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Is cowpea a ‘women’s crop’ in Mali? Implications for value chain development

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Abstract

Cowpea, which is produced primarily in West Africa, is valued locally for its agronomic benefits in dryland farming, nutritional content, and contribution to the livelihoods of farming families. Many feel that more investment in cowpea research and development is needed for the crop to achieve its economic potential. Cowpea has long been labelled a ‘women’s crop’. We tested whether this is the case in Mali by exploring five indicators with a combination of primary and secondary databases, and interpreting our results in the context of the regional literature. We conclude that, in Mali, cowpea is better characterised as a ‘women’s enterprise’. Men are more likely than women to plant cowpea as either a primary or secondary crop and tend to plant larger areas, with cowpea intercropped. In drier agro-ecologies, women are more likely to grow cowpea than other crops. Although subsample sizes are very small, women cowpea growers appear to earn more on average from selling the harvest from their individual plots than do men. Women represent 99% of traders of processed cowpea products in the open-air markets we surveyed. In the production segment of the value chain, investments to facilitate women’s access to improved cowpea seed and local markets would support their commercial orientation. Investments in women’s trade in processed cowpea products, including the provision of credit, storage, and training in organisational capacity, would enhance their incomes and their livelihoods.

Key words: cowpeas; women’s crop; open-air markets; value chain; Mali

1. Introduction

What is meant by the label, ‘women’s crop’? In the literature on farming in Sub-Saharan Africa, subsistence crops have been regarded as the domain of women, while commercial crops produced for cash or export have been viewed as men’s crops (Guendel 2009; Orr 2016). However, determining whether it is women’s preferences for food provision or their limited access to resources that drive the observed patterns has been difficult. Division of labour by gender also blurs over time and space within a crop (Guendel 2009). Doss (2002) explored the complexity of what it means to categorise crops as gender-specific. She uses three criteria—the gender of the household head, the gender of the plot manager, and the gender of the person who keeps the revenue from the plot. Based on her analysis of nationally representative survey data from Ghana, Doss (2002:1987) concludes that “few crops can be defined as men’s crops and none are clearly women’s crops”. Researchers have often found that, when women’s crops become profitable, men take an interest in them. Orr (2016) cautions that, by framing crops as ‘women’s’ or ‘men’s’, we assume a zero-sum game. In the case he reports on, namely groundnuts in Zambia, women viewed men’s expanding involvement as an opportunity to benefit the household as a whole.

Household food consumption has generally been an accepted area of agency of or control by women. Since Boserup’s (1970) seminal work, studies have often found that subsistence agriculture is considered ‘women’s work’. ‘Women’s work’ tends to be underreported, because it has no value in the marketplace. Numerous gender analyses conducted from the 1970s to the 1990s sought to better understand the value of that work in subsistence farming. This perspective was challenged by the growing recognition of women’s work in other segments of agricultural value chains in West Africa and elsewhere. The role of women traders in open markets in Ghana is perhaps the most popularly known; studies by Hill (1969) and Simmons (1975) explored the ‘hidden trade’ of secluded women. In Mali, Smale *et al.* (2008) explored women’s trade of sorghum and millet grain in village markets. Policymakers now view value chains as an entry point to support the equitable, economic empowerment of women in sub-Saharan Africa (African Development Bank [AfDB] 2015).

Cowpea has been explicitly labelled as a ‘women’s crop’ in Sub-Saharan Africa since the time when “most of the crop [was] grown for home consumption” (National Research Council [NRC] 2006:109–10). About a decade ago, Murdock *et al.* (2013:222) stated that “women are the primary cultivators [of cowpea] in many parts of Sub-Saharan Africa, both for the excellent nutrition it offers their families as well as for the income it generates when they sell it in the local markets or to travelling traders”. Recent studies are more ambivalent on whether cowpea is a women’s or men’s crop. In relation to Burkina Faso, Ouédraogo *et al.* (2018) state that “cowpea is predominantly a women’s crop from production to processing”, but provide no further explanation. In contrast, Shiratori *et al.* (2020:263) argue that cowpea production on family plots has become more frequent than on women’s individual plots, and cowpea therefore should no longer be considered just a “women’s crop” in Burkina Faso. Diarra *et al.* (2021) report that, in Mali, cowpea is produced by as many women as men, but they provide no statistical evidence. In the dryland farming systems of Mali, customary lore is that women grow legumes (cowpea, groundnuts) for their own use on the individual plots that are allocated to them upon marriage (Smale & Thériault 2021). The African Centre for Biodiversity (2018:8) also refers to cowpea as “an African crop; a women’s crop”. However, the Centre (2018:8) also states that, “[a]lthough women are involved in the farming of cowpea, this is only a secondary activity as women derive their main source of income from processing cowpea”.

