farm manager (farm head, can be a man or woman), other family members, permanent wage workers, temporary wage workers, mutual help, contractors. It also considers the gender (men, women) for each of these types of workers (except mutual help and contractors where gender has not been considered). The method differentiates two categories of work: i) the routine work (RW) which consists in tasks to be done daily and that cannot be postponed (e.g. milking, shepherding). The routine work is quantified in hours per day, and ii) the seasonal work (SW) which consists in tasks that can be concentrated and post-poned (e.g. ploughing, harvesting). The seasonal work is quantified in days per year. The method analyze the work organization at year scale considering different periods. A period defines a time interval during which the work organization is homogeneous because of the workforce involved and the tasks to be done on crops and livestock activities (and therefore the routine work to be carried out). During the survey, the questions are focusing on each period, one after the other. This approach of the work durations and organization through the decomposition of the year into periods gives a good level of precision of the respondent declarations, because of the proximity with the technical calendar of his/her farming system. The margin for error has been estimated as half an hour per day for routine work and half a day per month for the seasonal work by comparison with time budget registrations (Dedieu and Servière, 1999). QuaeWork is an analytical approach that relies on farmers' recall of events from the previous year, specifically the previous agricultural season. This method is based on two essential reference points. Firstly, the seasonal task calendar is used as a guide to interact with farmers. Secondly, it relies on routine work due to its regularity, which is clearly identified by farmers when they describe a typical day. By examining who does what during a typical day, precise information about routine work can be obtained.

1-2- The diversity of production systems in the 5 African rural contexts

The QuaeWork method was used to collect data on a large sample of family farms in five rural areas of African countries (Burkina Faso, Madagascar, Senegal, Tanzania and Tunisia). The sample was built by the research teams in each of these 5 countries in order to ensure a representation of diverse contexts of family farming systems (livestock or crops based / mixed crop-livestock) and socioecological conditions. Our analysis focused on a set of 14 farming systems for a total of 438 family farms (Table 1).

Countries (and research teams for data collection)	Name of the farming systems	Number of farms surveyed		
Burkina-Faso	Cotton-cereal-legume with livestock	32	64	
(ICRAF)	Cereal-legumes with livestock	32		
Madagascar	Agropastoral MDG ^(*) 1	41	120	
(CIRAD / GSDM /	Agropastoral MDG ^(*) 2	39	7	
FOFIFA)	Tree crop	40	7	
Senegal	Large herders transhumance	15	77	
(CIRAD / ISRA)	Large herders transhumance without crops	13		
	Small herders without transhumance	24		
	Small herders agriculture transhumance	25		
Tanzania	Maize mixed less agroecology	30	77	
(Sustainable	Maize mixed more agroecology	47		
Agriculture				
Tanzania)				
Tunisia	Gardening and fruits	30	100	
(CIRAD / ICARDA)	Agropastoral TN ^(**)	30		
	Pastoralism	40		
	TOTAL 438			
		Sourcos	Authors	

Sources : Authors

(*) Madagascar (**) Tunisia

In Burkina Faso, the farming system is based on the cultivation of cereal-legume associated with livestock and the cultivation of cotton or not. Agricultural farmers generally use pesticides and herbicides, with a more pronounced usage among cotton growers due to their higher financial means from cotton sales. A cotton company provides technical and material support to cotton growers, including loans for fertilizers, pesticides, and herbicides. Cotton cultivation is alternated annually with cereal crops and legumes.

In Madagascar three distinct farming systems were studied : Agropastoral 1, Agropastoral 2 and Tree crop. "Agropastoral 1" and "Agropastoral 2" farming systems are geographically close. The main crops cultivated include rain-fed rice, cassava, and peanuts. The "Tree crop" farming systems stands out distinctly from the other two farming systems with an agroforestry model, with rice in lowlands and crops with fruit or forest trees on uplands. Perennial cash crops predominate, and a notable feature is the common practice of double cropping on the same plot.

