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Oilseed Crop Production: Findings from the Myanmar Agriculture Performance Survey

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ABSTRACT

Groundnut, sesame, soybean, and sunflower crops are grown across Myanmar. Nationally, 15 percent of farmers were engaged in oilseed cultivation in the post/pre-monsoon 2023 season, while 17 percent of farmers planted oilseeds in the 2022 monsoon season. Among the agro-ecological zones, the Dry Zone had the largest share of farmers growing oilseeds as their most important non-paddy crop. At the same time, the percentage of farmers who grew oilseeds as their most important non-paddy crop in 2023 declined overall and in the Dry Zone compared to the post/pre-monsoon seasons of 2022 and 2021.

In the post/pre-monsoon 2023 season, 7 and 6 percent of the farmers grew sesame and groundnut, respectively. Only 2 percent of farmers grew soybeans while 1 percent grew sunflowers. Groundnut, sunflower, and sesame were mainly grown in the Dry Zone, while soybean was mainly grown in the Hills and Mountainous Region. The farm size of oilseed growing households was slightly larger than that of the average crop growing household, 5.7 acres compared with 4.7 acres. Most oilseed farmers specialize in oilseed production and plant more than half of their cultivated acres to oilseeds. Oilseed farmers grew oilseeds on 64 percent of their cultivated acres in the 2023 pre/post monsoon season and 36 percent of their cultivated acres in the monsoon season.

Groundnut, soybean, and sesame farmers relied on seeds saved from last year's harvest, while 67 percent of sunflower farmers purchased seeds from ag-input retailers or the government. Between post/pre-monsoon 2022 and post/pre-monsoon 2023, fertilizer prices increased significantly. Despite the rising cost of fertilizer, the share of sesame and sunflower farmers applying fertilizer increased in the 2023 post/pre-monsoon season compared to a year before. On the other hand, fewer groundnut and soybean farmers applied fertilizer in 2023, compared to 2022.

Seventy-one percent of oilseed farmers hired labor for their farming activities in the 2023 dry season. Despite a rapid increase in mechanization, cattle and buffalo were still important for oilseed crop production. In the 2023 post/pre-monsoon season, 21 percent of farmers used hired draught animals, while 37 percent used their own draught animals. The use of owned draught animals declined significantly between the 2022 and 2023 post/pre-monsoon seasons. Nevertheless, draught ownership remains important for oilseed production, especially in the Dry Zone. Fifty-eight percent of oilseed growing households in the Dry Zone owned draught animals compared to 51 percent for all oilseed growing households and 28 percent for any crop growing household.

Nationally, over half of oilseed farmers took out loans from the MADB. But the number of farmers taking loans from the MADB decreased in 2023. Instead, there was a significant increase in the share of oilseed farmers borrowing from agricultural input suppliers between 2022 and 2023. Among the different sources of extension, private sector agents including agents from input companies, traders, and ag-input suppliers, were the most common extension providers. Around 20 percent of oilseed growing households received extension services from these private sector agents. NGOs and cellphone applications were the second most common extension provider for oilseed growers in 2023.

The yields of groundnut, sesame, and sunflowers were lower than neighboring countries, indicating the need for productivity increases for these crops. This would require a combination of access to quality seeds, credit, and extension, as well as greater fertilizer use. At the same time, the gross margins of groundnut were relatively high compared to rice and pulses in the 2023 post/pre-monsoon season. Although soybean prices did not increase over the

2022/2023 period, gross margins for soybeans remained competitive compared with pulses. Soybean yields are equivalent to yields in neighboring countries, around 678 MMK/acre. Sunflower and sesame gross margins are lower than gross margins for rice and major pulses. While sesame and sunflowers have similar total expenditure per acre compared to the other oilseed crops, they have relatively lower total value per acre, and hence lower gross margins. If prices for sesame and soybean continue to rise, these crops could be comparatively lucrative as well.

1. INTRODUCTION

Myanmar's agriculture thrives on the cultivation of more than 60 diverse crops across its varied topography and ecosystems. Among these crops, oilseed varieties are important due to their crucial role in providing cooking oil, generating export income, and creating employment opportunities in the country. The consumption of edible oils is a critical part of the Myanmar diet, yet Myanmar faces significant production and consumption deficits of edible oils. Despite an annual national requirement of 1.1 million tons of edible oil, domestic vegetable oil extraction barely amounts to 400,000 tons[1]. Consequently, the country heavily relies on imports, which reach approximately 700,000 tons per year, with palm oil constituting 90 percent of these imports due to its competitive pricing compared to other alternatives (Moh et al., 2021).

Despite the large quantity of imported edible oils, per capita consumption is much lower than the regional average. Myanmar's consumption of 14.4 kg per capita of edible oil is 38 percent below the regional average of 23.2 kg per capita (Htar et al., 2022). Low consumption of edible oil reflects its high-cost relative to income. Despite low consumption, expenditure on vegetable oil accounts for 5.1 percent of monthly spending (MAPSA 2022).

The edible oil sector has recently been given a lot of attention by the military government. Because of soaring edible oil prices over the last three years due to a decline in global exports and Myanmar's currency depreciation, Myanmar could not import and produce enough oil to cover domestic consumption. To work towards self-sufficiency of edible oils in the country, the Ministry of Agriculture, Livestock and Irrigation (MOALI) has begun to promote sunflower crop cultivation. In the 2022-2023 financial year, sunflower cultivation projects were introduced on 1.5 million acres throughout the country[2]. The Department of Agriculture (DOA) and MOALI provide the inputs, irrigation water, technology, agricultural loans, and seeds, including Yezin hybrid-1 and Sin Shwekyar-2 varieties to farmers across the country. Further, the military government provides credit to those who establish sunflower oil mills[3].

At the same time, with the intention to promote the consumption of locally produced edible oil, such as groundnut, sesame, and sunflower oil, the military government has attempted to reduce palm oil imports. The military government set up an import restriction on palm oil at 50,000 tons per month at the end of 2021 (MAPSA 2023b).