In this paper, we examine whether cowpea should be label as a ‘women’s crop’ in Mali and discuss the implication of this for the development of the cowpea value chain. We explore resource allocation to cowpea production and marketing activities by gender, drawing our evidence from the literature and from empirical data collected in Mali. For decades, researchers and practitioners have argued

that, unless we understand how resources are allocated within farming households, agricultural projects and policies may not achieve their intended effects (Haddad *et al.* 1997; Doss & Quisumbing 2021). Although few crops may fit the label of being a women's crop/men's crop, the gendered patterns of cropping systems mean that agricultural policy is not neutral (Doss 2002). By documenting women's involvement in the cowpea value chain in Mali from production to marketing, we aim to elucidate the ways in which the development of the cowpea value chain could be made more inclusive.

2. Understanding household decision-making and cowpea farming in Mali

In Mali, agricultural activities are accomplished by the *l'exploitation agricole familiale* (EAF, or family farm enterprise). The national agricultural policy act (Loi d'Orientation Agricole) defines the EAF as a production unit composed of multiple individuals who are related and who exploit factors of production collectively under the supervision of the member designated as household head. Although the head may be a woman or a man, headship by women is rare in rural Mali. The head organises factors of production to address household objectives, and represents the household in civil acts, associations and programmes. Often, elder heads designate a younger team leader to supervise farm work and perform daily management activities.

The EAF is a complex organisation that enables the simultaneous cultivation of multiple crops on numerous plots by family members. Families are typically extended vertically and horizontally, including the wives and children of the head and his brothers, the wives and children of his married sons, unmarried daughters and other relatives. The farm often includes two types of plots. All able family members work the collective plots to address the basic food needs of the household. The head, who is also vested with patrilineal use rights, allocates smaller fields to individual family members who manage production and have the right to use the harvest or revenues from sales of the harvest to meet personal needs. The production of these plots is not managed collectively. Social norms dictate that women who marry into the family gain use rights to their own plots; customarily, these plots are planted to legumes such as cowpea or groundnuts, which provide the ingredients for the stews that accompany starchy staples (Smale & Theriault 2021).

Zoundi *et al.* (2006) found that Malian women still do not have direct and permanent access to land. They may use the land, but cannot make any 'permanent' investments in the land, such as planting trees, building houses and digging wells. Customary law excludes women's inheritance of land from either their natal or marital family (LANDac 2016), and this law still largely governs land use (Diawara *et al.* 2014; LANDac 2016).

In this patrilineal system, access to other resources, such as farm equipment and purchased inputs (e.g. fertiliser), are the subject of intra-household negotiation by individual plot managers. Motivation to meet staple food needs drives a preference for allocating resources first to the fields on which family members jointly produce cereals. In the dryland production systems bordering the Sahel of West Africa, heads place priority on inputs supplied to the collective fields, which tend to be significantly larger (Udry 1996; Kazianga & Wahhaj 2013; Haider *et al.* 2018). Household members may use ploughs to prepare land, especially on collective fields, where cowpea is frequently intercropped with staple cereals. Rates of fertiliser application are generally low in Mali and fertiliser is not often applied directly to cowpea because the crop fixes nitrogen.