In Tunisia, data were collected in three different areas by agro-silvo-pastoral and agropastoral systems in the arid and semi-arid Maghreb region. The "Pastoralism" farming system is located in South-East in Tunisia, approximately 480 km south of the capital, Tunis. Farmers are engaged in sheep and goat farming based on private and/or collective rangelands. They also cultivated crops (cereals/orchards) on small areas. The "Gardening and fruits" farming system stand out due to it intensive cultivated lands (irrigated or not). This is attributed to more intensive agriculture in these regions, helped by favorable rainfall patterns and the availability of agricultural land. Farmers cultivate cereals, vegetables and orchards (olive). They raised sheep and goats. The "Agropastoral TN" farming system is composed of traditional cereal-small ruminant systems in dryland. The cropping system is based on the traditional crops, i.e., cereal and orchard (olives). Sheep and goats are mainly raised on rangelands.

In Senegal, a farming system typology was built in the pastoral region of Ferlo, on the basis of various criteria: size of the herd, type of concentrated feed given to the animals, transhumance, herd health practices, crops practices, use of wage earners and perception of chocs. Large to small herders have cultivated areas, very large herders don't. Some small herders cultivate watermelon or other crops for cash, whereas large herders cultivate fodder for the animals. Animal manure is utilized for the fertilization of agricultural areas.

1-3- Comparison of working times and work organization between farming systems

An Excel file was used for data entry by each research team. Each excel file was composed of 3 main types of sheets: i) a dictionary of variables describing the variables (name, description, type, etc.); ii) one sheet per surveyed farm gathering information on routine work (RW) and seasonal work (SW). The routine work and seasonal work are broken down into gender and categories of workers; iii) a last sheet synthetizing data of all surveyed farms for the concerned farming systems.

The objectives for the 14 farming systems were to analyze the diversity of working durations and work organizations (who is doing what). Three types of analysis were carried out using descriptive statistics (means, standard deviation, min, max) using the statistical programming language R and Excel software to produce figures.

Firstly, the diversity of annual working times (SW and RW) on cropping and livestock activities was analyzed. The annual work times related to the crops and livestock activities on the farm were calculated. It is important to note that, generally, farms with high routine work times and low seasonal work times seem to correspond to livestock-based farming systems, while farms with high seasonal work times and low routine work times seem to characterize crop-based farming systems.

Secondly, the analysis of work organization was done in relation to the distribution of RW and SW among different categories of workers (farm manager, family workers, permanent wage workers, temporary wage workers) at yearly scale. The objective of this analysis of the work distribution among different categories of workers is to establish the average percentage as well as descriptive statistics of annual routine and seasonal work time carried out by farm managers, family members, permanent and temporary employees. Furthermore, analyzing the share of routine and seasonal work done by the farm managers and other family members

over the total work time provides better insight into the family aspect of the farm. The total work was calculated as following: the total routine + seasonal work expressed in days per year, with routine work converted, with a convention, into days (8h of RW = 1 day).

Thirdly, the gender-based analysis provides a detailed description of work distribution between men and women workers, considering the type of work (routine or seasonal) and all categories of workers (family and wage). The variables built are the percentages of work performed by women and men for the different categories of workers (farm managers, family workers, permanent or temporary wage workers) related to routine work time and seasonal work time.

1-4- Cross-sectional analysis based on multivariate analysis

A principal component analysis (PCA) has been implemented to build a typology of work organizations patterns considering all farming systems. The aim was to identify work organization patterns within all the case studies and to identify the variables explaining the most differences between farming systems. The type of work (routine/seasonal) and the categories of workers (farm managers, other family workers, permanent wage workers, and temporary wage workers) were active quantitative variables in the PCA and clustering (Table 2). Supplementary variables were added to describe the types: the farming system, number of Tropical Livestock Unit (TLU) and cultivated area (hectares). It allows to characterize if there is a significant " farming systems effect" and a farm size effect (TLU or cultivated area). To account for differences in farm or herd size between farming systems, we worked with the relative values of these variables rather than the absolute values. Each value is expressed relatively to the mean of the farming system (plus or minus x standard deviation). These analyses have been implemented on the dataset gathering all farms (438 at total) for the 5 countries and 14 farming systems. The FactoMineR package was used to carry out the analyses.

2- Results

2-1- A diversity of farm sizes

Looking at two usual indicators related to farm size (cultivated area and number of TLU), a huge diversity between the 14 farming systems was observed. All farming systems in Senegal, the Pastoralism farming system in Tunisia and the two farming systems in Burkina Faso have the highest number of TLU (Figure 1). Livestock farming plays a crucial role in the studied areas in Senegal, where herds primarily consist of cattle, sheep and goats. In Tunisia, herds are mainly composed of sheep and goats.