This research note analyzes the cropping pattern and profitability of oilseed crop production in Myanmar. To do so, this note uses data from the second, third and fourth rounds of the Myanmar Agricultural Performance Survey (MAPS), a nationwide phone panel survey

[1] https://www.gnlm.com.mm/peanut-sesame-exports-temporarily-suspended-to-secure-local-consumption/

[2] https://www.gnlm.com.mm/expand-sown-acreage-of-oil-crops-for-local-oil-sufficiency/

[3] https://myanmar.gov.mm/news-media/news/latest-news/-/asset_publisher/idasset354/content/govt-to-grant-loans-for-setting-up-sunflower-oil-mills

consisting of 14,983 crop farming households in 275 townships, conducted over three rounds between August 2022 and July 2023.

The structure of the paper is as follows. In the next section, we discuss MAPS data as well as present the oilseed cropping calendar for the MAPS surveys. Section 3 describes the spatial distribution of oilseed production. Section 4 presents a comparison of characteristics of all crop growing households, oilseed crop growing households, and Dry Zone oilseed crop growing households. It further discusses the oilseed cultivated areas in different agro-ecological zones and the farm size distribution of oilseeds. Section 5 examines the agricultural inputs used in oilseed production such as seeds, fertilizer, labor and mechanization, access to credit and information over two years. Section 6 provides a discussion on natural shocks in the different agro-ecological zones. Section 7 presents the gross margins of oilseed crops that are calculated based on the largest plot of cultivation. We conclude with a discussion of the implications of the survey findings.

2. DATA AND CROPPING CALENDAR

2.1 MAPS Data

This analysis relies on data from MAPS, which is a sub-sample of the households interviewed by phone for the Myanmar Household Welfare Survey (MHWS). MAPS focuses on the agricultural activities of 5,001 households that were identified as crop farmers in the MHWS. This research note mainly focuses on the oilseed production during the post/pre-monsoon 2023 using round 4 MAPS data. This production is compared to oilseed production during the 2022 post/pre-monsoon using round 2 MAPS data and monsoon production in 2022 using MAPS round 3 data. Some tables also include monsoon 2021 and post/pre-monsoon 2021 seasons. This data is recalled by farmers in MAPS round 3 and round 2, respectively. The fourth round of MAPS was implemented by phone by Myanmar Survey Research (MSR) over the period June 26th until July 25th, 2023. Of the 5,001 crop farmers interviewed in the fourth round of MAPS, a relatively small share of crop farmers, 15 percent of the interviewed crop producers, or 559 farmers, cultivated oilseed crops in the 2023 dry season (Table 1). The majority of the interviewed oilseed farmers reside in the Dry Zone, including Sagaing (189 farmers) and Magway (92 farmers) regions, reflecting the importance of these regions in oilseed production during the dry season period.[4] The agro-ecological zones classify states and regions into the Delta Region, the Central Dry Zone, the Coastal Zone and the Hilly and Mountainous Zone based on topography and rainfall (Figure A.1)

To assure that crop farmers are representative of the crop farming population in their state or region, a weighting factor was calculated building on the method used for the MHWS (MAPSA 2022a). In this research note, we focus on the information that was collected on the biggest non-paddy plot of oilseed producers in the dry season of 2023. Data for these plots were collected on input use and farm management practices, such as the use of seeds, agro-chemicals, fertilizers, labor and mechanization and oilseed output. Farmers were also asked to estimate overall monetary input expenditures on these plots. While we collected these data from 559 households, caution is warranted in interpretation and extrapolation to national and

[4] Covering the post- and pre-monsoon period, or winter and summer crops, typically crops that are harvested between February and July

state/region-wide oilseed production as we only collected information on the largest oilseed plot.

Table 1. Sample of oilseed farmers in MAPS

State/Region	Monsoon 2021	Monsoon 2022	Post/pre-Monsoon 2022	Post/pre-Monsoon 2023
Kachin	16	18	36	31
Kayah	13	11	2	0
Kayin	6	3	8	7
Chin	3	2	0	1
Sagaing	137	153	210	189
Tanintharyi	0	0	2	2
Bago	62	66	52	28
Magway	247	249	192	92
Mandalay	191	194	185	91
Mon	0	0	6	9
Rakhine	5	5	27	28
Yangon	1	1	2	0
Shan	95	122	60	57
Ayeyarwady	6	10	14	15
Nay Pyi Taw	14	14	24	9
Total	796	848	820	559

Source: Authors' calculation based on MAPS

2.2 Cropping Calendar of Growing Oilseed

The cropping calendar of oilseed farmers in this survey by agro-ecological zones is presented in Table 2. Groundnut and sunflowers were grown across all four agro-ecological zones in different seasons. Sesame and soybean were grown in the Hilly and Mountains, Delta Region and Dry Zone. Sesame is mainly grown in the monsoon season in the Hills and Mountains, and pre-monsoon season in the Delta Region and Dry Zone. Soybean is mostly grown in the pre-monsoon season in Hills and Mountains, and monsoon season in the Delta Region and Dry Zone. Very few farmers in the Coastal Zone planted sesame and sunflower. Niger was only grown in the Hills and Mountains in the post-monsoon season.

According to the MOALI, the cropping calendar of oilseed varies based on lowland cropping, upland cropping, and monsoon rice-based cropping in lower Myanmar and upper Myanmar (Table A.1). Sunflower and soybean are mostly grown in monsoon season and post-monsoon season, while groundnut and sesame are grown in pre-monsoon, monsoon, and post-monsoon seasons. Niger is grown as a post-monsoon crop after monsoon paddy. In 2018-2019, total sown area of oilseed crops was 7.8 million acres which covers 16 percent of the national cultivated areas of all crops. Monsoon and post/pre-monsoon oilseed crops occupied 9 percent and 7 percent of total cultivated crop area, respectively (DOP, MOALI).