Most of the world's cowpeas are produced in West Africa, with Nigeria, Niger, Burkina Faso, Mali, Ghana and Senegal together accounting for over 85% of that production (Guendel 2009). Valued locally for its diversity of uses and nutritious content, many believe that cowpea has not received the investment in research and development needed to achieve its economic potential. Cowpea is a

versatile crop that can be harvested when dry or green, and it is widely traded in local and regional markets. West Africans consume the nutrient-rich, fibrous leaves, pods and seeds in various stages of maturity, and the stems, leaves and vines supply nourishing fodder for livestock. Fifty-two percent of the production in sub-Saharan Africa is used for food, 13% as animal feed, 10% for seeds, 9% for other uses, and 16% is wasted in post-harvest losses (International Institute of Tropical Agriculture [IITA] 2021).

Over the past 40 years, the ratio of cowpea area to cereals area harvested in Mali has shown a long-term average of 6.6% (FAOSTAT 2002). The current fertiliser subsidy, which was launched in 2008/2009 in response to the global food price crisis, targets rice, maize, sorghum, millet and cotton. Since 2008/2009, the cultivated area allocated to non-target crops, including cowpea, has declined significantly in favour of target crops (Theriault & Smale 2021). Yet it is important to recognise that cowpea is far more likely to be grown as an intercrop than a primary crop – and usually in fields where the primary crop planted is a staple cereal. For example, Smale and Theriault (2021) show that cowpea planted as a primary crop represents only 1% of smallholder farm area, whereas cereal fields intercropped with cowpea account for 11% in two agroecological zones of Mali.

Referring to Burkina Faso and Niger, CNFA (2016:13–4) reports that women’s cowpea plots are smaller than men’s, and that “women play the leading role with respect to the harvesting of cowpea both on their own small plots and on the larger plots owned by men”. The authors make no mention in their report of collective or individual plots. In Mali, labour may be exchanged among individual plots, with men and women working on each other’s fields (Smale & Theriault 2021).

Cowpea has traditionally been considered a subsistence crop. Research on cowpea value chains makes scant mention of household income shares derived specifically from cowpea production. CNFA’s cowpea value chain analysis in both Niger and Burkina Faso (2016:14) finds that women are often paid in kind for their work in the cowpea fields managed by men, and that a portion of the cowpea harvest, together with the production from their own, smaller fields, is used for household consumption, animal feed and trade.

3. Data

We used several secondary data sources and a primary data source to explore women’s role in cowpea production and marketing. The secondary datasets, which were collected through farm surveys, provide us with indicators of women’s control of cowpea production and revenue. The primary dataset was collected in open-air markets and reveals women’s agency in cowpea marketing.

Our first data source is the Living Standards Measurement Study – Integrated Surveys on Agriculture (LSMS-ISA), which was conducted in Mali in two visits each during the 2014/2015 and 2017/2018 growing seasons. With a probability of selection proportional to the size of the population as of the 2009 Census, the statistical sample for each of the two rounds was nationally representative of both rural and urban areas, although the probability of selection was based on the size of the population in 2009. The final sample size in 2014/2015 (3 804, as compared to a planned sample of 4 218) was limited by political insecurity in some parts of the country. Kidal was excluded, and sample sizes were particularly affected in the regions of Mopti, Tombouctou and Gao. By contrast, enumerators were able to reach a sample of 8 390 households in 2017/2018. Our analytical sample best represents the regions of Kayes, Koulikoro, Sikasso, Segou and Mopti. One limitation of the dataset is that the two years of the survey do not constitute a household panel.

The LSMS-ISA survey integrates plot-level data on input use and crop production with the household consumption and expenditure data typically included in the LSMS. In the case of Mali, because of

the larger number of plots per farming household and the associated survey burden, plots were grouped by crop and crop association, and only one-third were sampled. A second limitation of the dataset for our purposes is the underestimation of plot numbers, and the possibility that women's plots were underrepresented because men's and women's plots were not sampled proportionately.

In addition to the two LSMS-ISA datasets, we consulted a dataset of data collected under the PrePoSAM project by the Institut d'Economie Rurale and Michigan State University (IER/MSU). The survey team conducted repeated visits to farming households from October of 2017 through July of 2018. The IER/MSU team chose to implement an independent survey after careful consideration of the data collected under the LSMS-ISA. The team found that the representation of some crops and farming systems was sparse, and data on plot management did not include adequate detail for their purposes.