Figure 1. Average number of tropical livestock units (TLU) per farming system

Regarding cultivated land size, the farming systems in Tunisia have the largest cultivated areas, 15.2 and 8.6 hectares, respectively (Figure 2). In contrast, the Madagascar and Senegal farming systems have notably smaller cultivated areas. The differences in size are mainly related farming systems. In Senegal farming systems, pastoralists haven't much own land as the traditional management includes transhumance. It is also explained by the capacity to access land and to land pressure, especially in Madagascar. For example, Agropastoral 1 and Agropastoral 2 in Madagascar face a very high land constraint. Another factor is the level of mechanization: in the agropastoral and fruit/gardening farming systems in Tunisia, farmers own or rent tractors for ploughing and some other tasks (such as harvesting wheat for instance) while in Madagascar agricultural activities are mainly manual. In Burkina Faso, the cultivated area is in-between Tunisia and others farming systems due to the use of draught cattle which allow to cultivate larger areas.



Figure 2. Average cultivated areas (hectares) per farming systems

2-2- A diversity of work times according to the orientation of farming systems

The results showed a high variability of work duration between farming systems (Figure 3). In all farming systems, more than 80% of routine work (RW) is composed of livestock tasks (e.g. feeding and watering animals). RW also includes tasks related to cropping system such as water management (irrigation especially in the case "Gardening and fruits" in Tunisia) and crop protection (e.g. bird scaring for rice production). The amount of RW highly varies between farming systems from 448 hours per year in the "Maize mixed more agroecology" farming systems in Tanzania to more than 10.000 hours per year in large breeders (52.8 TLU on average, with goats, sheep and cattle) who practice transhumance in Senegal with several batches shepherded in parallel. Managing a large number of animals requires more daily work (monitoring animals, watering, cleaning manure), which is reflected in the higher routine work time. Beyond the herd size factor, differences can also be explained by crop routine work (use of irrigation for example) and farm sizes.



Figure 3. Inter farming systems variability of annual routine work duration for crops and livestock expressed in hours per year

Seasonal work (SW) is mainly composed of tasks related to crops (land preparation, sowing, weeding, harvesting, etc.) in all farming systems (Figure 4). Some tasks are also related to livestock in "Pastoralism" farming system (Tunisia) and in both farming systems in Burkina Faso with tasks such as moving the animals or weaning the young animals. The amount of SW duration highly varies according to the farming system. The difference is higher than for RW: the higher value of seasonal work duration (about 1100 days per year for "Cotton-cereal-legume with livestock" in Burkina Faso) is more than six times high to the lower value of seasonal work (about 161.5 days per year for the farming system "Maize mixed more agroecology" in Tanzania). The size of the farm contributes to explain these differences between farming systems (farms have larger cultivated areas in Burkina Faso which have the higher seasonal work, this is justified by the collection of crop residues during the pre-season period, storing them, with them during the seasonal period.



Figure 4. Inter farming systems variability of annual seasonal work duration for crops and livestock expressed in number of days per year

2-3- A work performed by the family and wage workers

Different categories of workers contribute to RW and SW. RW is mainly carried out by family workers, notably by the farmers in Tunisia and Tanzania and by other family members in Burkina Faso, Senegal and Madagascar (Figure 5). For both farming systems in Burkina Faso, it is exclusively managed by family members. In all other farming systems in the 4 other countries, it involves not only family members but also wage workers. In all farming systems in Madagascar and in Tunisia, farmers hired permanent wage workers. Temporary wage workers are also involved in Senegal as well as in one farming system of Tanzania (less agroecological).



Figure 5. Inter farming systems variability of routine work distribution between categories of workers expressed in % per farm

Compared to RW, the main difference is the contribution of temporary wage workers to SW even if their contribution varies across farming systems (Figure 6). In Tunisia, especially in "Gardening and fruits" and "Agropastoral TN" farming systems, temporary wage workers carry out most of the SW. Farmers hire temporary workers because the cultivated farming systems are very large with different and labour-intensive crops (market gardening) and family members alone cannot do all the work. In Madagascar, SW is shared between farm managers, other family members and temporary wage workers, even if farm sizes are very low. In both farming systems in Burkina Faso, in Tanzania and in Pastoralism farming system in Tunisia, the seasonal work is carried out by family members, especially farm managers. A common point to all farming systems is that permanent wage workers rarely contribute to SW.