Table 2. Main month of planting and harvesting in post/pre-monsoon 2023 by agro-ecological zones

Oilseed	Agro-ecological zones	Monsoon				Post-monsoon					Pre-monsoon		
		June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	March	April	May
1. Sesame	Hills and mountains	Plant									Harvest		
	Dry zone	Harvest										Plant	
	Delta region		Harvest									Plant	
	Coastal zone												
2. Groundnut	Hills and mountains			Harvest	Plant			Harvest					Plant
	Dry zone			Plant								Harvest	
	Delta region			Plant							Harvest		
	Coastal zone			Plant							Harvest		
3. Sunflower	Hills and mountains				Plant							Harvest	
	Dry zone	Plant										Harvest	
	Delta region					Plant					Harvest		
	Coastal zone							Plant					Harvest
4. Soybean	Hills and mountains											Plant	Harvest
	Dry zone				Plant						Harvest		
	Delta region					Plant					Harvest		
	Coastal zone												
5. Niger	Hills and mountains					Plant					Harvest		
	Dry zone												
	Delta region												
	Coastal zone												

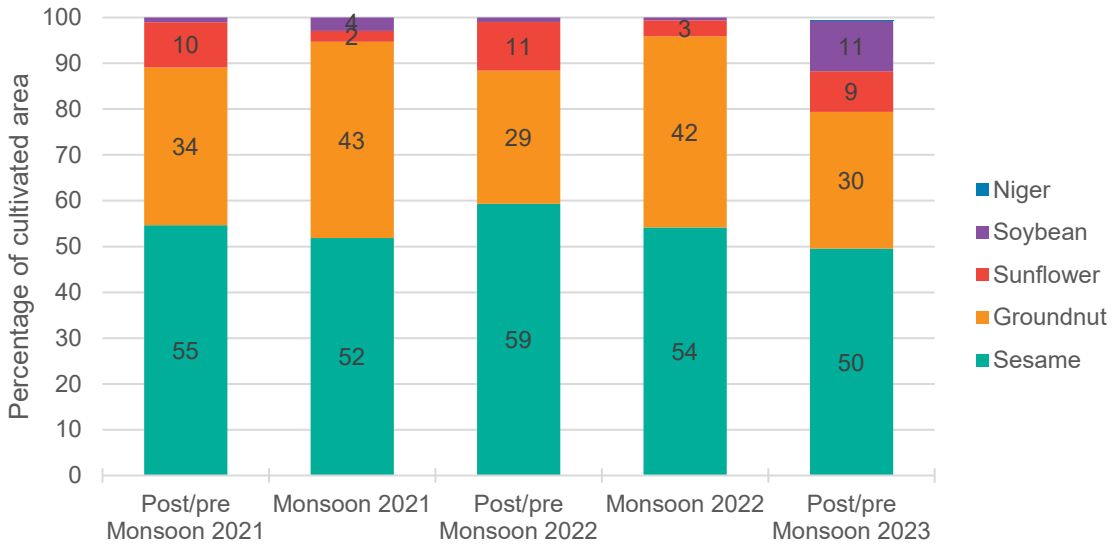
Source: Authors' calculation based on MAPS

3. SPATIAL DISTRIBUTION OF OILSEED CROPS

We estimate that in the post/pre-monsoon 2023 season, oilseeds were grown on 10 percent of the total cultivated area of the farmers in the MAPS sample. In the post/pre-monsoon season of 2023, sesame accounted for 50 percent of the oilseeds planted, followed by groundnut at 30 percent (Figure 1). Soybean, sunflower, and niger covered 11 percent, 9 percent, and less than 1 percent, respectively in the same season. Compared to the same season in 2022, in the post/pre-monsoon season of 2023 there was a slight decrease in the share of cultivated area of sesame, while the area of groundnut cultivated increased marginally.

In the monsoon season of 2022, oilseeds were also grown on about 10 percent of the sample cultivated area but cropping distribution between the oilseeds differed. While sesame was planted on roughly the same percentage of cultivated area, groundnut was planted on a much larger share of acres in the monsoon season. Sunflower and soybean, on the other hand, are not monsoon crops, they are mainly planted in the winter season. The share of farmers in the MAPS sample growing sunflower did not increase in the 2023 dry season compared to the previous dry season. In contrast, the share of soybean growers increased significantly between post/pre-monsoon 2022 and 2023.

Figure 1. Share of cultivated area by type of oilseed crop in the post/pre-monsoon and monsoon seasons of 2021, 2022, and 2023



Source: Authors' calculation based on MAPS
Note: This figure contains the share of each oilseed cultivated area out of total oilseed cultivated areas for the five oilseeds overall, not only for largest plot.

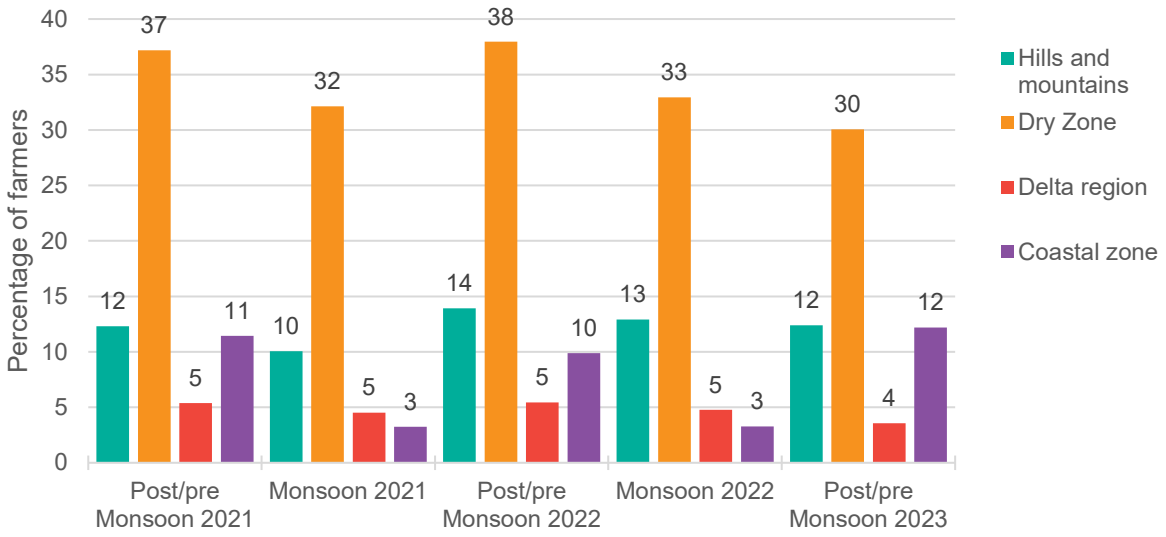
3.1 Share of Farmers Who Grow Oilseeds as Their Most Important Crop by Agro-Ecological Zone

Nationally, 15.2 percent of farmers were engaged in oilseed cultivation in the post/pre-monsoon 2023 season. This marks a decline from the 2022 monsoon season, where 16.9 percent of surveyed households planted oilseeds, and from the 2022 post/pre-monsoon season, where 19.0 percent of households planted oilseeds. Figure 2 illustrates the change in the share of farmers growing oilseeds as their most important crop (among non-paddy crops) by agro-ecological zones (AEZ) between post/pre-monsoon 2021 and post/pre-monsoon 2023. In the post/pre-monsoon season of 2023, approximately 12 percent of farmers grew oilseeds as their first priority crop (among non-paddy crops), while 3 percent and 1 percent grew them as their second and third priority crops, respectively.