The sample was stratified by agroecological zone, including the zones of the Niger Delta and Koutiala Plateau. The Niger Delta itself is an area based on irrigated rice production, but the zone also includes dryland farming based on millet production. The Koutiala Plateau has a rainfed farming system based on sorghum and a cotton-maize rotation. The sample was composed of 2 400 households cultivating 9 194 plots of target crops managed individually and/or collectively. The PrePoSAM data are more detailed with respect to major crops and input use, but are not nationally representative.

In each of these secondary datasets, according to the enumerator manuals, heads of household were interviewed for plot inventories and asked to name the household members responsible for production on each plot. The listing of household members then shows which of these are men and women. Detailed information regarding crop production and input use on each plot, harvest and sales was obtained from the plot manager.

The authors collected the primary dataset on cowpea marketing activities. The survey team gathered information on the characteristics of the markets, traders and products in markets across four regions of Mali (Kayes, Koulikoro, Ségou and Sikasso) and in Bamako, the capital. Enumerators conducted the interviews in Bambara in February and March of 2021 (the dry season). The team selected markets on the basis of secondary data on cowpea production areas in Mali (supplied by Cellule de Planification et de Statistiques (CPS-SDR), the Institut National de la Statistique (INSTAT) and the Observatoire du Marché Agricole (OMA)), and in collaboration with local informants, including Agriculture Services officers and the Chamber of Agriculture. Experts provided information on market location, whether traders sell cowpea products, on which day the fair is held, and the security situation. The team selected rural markets from the resulting list at random, both systematically and proportionally according to the scale of cowpea production (low, medium, high) in the administrative circles where they are located. A total of 21 markets (seven per stratum) were included. In addition, six urban and semi-urban markets were selected with the help of experts, based on volume and regularity of cowpea trade. In Bamako, the markets were chosen based on advice from OMA. A total of 487 vendors were interviewed across 24 open-air markets.

4. Gender indicators

Our first indicator was the percentage of all cowpea plots grown by farming households in the dataset that are managed by men and women. We compared the likelihood that men or women manage the plots on which cowpea is grown as a primary crop or as a secondary intercrop. This indicator represents gendered access to land in use rights that are allocated to cowpea.

Our second indicator was the relative importance of cowpea as a crop for women farmers, expressed as the percent of plots managed by women that they planted to cowpea. Rather than compare men to

women, this indicator expresses the extent to which women specialise in the production of cowpea compared to other crops. Specialisation suggests how important the crop is to women.

Our third indicator of engagement in cowpea production was the relative size of the land resource devoted to cowpea by men and women. This indicator expresses the extent, or scale, of engagement in growing cowpea. The number or percentage of plots managed by men and women does not control for size.

A fourth set of indicators was the volume of cowpea harvested or sold, or income from sales earned by women as compared to men. These represent control over cowpea production and revenue. None of our secondary sources included data on the involvement of women in marketing cowpea products. This fifth indicator is drawn from our primary data source and represents the percentage of cowpea products sold by men and women among the sampled vendors.

Plot management and revenue control indicators were similar to those employed by Doss (2002). In simplified terms, we followed the nodes of the value chain from the production to the marketing of cowpea products. Our indicators are general because the datasets from which they were drawn were not explicitly designed to measure women's and men's actual or perceived control over the production and commercialisation of crops (as in Orr *et al.* 2016). They have the advantage of statistical representation and broad applicability. More comprehensive indicators have been developed to guide the design and implementation of agricultural development projects (e.g. World Bank *et al.* 2009), measure women's empowerment in agriculture (e.g. IFPRI 2012), and assess overall gender equality in a country (e.g. African Development Bank and United Nations Economic Commission for Africa [AfDB-UNECA] 2020).