Figure 6. Inter farming systems variability of seasonal work distribution between categories of workers expressed in % per farm. The 3 farming systems in Senegal were not taken into account in this figure due to the very low level of seasonal work.

2-4- A high contribution of women to work

Furthermore, our research reveals the significance of women labour (Figure 7). Women contribute to SW and RW across all farming systems studied. Women have higher agricultural working time than men in the agropastoral farming systems of Tunisia and all farming systems in Senegal except farms owned by large breeders who practice transhumance. In Burkina Faso, the share of men outweighed that of women because the cotton sector requires a lot of physical efforts. Furthermore, women have their own individual farms where they work after contributing to the collective farm in Burkina Faso farming systems.



Figure 7. Inter farming systems variability of gender contribution to the total work expressed in %

The results highlight a diverse participation of women in agricultural activities in all farming systems (Figure 8). On all farming systems, all categories of workers are represented, except for farming systems in Burkina Faso where women wage are not present. The share of work by men family workers exceeds half of the total working time on both farming systems in Burkina Faso, as well as in the Agropastoral 1 and Tree crops farming systems in Madagascar. In Tunisia and Senegal, we observed a higher contribution of women (in comparison with men) especially women wage workers in Tunisia and women family workers in Senegal. The share of work by women family workers also exceeds half of the total working time on farming systems with large transhumant herders without crops, as well as on farming systems with medium-sized breeders who do not practice transhumance or agricultural activities in Senegal. In two farming systems in Tunisia (Gardening/fruits and Agropastoral) around 30 to 40% of total work is performed by women temporary workers.



Figure 8. Inter farming systems variability of category of workers and gender contribution to the total work expressed in %

2-5- Three patterns of work organization

This aim of this section is to present the results on the typology of work organization patterns in the 438 farms surveyed. The variables used in the analysis are presented in Table 2. By combining the first two dimensions (axes), we are able to explain 44.3% (Table 3) of the total variance between farms. We retain the first two dimensions in our analysis because the eigenvalues associated with these dimensions exceed the threshold value of 1, in accordance with the Kaiser's absolute criterion. The first axis explains more than 23.3% of the variance and so plays a crucial role in summarizing the majority of information.

Variable name	Variable description	Min	Mean	Max
RW decision makers (farmers)	n makers (farmers) Share of routine work done by decision make (farmers) Routine work in proportion of tota routine work done by decision makers (farmers)		0.49	1
RW other family members	Share of routine work done by other family members	0	0.33	1
RW permanent wage	Share of routine work done by permanent wage workers	0	0.06	1
RW temporary wage	Share of routine work done by by temporary wage workers	0	0.01	0.73
SW decision makers (farmers)	Share of seasonal work done by decision makers (farmers)	0	0.40	1
SW other family members	Share of seasonal work done by other family members	0	0.19	1
SW permanent wage	Share of seasonal work done by permanent wage workers	0	0.005	0.6
SW temporary wage	Share of seasonal work done by temporary wage workers		0.18	1
Cultivated area	Area cultivated (ha)	0	2.9	74
Tropical Livestock Units	Number of Tropical Livestock Units	0	7.88	134
	Active Variables in dark / <i>Complemen</i>	tary var	riables in	blue

Table 2. List of quantitative variables used in the PCA and clustering

Table 3. Inertia decomposition

	Dim.1	Dim.2	Dim.3	Dim.4	Dim.5	Dim.6
Variance	1.866	1.678	1.135	0.956	0.948	0.772
% of variance	23.326	20.981	14.193	11.947	11.846	9.646
Cumulative % of variance	23.326	44.307	58.501	70.447	82.293	91.939

The results of the PCA shows that the type of work – seasonal or routine - and the category of workers differentiate farms (see Table 4): the first axis is characterized by temporary wage and family seasonal workers; and the second axis is characterized by family routine workers (Figure 9). Indeed, the first axis is characterized by a high contribution of variables related to the contribution of different types of workers to seasonal work. More precisely, this axis is positively correlated (0.63) with the portion of time done by temporary seasonal workers,

while it shows a negative correlation with the portion of time devoted by family members to seasonal work in proportion of total seasonal work. Therefore, the first axis is characterized by a gradient of work from family to wage work for the seasonal work. It means that what differentiate farm regarding seasonal work is who is doing it: mostly family workers or mostly wage workers. Furthermore, the "cultivated area" variable demonstrates a strong statistical significance in relation to the first axis (p-value: 0.0000) and a positive correlation (0.32) with it. This suggests that the size of cultivated land is correlated with seasonal work.