Among the agro-ecological zones, the Dry Zone (Magway, Mandalay, Sagaing and Nay Pyi Taw) had the largest share of farmers growing oilseeds as their most important non-paddy crop. At the same time, the percentage of farmers who grew oilseeds as their most important non-paddy crop declined in the Dry Zone compared to the post/pre-monsoon seasons of 2022 and 2021, and even declined slightly from the previous monsoon season. The Hills and Mountains was the second most important zone for oilseed production, with 12 percent and 14 percent of farmers in that zone growing oilseeds as an important non-paddy crop in the 2023 post/pre-monsoon season and the 2022 monsoon season. Further, the percentage of farmers in the Hills and Mountains who planted oilseeds as an important crop remained consistent between monsoon and post/pre-monsoon seasons.

In the coastal zone, 12 percent of farmers also grew oilseeds as an important non-paddy crop in the 2023 post/pre-monsoon season. But there were strong seasonal fluctuations with 10 percent or more of farmers planting oilseeds as an important non-paddy crop in the 2022 post/pre-monsoon season, and only 3 percent in the 2022 monsoon season. Finally, in the Delta, the number of farmers counting oilseeds as an important non-paddy crop was around 4 percent and declined marginally over the period.

Figure 2. Share of farmers who grow oilseeds as their most important non-paddy crop by agro-ecological zone



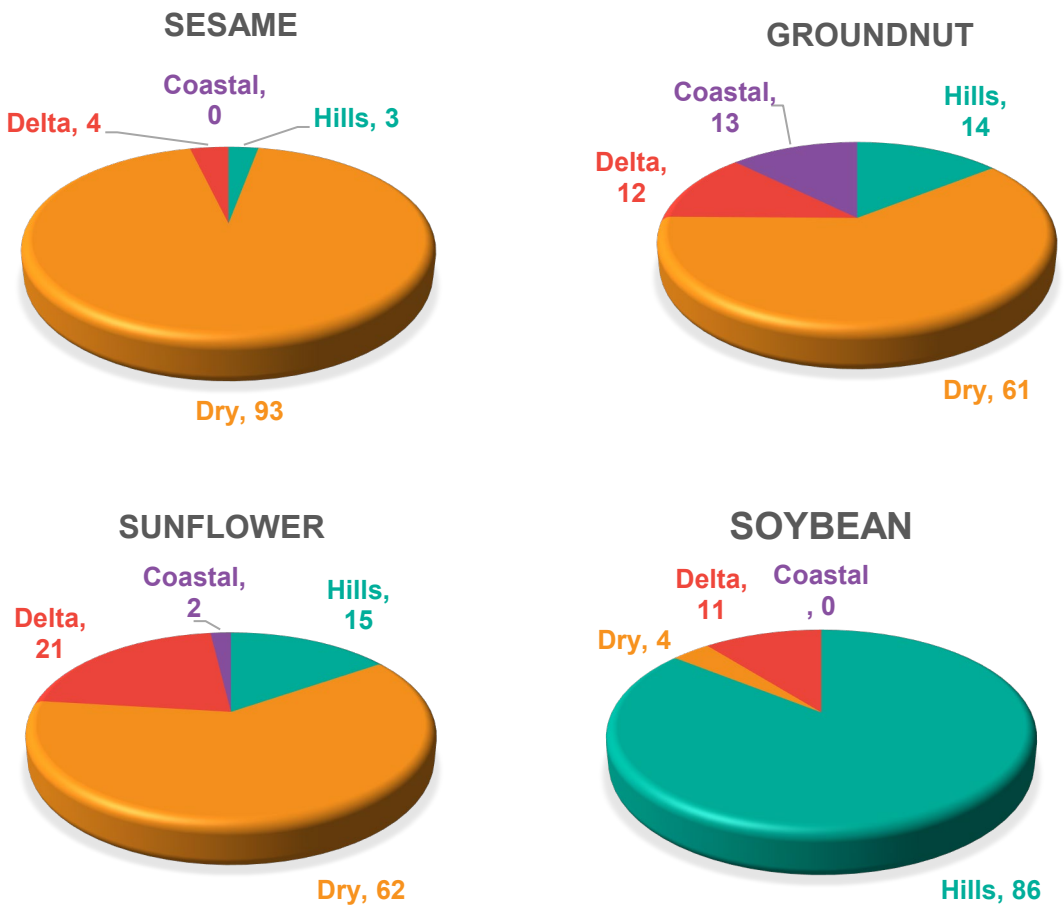
Source: Authors 'calculation based on MAPS
Note: Share of farmers who grow oilseeds as their important crops other than paddy by agro-ecological zone, overall, not only for largest plot.

3.2 Share of Farmers by Type of Oilseed Crop by Agro-Ecological Zones

In the post/pre-monsoon 2023 season, 7 percent and 6 percent of the farmers grew sesame and groundnut, respectively. Only 2 percent of them grew soybean while 1 percent grew sunflower. The share of niger farmers was low in 2023, accounting for 0.1 percent of farmers. In the post/pre-monsoon season of 2022, sesame was the most common oilseed crop planted, as nearly 10 percent of total sample farmers grew sesame, followed by groundnut, 8 percent, sunflower 2 percent, and soybean, 2 percent. Oilseed cultivation varied depending on the geographical location. The share of farmers growing different oilseed crops by agro-ecological zones in 2023 is shown in Figure 3. The share of farmers in 2023 was similar to 2022 and 2021, which is shown in Figure A.2 and Figure A.3. Groundnut, sunflower, and sesame were mainly grown in the Dry Zone, the country's "oil bowl", while

soybean was mainly grown in the Hills and Mountainous Region. Although most groundnut and sunflower production was in the Dry Zone, both crops were planted across all four agro-ecological zones. On the other hand, almost all farmers who planted sesame were located in the Dry Zone.