5. Facts or folklore: Is cowpea a women's crop?

All our data sources confirm that cowpea production as a primary crop is marginal, whereas cowpea production as a secondary crop is common. Only 3% to 4% of all plots inventoried were planted to cowpea as a primary crop. The PRePoSAM data show that cowpea was the secondary crop on 79% of intercropped plots. The LSMS-ISA 2014/2015 data provide a similar estimate, of 68%, which is most probably lower because of the differences in geographical representation. The LSMS-ISA 2017/2018 data are puzzling; we notice a different method of data structure in this round and suspect this might have led to the undercounting of cowpea as a secondary crop (only 19%).

Next, all our secondary data sources based on large-scale surveys show that, in Mali, men are more likely to manage either the plots planted with cowpea as a primary crop or those where cowpea is grown as a secondary crop. The differences are considerably greater in the LSMS-ISA data, which depict women as playing a truly minor role in cowpea plot management (8%, 3%, 12% and 5% of cowpea plots; see Table 1) compared to the PRePoSAM data (21% and 14% of cowpea plots; see Table 1). This result may be a consequence of sub-sampling from the household plot inventory, or of the differences in statistical representation noted above.

As a point of contrast, of farmers in Burkina Faso cultivating cowpeas as a primary and secondary crop, 42% and 48% respectively are women (Theriault *et al.* 2022). Women are more involved in cultivating cowpea in Burkina Faso than in Mali, but both men and women grow the crop. Our findings therefore challenge the idea that cowpea is cultivated mostly by women in the region (Murdock *et al.* 2013; Tamini *et al.* 2019).

Although we find almost negligible use of purchased inputs on cowpea plots in our secondary data sources, we know (noted above) that land access necessarily links to other aspects of decision-making

on farm inputs through strength of negotiation. Horezeanu (2017:68) reports that, in Benin, “women farmers grow cowpea on smaller plots and have limited access to male labor”, with extensive use of female labour – both family and hired. Furthermore, Abubakar *et al.* (2020:4) indicate that, in Sokoto State in Nigeria, “women cowpea farmers were constrained by pest and diseases, high cost of pesticides and fertiliser, inadequate finance, high cost of labor and poor storage facilities”.

We measure the relative importance of cowpea among women’s crops (‘specialisation’) as the percentage of plots they manage that are planted to cowpea (Table 1). Again, cowpea represents only 2% to 4% of primary crops on plots managed by women, but an important share of secondary crops on their plots (48% and 29% in the PRePoSAM data and LSMS-ISA 2014/2015 data respectively). Here, as in Table 2, the LSMS-ISA 2017/2018 data appear to underestimate secondary crops. By farming system and agroecology, the percentage for secondary crops is 16% of plots managed by women on the Koutiala Plateau and 66% in the Niger Delta. We also observe more secondary crop plots managed by women overall in the Niger Delta than on the Koutiala Plateau (180 vs. 105). We deduce that agroecology matters for which crops are grown, but also by whom they are grown in the household. In northern Burkina Faso, Tamini *et al.* (2019) found that women are more likely to specialise in cowpeas because the crop needs fewer inputs than crops such as rice and maize.

Table 1: Number and percentage of cowpea plots managed by men and by women

Data source	Indicator		Plot manager		All cowpea plots	All plots	Cowpea as % of all plots
			Men	Women			
Mali-PRePoSAM 2017/2018	Cowpea as primary crop on plot	n	268	71	339	11 971	3
		%	79.06	20.94	100		
	Cowpea as secondary crop on plot	n	844	136	980	1 243	79
		%	86.12	13.88	100		
Mali LSMS 2014/2015	Cowpea as primary crop on plot	n	273	24	297	9 325	3
		%	91.92	8.08	100		
	Cowpea as secondary crop on plot	n	275	7	282	412	68
		%	97.52	2.48	100		
Mali LSMS 2017/2018	Cowpea as primary crop on plot	n	877	120	1 006	22 870	4
		%	87.96	12.04	100		
	Cowpea as secondary crop on plot	n	280	4	284	1 495	19
		%	94.65	5	100		

Source: Authors’ compilation (see text for details on data sources)