Figure 9. Correlation circle

The second axis of the PCA is characterized by a high contribution of variables related to the contribution of the types of family workers to routine work. All values are statistically significant. The correlation between the proportion of routine work done by other family workers is more strongly negative (0.87). The most positive contribution to the formation of this second axis comes from the contribution of farm managers workers to routine work in proportion of total routine work (0.58), and this correlation is statistically significant. This is not the fact to hire a permanent employee for routine as for the seasonal work (axis 1) that differentiate farms but more that routine work is done either done by the farm manager or other family workers. The variable "farming system" is moderately correlated with the second axis (0.41) (Table 4). Furthermore, there is a statistically significant relationship between the choice of the farming systems and the variation captured by the PCA, confirmed by a significance threshold of 5%.

Table 4. Contribution of variables to PCA dimensions

	Axis 1		Axis 2	
	Contribution	Cos ²	Contribution	Cos ²
RW decision makers (farmers)	13.14	0.25	20.22	0.34
RW other family members	2.92	0.05	45.33	0.76

RW permanent wage	22.71	0.42	6.74	0.11
RW temporary wage	2.20	0.04	1.79	0.03
SW decision makers (farmers)	24.71	0.46	3.46	0.06
SW other family members	8.67	0.16	7.93	0.13
SW permanent wage	4.32	0.08	0.18	0.00
SW temporary wage	21.31	0.40	14.35	0.24
	R ²	p.value	R ²	p.value
Name of farming systems	0.37	0.0000	0.41	0.000

From the multivariate analysis, we identified three patterns of work organization (Table 5). The first one is based on seasonal and routine work mainly carried out by farm managers. Farms of this type are characterized by considerably high proportions of routine work and seasonal work compared to the respective totals carried out by farmers, as illustrated in Table 5. It is particularly prevalent in pastoralist system and agropastoral system (Tunisia) and in all farming systems of Tanzania. The second work organization pattern is based on routine work mainly carried out by family workers in proportion of total routine work. Furthermore, this type of work organization pattern is characterized by farms with high number of tropical cattle livestock units (4.9 TLU on average). This pattern is significantly observed in croplivestock farming systems in Burkina Faso ("cereal-legume with livestock"), and in Senegal (farms where small herders are not engaged in agriculture or transhumance, and farms where small breeders practice both agriculture and transhumance). The third work organization pattern is based on routine work carried out by family and permanent wage workers and seasonal work mainly carried out by temporary wage workers. Farms have high cultivated areas, reaching up to 7.88 hectares. It is found on various farms carrying out varied activities on two farming systems in Tunisia ("Gardening and fruit" and "Agropastoral") as well as in Madagascar ("Agropastoral MDG 2"). Thus, the relevance of this pattern does not lie only in the size of the cultivated area, because we observe both large mechanized farms in Tunisia and small non-mechanized farms in Madagascar.

	Type 1	Type 2	Туре З
RW decision makers (farmers)	11.7	-9.69	-4.44
RW other family members	-13.7	15.8	-3.19
RW permanent wage	-5.28	-3.13	16.1
RW temporary wage	-3.78	4.37	-0.92
SW decision makers (farmers)	8.88	-6.4	-5.09
SW other family members	-2.79	4.6	-3.27
SW permanent wage	-2.02	-0.906	5.61
SW temporary wage	0.256	-6.04	10.9
Tropical livestock unity	-4.03	4.9	-1.45
Cultivated area	0.0666	-4.25	7.88
Large_herders_transhumance without crops	-1.7	2.23	-0.885
Small herders without transhumance	-2.98	3.71	-1.4
Small herders agriculture transhumance	-5.51	5.71	-0.525
Gardening and fruits	0.961	-3.97	3.94
Agropastoral TN	2.79	-4.4	1.9
Maize mixed less agroecology	4.71	-3.97	-1.65
Pastoralism	4.97	-4.53	-1.18
Maize mixed more agroecology	5.08	-4.62	-1.21

Table 5. Correlation of variables with each type of work organization patterns

Agropastoral MDG 2	-3.22	2	2.09
Cereal-legume with livestock	-2.58	3.42	-1.69
		p.value	
farming systems		0.0000	

we only represent values with a significant at 5%

3- Discussion / conclusion

3-1- Work duration and organization: a huge diversity explained by farming systems and farms size