Figure 3. Share of farmers by type of oilseed crop by Agro-Ecological Zones in 2023 (in percent)



Source: Authors 'calculation based on MAPS

4. CHARACTERISTICS OF OILSEEDS GROWING HOUSEHOLDS

Table 3 presents the characteristics of all crop growing households, oilseed growing households, and oilseed growing households in the Dry Zone. In the 2023 post/pre-monsoon season, the farm size of oilseed growing households was slightly larger (5.7 acres) than that of the average crop growing households (4.7 acres). Oilseed farmers grew oilseeds on 64 percent of their cultivated acres in the 2023 pre/post-monsoon season and 36 percent of their cultivated acres in the monsoon season. Across the seasons, sixty-three percent of oilseed farmers also grow rice.

We disaggregated the ownership of assets into livestock, draught animals, and tractors which were the three most owned assets among crop farmers. Oilseed growing households in the Dry Zone owned more draught animals, but fewer tractors, compared to the national average for oilseed growing households. In the Dry Zone, 58 percent of oilseed growing households owned draught animals compared to 51 percent for all oilseed growing households and 28 percent for crop growing households nationally. The ownership of tractors among crop and oilseed growing households was

25 percent and 30 percent, respectively, while only 20 percent of oilseed growing households in the Dry Zone owned tractors. The average travel time from a farming household to a commercial center was approximately 41 minutes and did not vary significantly between oilseed growing households and households growing other crop types.

Table 3. Characteristics of households growing all crops and oilseed crops in the post/pre-monsoon of 2023

No	Characteristics	Unit	All crops growing households	Oilseeds growing households	Oilseeds growing households in Dry Zone
1	Farm size	acre	4.7	5.7	5.5
2	Asset ownership				
	1. Draught animal	%	28	51	58
	2. Tractor	%	25	30	20
	3. Livestock	%	70	76	78
3	Travel time to center of township	minute	41	40	40
	Number of observations		3317	558	380

Source: Authors' calculation based on MAPS

4.1 Farm Size Distribution of Oilseed Crops

As shown in Table 4, approximately half of the oilseed crop farmers in this survey owned less than 5 acres. Nearly a third of oilseed growing farmers owned between 5 and 10 acres, while 19.5 percent owned 10 acres and above. Compared to rice and pulse farmers, a larger percentage of oilseed farmers owned plots greater than 5 acres. In the 2023 post/pre-monsoon season, some farmers who owned plots larger than 5 acres stopped growing oilseeds, hence the increase in the share of smaller farm owners planting oilseeds.

Table 4. Percentage of farm size distribution of oilseed crops from the post/pre-monsoon season of 2021 to 2023

Size of farm	Post/pre-Monsoon 2021	Monsoon 2021	Post/pre-Monsoon 2022	Monsoon 2022	Post/pre-Monsoon 2023
=<5 ac	48.9	43.7	48.9	47.8	55.0
>5 to =<10 ac	30.0	32.1	29.6	30.7	25.5
more than 10 ac	21.1	24.2	21.3	21.5	19.5

Source: Authors' calculation based on MAPS
Note: The farm size shares are based on the total land owned by oilseed farmers

Looking at the share of each oilseed out of the total cultivated area for each farmer, most oilseed farmers specialize in oilseed production, and plant more than half of their cultivated acres to oilseeds. During the winter season, sesame made up around 72 percent of total cultivated area, followed by soybean, 68 percent, groundnut, 61 percent, and sunflower, 55 percent. Table A.2 presents the average and median area cultivated by oilseed crop. In the post/pre-monsoon season, sesame was planted on 3.6 acres, compared to 3.5 for soybean, 3.0 for sunflower, and 2.3 for groundnut. In the monsoon season, the shares of total cultivated area for oilseeds were lower. Groundnut had the highest share at 43 percent, followed by sesame.

Table 5. Percentage of share of oilseed crop coverage out of total cultivated area by season

Oilseed crops	Post/pre-Monsoon 2021	Monsoon 2021	Post/pre-Monsoon 2022	Monsoon 2022	Post/pre-Monsoon 2023
Sesame	67	40	73	39	72
Groundnut	57	46	58	43	61
Sunflower	58	27	56	27	55
Soybean	65	36	69	34	68

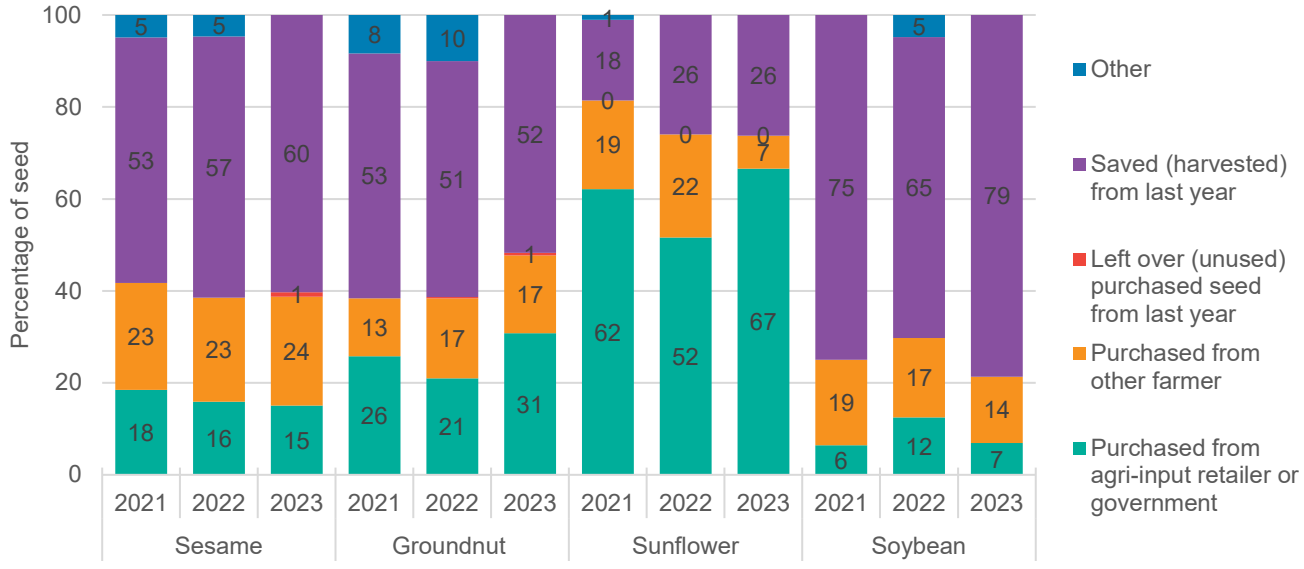
Source: Authors' calculation based on MAPS