Our third indicator of engagement in cowpea production is the size of the land resource devoted to cowpea. The sizes (in ha) of plots where cowpea was produced as a primary or secondary crop are shown in Table 3, by gender of the plot manager. In the data collected in the Niger Delta and Koutiala Plateau, mean areas of primary cowpea plots are similar for men and women, but where cowpea is a secondary crop on the plot, plots managed by men are more than three times as large on average (3.9 vs. 1.2). This probably reflects the fact that many of the male plot managers are heads of household, who supervise production on the ‘grands champs’ (large family fields) planted to staple cereals (millet, sorghum and maize), which are intercropped with cowpea. The pattern is largely repeated in the LSMS-ISA 2014/2015 data, although the difference between the men’s and women’s plot sizes where cowpea is grown as a secondary crop is not as large (2.6 vs. 1.7). Large differences were shown

between men's and women's plot sizes in the LSMS-ISA 2014/2015, although only sizes of primary cowpea plots were included. As would be expected, given the structure of family farming in Mali, when all plots are considered, those managed by men are several times larger than those managed by women.

Table 2: Number and percentage of women's plots planted to cowpea

Data source	Indicator		Women's cowpea plots	All women's plots
Mali-PRePoSAM 2017/2018	Cowpea as primary crop on plot	n	70	1 580
		%	4.43	
	Cowpea as secondary crop on plot	n	136	285
		%	47.72	
Mali LSMS 2014/2015	Cowpea as primary crop on plot	n	24	1 171
		%	2.05	
	Cowpea as secondary crop on plot	n	7	24
		%	29.17	
Mali LSMS 2017/2018	Cowpea as primary crop on plot	n	116	3 376
		%	3.44	
	Cowpea as secondary crop on plot	n	5	80
		%	6.00	

Source: Authors' compilation (see text for details on data sources)

Table 3: Comparative size of men's and women's cowpea plots

		Cowpea primary plot (ha)	Cowpea secondary plot (ha)	All plots (ha)
Mali-PRePoSAM 2017/2018	Male plot manager	0.582	3.92	2.16
	Female plot manager	0.552	1.19	0.650
	All cowpea plots	0.577	3.54	
Mali LSMS 2014/2015	Male plot manager	1.69	2.60	2.38
	Female plot manager	1.06	1.68	2.26
	All cowpea plots	1.65	2.58	2.37
Mali LSMS 2017/2018	Male plot manager	0.917		2.41
	Female plot manager	0.443		0.581
	All cowpea plots	0.837		

Note: 2014-15 data for man plot managers trimmed at 95% for outliers of extreme size (> 90 ha).

Source: Authors' compilation (see text for details on data sources)

We found very few observations in any of our data sources regarding total cowpea production, sales and revenue. Because the observations for the variable, 'who controls the revenue from the plot', were so few in the LSMS-ISA data sources, Table 4 presents only the PRePoSAM data. The figures suggest that, while male plot managers produced more cowpea on their plots on average, they sold less and therefore earned less in gross revenue from sales. Table 4 refutes the idea that women cultivate cowpeas for home consumption while men cultivate them for business (Context 2014). Our data calculations with the PRePoSAM data show that, of crops sold by all household members over several months following harvest, cowpea revenues constituted about 7% of the value of sales. For a minor crop, this is a sizeable household share.

We turn now to the data on women's agency in marketing cowpea products. Processed products identified in the local markets of Mali included *sho frou-frou* (fritters made from dough), *accras* (fritters made from crushed cowpeas, fried), *sho boulettes* (dumplings made from dough, sometimes served with tomato sauce), *fari* (pancakes served with onion sauce and oil), and boiled cowpea (eaten with oil and vegetables, such as tomatoes, onions or cucumbers). These foods are often consumed by lower-income clients as snacks. Dry cowpea grain, cowpea fodder and cowpea leaves were also sold in open-air markets.