Our study shows the diversity of working times and work organization patterns on family farms in Africa. Working time are highly variables both for routine and seasonal work. Our research allows to identify factors explaining differences among farms. One of these factors is the type of production system. The higher durations of routine work were observed in farms with production systems relying on livestock as for example in Senegal and Tunisia. Managing a large number of animals may require more daily work, which is reflected in the higher routine work time of the farmers (Cournut et al., 2018). The higher seasonal work was observed in both farming systems in Burkina-Faso indicating that cotton cultivation demands substantial work, especially during the specific periods of planting, harvesting and processing. This finding aligns with trends observed in the literature (Danzer and Grundke, 2016), where cotton cultivation is often associated with significant working time requirements (including manual harvesting processes, the care needed to maintain cotton fiber quality, as well as specific timelines dictated by weather conditions and growth cycles).

Other factors are related to farm sizes. Farms with larger herds seem to have a higher routine work. We observed higher seasonal work in farms with higher number of hectares (in Burkina Faso and Tunisia). But the relation with the cultivated area and the total amount of seasonal work is not so obvious. Our study did not allow to conclude about a scale effect on work and contrary to other studies (Dedieu and Servière, 2012; Hostiou et al., 2012). Farm size also gives the work to be done in relation to the types of workers. With a high TLU there is more routine work which is mainly performed by the family. A high number of hectares gives more seasonal work which is mainly carried out by temporary workers.

3-2- The family farm in question

Among the many "family farms" covered by our sample, our results show complex situations and highlight the contribution of family and wage workers. Work organizations are of various types and follow diverse patterns in all farming systems. The results provide insights on the proportion of work performed by farm managers compared to the family contribution and reveal how wage workers are engaged in agricultural work. Family workers remain fully engaged in agricultural work, particularly in routine work. Our results confirm the findings of previous studies that family farmers have to hire workers, especially temporary workers for seasonal tasks on crops. One of reason for hiring temporary workers is when family labour is insufficient or when the workload is high due to large cultivated areas as showed in others studies on farms (Novo et al., 2012; Wright et al., 2012; Hostiou et al., 2012) as well as growing literature about dynamic rural labour markets (Pontara, 2015). The importance of the contributions of women is also confirmed, particularly among temporary workers. The use of temporary workers can have advantages in terms of managing seasonal work, but it can also pose challenges such as working conditions (wages, drudgery, etc.).

Hiring workers can also be a way to deal with a lack of family workers. In Burkina Faso, work is characterized by a greater dependence on family labour for seasonal work. This may reflect a tradition of self-sufficiency in labour and underscores the strong involvement of family members in agricultural activities. But it is also showed a change in youth employment. Youth people prefer to be engaged in non-agricultural activities. For example, in Burkina Faso in the past, there was available labour to work on farmers' farms. Currently, with the proliferation of gold mining sites in the country, which employ many well-paid young people, no one wants to work on farms anymore. The attractiveness of agricultural activities is in question for youth in many African countries highlighting the need to improve working conditions and to provide decent work on farms.

4-3- Implications and perspectives

Our article demonstrates that work duration and work organization vary across family farming systems. This result highlights that it is crucial to consider all those who work in order to support more decent working conditions at farm level. The exploration of concrete improvement solutions to favor more liveable work on farms could include simplification of technical sequences, new work organizations (collective, contractors) and use of small mechanization for the most labour-intensive tasks and peak periods. These solutions can have specific impacts of work for the different categories of workers that is important to consider.

Public policies should take into account the work organization in local contexts, with particular emphasis on gender equity, the contribution of temporary workers and work duration in order to focus on adapted sustainable innovations.

In the field of agricultural and academic research, it is imperative to persevere in efforts aimed at developing in-depth methodologies for analyzing work within farm. These efforts should encompass a meticulous evaluation of working time and of work organization. Working conditions as experienced by the different categories of workers should also be considered as drudgery, remuneration, self-fulfillness, more generally satisfaction and wellbeing, expressed by the workers, are important dimensions of work (Oya, 2016; Duval et al., 2021). It is also essential to continue investing in the training of researchers specializing in this theme, thereby enhancing their expertise and contributing to the advancement of knowledge in the field.

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