5. AGRICULTURAL INPUTS USED IN OILSEED PRODUCTION AND SERVICE DELIVERY

5.1 Seed

Sources of seed acquisition for oilseeds include purchased from agri-input retailers or government, purchased from other farmers, purchased seed from last year, saved seed from last year, and other sources (e.g., gifts). Figure 4 shows that among different sources, seeds saved from last year's harvest were the most common source for groundnut, soybean, and sesame seeds. The second most common source was agri-input retailers or the government, and the third was purchasing from other farmers. Very few soybean farmers purchased seeds from agri-input retailers or the government, 7 percent in the 2023 post/pre-monsoon season. Slightly more groundnut and sesame farmers purchased seeds from this source, 31 and 15 percent, respectively in 2023. On the other hand, in 2023, 67 percent of sunflower farmers purchased seeds from agri-input retailers or the government. This increased significantly from 2022. While the share of recycled sunflower seeds stayed the same, the share purchased from other farmers decreased from 22 percent to 7 percent between 2022 and 2023. Therefore, more farmers are now purchasing sunflower seeds from the government or agri-input retailers rather than other farmers. This is linked to the government project of expanding sunflower cultivation across the country. Under this project, the regional government distributed sunflower seeds to farmers.

Figure 4. Share of seed acquisition from different sources



Source: Authors' calculation based on MAPS
Note: Seed sources for the largest oilseed plot

5.2 Fertilizer Inputs

Between post/pre-monsoon 2022 and post/pre-monsoon 2023, the price of potash per kg sharply increased by 115 percent, followed by T-super (96 percent), compound (15-15-15) (51 percent), and urea (35 percent) in 2023. Despite the rising cost of fertilizer, the share of farmers applying fertilizer increased in the post/pre-monsoon 2023 season compared to a year before for sesame and sunflower farmers. On the other hand, fewer groundnut and soybean farmers applied fertilizer in 2023, compared to 2022.

Table 6 demonstrates that use of fertilizer is common in oilseed cultivation in Myanmar. First, around 70 percent of sesame farmers used fertilizer on their largest plot in the post/pre-monsoon 2023 season. This marks an increase in fertilizer use compared to the previous post/pre-monsoon season and monsoon season. This was driven by an increase in the use of urea fertilizer on the largest sesame plot from 42 percent in the previous seasons to 61 percent in 2023.

Around 45 percent of groundnut farmers used fertilizer on their largest plots in the post/pre-monsoon season of 2023. This was slightly lower than the percentage of farmers using fertilizer in the 2022 post/pre-monsoon season and the two previous monsoon seasons. Unlike for sesame, the use of urea declined between the post/pre-monsoon seasons. Further, the significantly higher use of fertilizer during monsoon groundnut production is due to a higher use of gypsum and T-super.

The application of fertilizer increased significantly in sunflower cultivation between the post/pre-monsoon seasons from 37 percent of farmers in 2022 to 57 percent of farmers in 2023. This was driven by an increase in the use of urea fertilizer on the largest plot as well as an increased use of gypsum. Finally, soybean farmers applied the least fertilizer of the oilseed farmers. Monsoon application was around 13 percent over the two monsoon seasons. Further, post/pre-monsoon season application declined to 39 percent of farmers in 2023. This was driven by a decrease in the use of urea fertilizer and compound fertilizer on the largest plot.

Most farmers only applied one type of fertilizer. Among the different types of fertilizers, urea was the most common type of fertilizer applied to oilseed crops, followed by compound 15-15-15 fertilizer or other types of compound fertilizers and Triple Super Phosphate (TSP). In post/pre-monsoon 2023, 61 percent of sesame farmers used urea on their largest plot, followed by 51 percent of sunflower farmers, 21 percent of soybean farmers, and 17 percent of groundnut farmers.

Table 6. Percentage of share of oilseed farmers who used fertilizers on their largest plot

	Monsoon 2021	Monsoon 2022	P-value difference	Post/pre-Monsoon 2022	Post/pre-Monsoon 2023	P-value difference
Sesame	51	54	**	55	70	***
Groundnut	62	64	**	48	45	***
Sunflower	51	59	**	37	57	***
Soybean	13	12	**	62	39	***

Source: Authors' calculation based on MAPS
Note: Stars denote significant differences between the two monsoon seasons and the two post/pre monsoon seasons at p-values * p < 0.10, ** p < 0.05, *** p < 0.01.

Table 7 examines the changes in the amount of fertilizer used between 2022 and 2023 among fertilizer users. Overall, groundnut farmers reported using very little fertilizer, 4.8 kg per acre of urea, 4.6 kg/acre of compound 15-15-15 and around 2 kg per acre of other compound and T-super. Soybean farmers used slightly more urea and other compound fertilizer, but less compound 15-15-15 and T-super. The amount of urea fertilizer sesame farmers applied jumped between post/pre-monsoon season 2022 and post/pre-monsoon season 2023, as reflected in Table 5 as well. Sunflower farmers also increased the use of urea fertilizer, while other fertilizers were applied in very limited quantities.