Table 4: Cowpea production and sales by men and women

		Production (kg)	Sales (kg)	Revenue (FCFA)
Male plot managers (n = 396)	mean	114	17.3	4 609
	min	0	0	0
	max	1 000	500	125 000
Female plot managers (n = 36)	mean	65.4	27.9	7 299
	min	0	0	0
	max	400	400	100 000

Note: the LSMS 2014/2015 data include a variable indicating who controls the revenue from sales. However, only 30 observations were reported for cowpea, and all but three were reported to be men. In 2017/2018, only 16 observations were reported for cowpea, and all were reported to be men.

Source: Authors' compilation, based on Mali PRePoSAM 2017/2018

The data shown in Table 5 confirm that the processing and marketing of cowpea products – and especially processed products – are women's business, with 89% of the 487 cowpea vendors interviewed in local markets of Mali being women. Of these, 99% of vendors of processed cowpea products were women. *Sho frou-frou* were sold the most by women. The few men in this category sold boiled cowpea. Women do most of the processing (up to the production of flour) at home, with the preparation of dough and cooking completed on site in markets. In the West African region, women traditionally have prepared and sold fritters (Ibro *et al.* 2008). Our results indicate that this is still the case.

Table 5: Characteristics of vendors in open-air markets

Vendor characteristic		Processed products	Grain ¹	Fresh leaves	Fodder	All
Men	n	4	38	0	11	53
	%	1	51	0	61	11
Women	n	373	37	17	7	434
	%	99	49	100	39	89
All	n	377	75	17	18	487
	%	100	100	100	100	100

¹ Includes wholesalers, collectors and retailers; most are retailers.

Source: Authors' compilation

Another 49% of grain vendors (including wholesalers, collectors and retailers) were women. Sissoko *et al.* (2021) emphasise that grain retailers who sell in local units of measure are all women. Citing Langyintuo *et al.* (2003) and Cissé (2012), they explain that farm women who sell grain in open-air markets often sell small quantities from their own plots to support the needs of their dependants. This is consistent with findings reported by Smale *et al.* (2008) for sorghum and millet in the Segou and Mopti regions of Mali. Typically, women are in the market to conduct various transactions with other family members, and they typically do not have the time or means to go to market on their own with larger quantities. As in Ghana (Mishili *et al.* 2009; Quaye *et al.* 2009) and Burkina Faso (Dossou *et al.* 2004), women are involved in both wholesaling and retailing activities, but they are most often engaged in the latter.

Only women sold fresh cowpea leaves, although the team observed that both men and women sold cowpea fodder. Women also sell fodder from door to door in urban areas, where there is a steady market. Sales of fresh cowpea fodder and leaves appears to be rare in rural markets, especially in the dry season when the survey was conducted.

Several studies also tie market involvement to field size, since many of the women engaged in part-time trading are also farmers. In Mali, Cissé (2012) reported that one of the main constraints to the development of marketing enterprises for women's cowpea products is that they have access only to the small, individual fields allocated to them on marriage into the family. Similarly, Mane's (2017)

research on women's producer organisations and markets in Senegal, which included the production of cowpea and cowpea products, found that women's market share remains low due to the small size of their fields and poor-quality soils. To position themselves in the market sustainably, it is important for them to have the ability to produce and store surplus. Baributsa *et al.* (2013) echo this point, reporting that Burkinabe women who participated in a project to improve cowpea storage were in a better position to sell significant amounts of stored cowpea and increase their income.

However, assets alone do not resolve these problems. With reference to the pigeon pea value chain in Malawi, Me-Nsope and Larkins (2016:18) found that, because of the overriding strength of patriarchal customs in both matrilineal and patrilineal communities, "promoting equitable land access is a necessary but not a sufficient condition for empowering women in agriculture". Customs and perceptions – such as the expectation that women will accomplish domestic chores and conduct business part-time – clearly matter. Pigeon pea, like cowpea, is a minor leguminous crop. Further, in relation to a staple cereal and heavily marketed crop like maize, Adam *et al.* (2020:27) find that "women's participation is generally limited to maize production, and women face barriers to entry into higher nodes".