Table 7. Fertilizer application rate (kg per acre) in the post/pre-monsoon of 2023, by oilseed crop

	Urea		Compound 15-15-15		Compound other		T-super	
	2022	2023	2022	2023	2022	2023	2022	2023
Sesame (kg/acre)	8.8	20.4	3.4	4.2	1.7	1.0	0.7	1.1
Groundnut (kg/acre)	6.9	4.8	3.7	4.6	2.2	2.1	1.2	1.9
Sunflower (kg/acre)	7.8	14.2	1.2	1.3	0.5	1.7	0.2	2.8
Soybean (kg/acre)	4.2	6.0	5.8	1.5	4.9	5.0	1.5	0.2

Source: Authors' calculation based on MAPS
Note: For oilseed farmers who used fertilizer on their largest plot (this includes oilseed farmers who do not use fertilizers)

The recommended rate of Urea and T-super for each type of oilseed crop by MOALI is shown in Table 8. Oilseed farmers in our survey used much less fertilizer than the recommended amounts because many farmers did not apply Urea or T-super fertilizer. But among the farmers that did apply fertilizer, they did apply close to the recommended rates. Excluding soybean farmers, all farmers who applied T-super, which was very few, applied T-super in the appropriate quantities and/or reporting applying too much T-super. Groundnut and soybean who applied fertilizer, reported applying too much urea, or more than recommended amounts. Sesame and sunflower farmers who applied fertilizer, applied less than the recommended amounts of urea.

Table 8. Comparison of MOALI recommended rates to MAPS application rates, amount applied (kg/acre)

	MOALI recommended rates		MAPS rates	
	Urea	T-super	Urea	T-super
Sesame (kg/acre)	38	25	33.3	35.7
Groundnut (kg/acre)	13-25	38-50	28.0	42.9
Sunflower (kg/acre)	50	25	27.7	100.0
Soybean (kg/acre)	13	38-50	28.0	25.0

Source: Authors' calculation based on MAPS
Note: MAPS rates are amount applied (kg/acre) from the largest plot only and for those who used chemical fertilizer

5.3 Use of Labor and Mechanization Service

Agriculture in Myanmar still largely relies on labor. Seventy-one percent of oilseed farmers hired labor for their farming activities in the 2023 dry season. Another option for obtaining additional labor is to exchange it. At the national level, the share of oilseed farmers who exchanged labor was around 6.5 percent in the post/pre-monsoon seasons. Despite a rapid increase in mechanization, cattle and buffalo were still important for oilseed crop production. In the 2023 post/pre-monsoon season, 21 percent of farmers used hired draught animals, while 37 percent used their own draught animals. The use of own draught animal declined significantly between the 2022 and 2023 post/pre-monsoon seasons. The use of machine labor is becoming more widespread. At the national level, nearly a quarter of oilseed farmers used their own tractors for land preparation (Table 9). Around half of farmers used hired tractors, and therefore any tractor use increased in the post/pre-monsoon season of 2023.

Table 9. Overall use of labor and mechanization for oilseed farmers

	Monsoon 2021	Monsoon 2022	Post/pre-Monsoon 2022	Post/pre-Monsoon 2023	P-value difference
Labor (%)					
Hired labor (%)	62	62	75	71	
Exchange labor (%)	8	10	6	7	
Any labor (%)	70	71	81	78	
Draught Animal (%)					
Hired (%)	22	24	24	21	
Own (%)	49	45	44	37	**
Any animal (%)	72	69	68	57	***
Tractor for land preparation					
Hired (%)	45	47	51	52	
Own (%)	12	11	21	25	
Any tractor (%)	52	54	68	74	*
No. of obs	717	771	703	492	

Source: Authors' calculation based on MAPS
Note: Stars denote significant differences between the two monsoon seasons and the two post/pre monsoon seasons at p-values * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. We find no significant differences between monsoon 2021 and monsoon 2022, and thus we omitted the column.

Table 10 looks at the use of labor, animals, and tractors in oilseed production in the post/pre-monsoon season of 2023 by agroecological zone. The share of oilseed farmers who hired labor was highest in the Delta Region, accounting for 84 percent, followed by the Dry Zone, 71 percent. Because of favorable weather conditions for grazing, cattle are most common in the Dry Zone. According to the National Livestock Baseline Survey (LBVD, 2019), the Dry Zone has over 52 percent of the total cattle population in Myanmar. Most oilseed farmers used their own cattle in their farming activities. The Dry Zone had the highest share of farmers using their own cattle (46 percent) and hired cattle (26 percent) relative to the other regions.

The rates of machinery ownership remain low in the Dry Zone as nearly 90 percent of the machinery used in the Dry Zone is rented (Filipski et al., 2018). This is consistent with our findings for oilseed farmers in the Dry Zone. These farmers mainly relied on their own cattle and tractor rental services for growing oilseed crops. The Dry Zone had the lowest share of farmers owning tractors (17 percent) followed by the Coastal Region (13 percent). Among the agro-ecological zones, the highest share of farmers using their own tractor for land preparation was found in the Hills and Mountains (52 percent). Among farmers using tractor rental services the highest shares were in the

Dry Zone (58 percent) followed by Hills and Mountains (42 percent), the Delta (39 percent) and lastly the Coastal Region (32 percent).

Table 10. Percentage of use of labor and mechanization by oilseed farmers on their largest plots, by agroecological zone

	Hills	Dry	Delta	Coastal
Hired labor	63	71	84	76
Exchange labor	13	6	4	10
Any labor	76	77	88	87
Hired	8	26	11	14
Owned	11	46	21	32
Any animal	19	71	32	47
Hired	42	58	39	32
Owned	52	17	33	23
Any tractor	87	73	66	55

Source: Authors' calculation based on MAPS

Table 11 provides information on labor, draught animal, and mechanization for the different oilseed crops. Around 85 percent of sunflower farmers used hired labor in 2023. This is compared to 71 percent of sesame farmers, 70 percent of groundnut farmers, and 65 percent of soybean farmers. Between the 2022 and 2023 post/pre-monsoon season, the use of hired labor declined marginally in groundnut and soybean production, while it increased or stayed the same in sesame and sunflower production.

Use of draught animals is still extremely important for sesame and groundnut production. Forty-nine percent of groundnut farmers relied on their own animals for groundnut farming, while 18 percent hired animals. Thirty-five percent of sesame farmers used their own animals while 29 percent hired draught labor. Fewer sunflower and sesame farmers rely on draught animals. In sesame, sunflower, and soybean, the use of own draught animals declined between 2022 and 2023 to 35, 11, and 7 percent, respectively.