Otoo *et al.* (2011) assert that entrepreneurship by women in the informal sector, such as street food vending, is important for poverty alleviation in West Africa, since it provides both employment and an inexpensive, nutritious food option. They found that women entrepreneurs could earn incomes many times higher than the minimum wage in Niamey and Kumasi, contributing directly to the health, education and needs of their families (Otoo *et al.* 2011:37).

6. Conclusions

Cowpea continues to be an important crop in West Africa because of its agronomic advantages, nutritional benefits and potential contribution to the livelihoods of farming families through income generation in open-air markets. We have drawn on primary and secondary data collected in farm and trader surveys to test whether cowpea is a 'women's crop' in Mali. We applied five indicators to the data: 1) the share of cowpea plots managed by men and women; 2) the share of women's plots planted to cowpea; 3) the relative size of the land resources allocated to cowpea production by men and women; 4) the volume of cowpea harvested and sold, and/or income from cowpea sales by women and men; and 5), the share of cowpea products sold by men and women vendors in open-air markets. We then interpreted our findings in the context of regional literature.

Cowpea as an intercrop represented 68% to 79% of all plots cultivated by households, generating benefits from nitrogen fixation, fodder and grain for household subsistence or sale.

We conclude that, in Mali, the statement that cowpea is a 'women's crop' is folklore. Cowpea is cultivated on plots managed by both men and women in the country, and cowpea plots are more likely to be managed by men. Among women's plots, cowpea is the most frequently grown crop. Yet there are notable differences in the share of women's plots allocated to cowpea across agroecological zones, highlighting differences in farming systems. The size of land area devoted to cowpea as a primary crop (which represent relatively few plots overall) is similar between men and women plot managers, but the size of land area differs significantly by gender when cowpea is planted as an intercrop with staple cereals (particularly on collective fields). However, although our data are sparse on this indicator, we find that women sell and earn more in gross revenues from cowpea sales. In the dryland production systems of Mali, women who marry into the family customarily are allocated individual plots on which they manage their crops and control production and revenue from sales. Data collected in open-air markets confirm that women dominate the processing and marketing of cowpea products. Together, these findings indicate that, in Mali, cowpea is not a 'women's crop' but a 'women's

enterprise'. In Mali, women have agency in both the production and marketing segments of the cowpea value chain, but the marketing of processed cowpea products is their particular niche.

7. Recommendations

To gain a comprehensive understanding of gender roles and relationships in any agricultural value chain, we need to collect gender-disaggregated data along the nodes and within the different segments of the chain. Comparative studies conducted with the same methodologies across several countries would also lend greater insights. For example, the literature we consulted suggested a greater role of women in cowpea production in Burkina Faso and Niger than in Mali. Furthermore, the large-scale secondary datasets we analysed did not disaggregate data fully within the production segment of the value chain. Where feasible, a tool such as that employed by Orr *et al.* (2016) would seem preferable, although data intensive. The production segment would also need to be integrated with a marketing component (Twyman & Ambler 2021), because women traders are often also farmers, and resource constraints follow them from their fields to the open-air market. Formulating sound policies and programmes to improve the performance and inclusiveness of agricultural value chains, including for cowpea, depends on good data and careful interpretation. The data clearly reveal the role of women in commercialising cowpea and selling cowpea products as traders in Mali, controlling the revenue from these activities. Further, hands-on research is needed to design appropriate information channels and specific organisational innovations to support them.

General recommendations can be made to guide policies and programmes aimed at improving inclusiveness and empowering women along the cowpea value chains. One issue that could be addressed is women's access to improved cowpea seed, including seed of cowpea fodder types to be grown and marketed cooperatively (Dembélé 2015). Informal, continuing education is crucial to improve the production, processing and marketing practices and enhance the value of cowpea products. Training women in how to use technology to increase the production and conservation of cowpea grain could allow them to sell more, as well as later after harvest, when prices are higher. Historically, women's associations have enabled access to credit and could enable investments in transport and both on-farm and in-market storage facilities. Better storage would reduce post-harvest losses and also enable them to take advantage of or mitigate the effects of seasonal variation in prices. Current practices for processing cowpea consumer products could be examined with the aim of improving profitability, and the potential gains from cooperative production and marketing should be explored.

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