Despite the high use of draught animals in sesame and groundnut production, these farmers also use tractors for land preparation. This includes 80 percent of sesame farmers and 61 percent of groundnut farmers. Because of lower draught animal use among sunflower and soybean growers, 93 and 90 percent of these farmers used tractors, respectively. Soybean farmers had the highest share of farmers using their own tractors, 51 percent. Conversely, sesame had the lowest share of farmers using owned tractors for land preparation, 17 percent.

Table 11. Labor and mechanization use during the post/pre-monsoon seasons for the largest oilseed plot

Labor/animal/tractor use	Sesame		Groundnut		Sunflower		Soybean	
	2022	2023	2022	2023	2022	2023	2022	2023
Labor								
Hired labor (%)	69	71	82	70	75	85	82	65
Exchange labor (%)	8	5	3	9	7	0	8	14
Any labor (%)	77	76	85	79	82	85	90	79
Draught Animal								
Hired (%)	29	29	23	18	17	5	5	6
Own (%)	47	35	48	49	28	11	13	7
Any animal (%)	76	64	71	67	45	16	18	13
Tractor for land preparation								
Hired (%)	54	67	48	36	69	73	28	47
Own (%)	13	17	22	27	20	25	67	51
Any tractor (%)	64	80	65	61	89	93	87	90
	369	210	232	199	51	29	45	52

Source: Authors' calculation based on MAPS

5.4 Access to Credit for Oilseed Crops

Agricultural credit is important for financial access to productivity enhancing inputs. Farmers can potentially obtain credit from multiple sources. The sources of credits consist of the formal financial institutions (MADB, Department of Cooperatives, microfinance institutions (MFIs) and non-government organizations (NGOs), private banks), revolving funds (Mya Sein Yaung), and the informal credit sector (agricultural input suppliers, agricultural machinery suppliers, agricultural traders, rice or oil mill owners, friends and relatives, and private money lenders).

5.4.1 Sources of credit for oilseed farmers

MADB is the most common source of credit for oilseed farmers. The bank currently issues seasonal crop production loans (SCPL) for a total of 22 crops, primarily for paddy (Luna-Martinez and Anantavrasilpa, 2014). It provides pre-monsoon loans, monsoon loans and post-monsoon loans (winter loans). The MADB disburses farm loans for the pre-monsoon cultivation season between early January and the end of March, which farmers must pay off by the following February. It provides loans for the monsoon crop from May to September, and the deadline for repayment is in April the following year. For the winter crop season, it disburses the loans from October to December, with a deadline of repayment by the following September[5]. It lends 150,000 MMK per acre for paddy and 100,000 MMK per acre for the other crops up to a maximum of 10 acres at an interest rate of 7 percent, which was cut from 8 percent in April 2020. Due mainly to the outbreak of COVID-19, the MADB reduced its interest rate for agricultural loans from 7 percent to 5 percent in May 2020. The MADB, however, does not extend loans to farmers who did not repay their last loans in full. Hence it is likely that some farmers did not have access to new MADB loans.

In Table 12 we explore access to credit among oilseed farmers who did not also cultivate rice. Because we ask each farmer if they have credit rather than asking credit by crop, by focusing only on oilseed farmers who did not cultivate rice, we can try to tease out lending patterns among oilseed farmers alone. Nationally, over half of oilseed farmers took loans from the MADB (Table 12). Loans from microfinance institutions were the second most frequent source of credit at 14 percent in post/pre-monsoon of 2023. The shares of farmers taking loans from MADB decreased in 2023

[5] https://www.madb.gov.mm/en/winter-loan/

compared to same time last year while the share of loans from microfinance institutions was similar in both years. The share of households taking loans from private banks declined to zero percent in the post/pre 2023 monsoon season. Borrowing from agricultural traders was less common compared to borrowing from agricultural suppliers.

There was a significant increase in the share of oilseed farmers borrowing from agricultural input suppliers between 2022 and 2023. Nearly 8 percent of oilseed farmers obtained loans from agricultural suppliers in 2022. This increased to 19 percent in 2023. There was also a slight increase in the share of farmers who took out loans from relatives or friends, and private money lender. These patterns were similar for the different type of oilseeds planted and for oilseeds planted in the Dry Zone.

Table 12. Main sources of agricultural loans overtime for oilseed farmers who did not cultivate paddy

	Unit	Post/pre-Monsoon 2021	Monsoon 2021	Post/pre-Monsoon 2022	Monsoon 2022	Post/pre-Monsoon 2023
MADB	%	60.7	59.0	58.6	46.3	53.5
Agricultural input suppliers	%	7.3	4.5	7.8	5.7	18.8
Relatives/Friend	%	10.9	13.4	11.2	17.6	14.6
MFI/ NGO	%	15.5	18.1	14.1	23.9	14.0
Private money lender	%	6.2	8.5	7.1	12.6	9.1
Revolving funds	%	7.1	11.1	7.2	10.8	8.1
Agricultural traders	%	2.7	4.3	4.1	3.3	2.9
Department of Cooperatives	%	4.7	2.9	4.2	2.8	1.6
Other	%	2.1	0.3	2.0	1.4	1.1
Private bank	%	1.8	1.4	2.7	0.7	0.0
Agricultural machinery suppliers	%	0.2	0.0	0.4	0.0	0.0
Rice or oil mill	%	0.0	0.0	0.0	0.0	0.0
No. of obs		397	168	361	188	207

Source: Authors' calculation based on MAPS

5.5 Access to Extension

Extension services can be accessed by farm households from different sources such as public extension agents (DOA, including a call center in MOALI), private sector agents, NGOs, and cellphone applications or the internet. Table 13 shows the shares of different sources of extension services for different types of farm households: all crops growing households, oilseed growing households, and oilseed growing households with no rice crop.

Among the different sources of extension, private sector agents including agents from input companies, traders, and ag-input suppliers, were the most common extension providers. Around 20 percent of oilseed growing households with or without rice received extension services from private sector agents in 2023, respectively. Cellphone applications or the internet were the second most common extension provider in 2023, with 18 percent of households relying on this method. Public extension was the third most common service provider. Around 12 percent of farmers received public extension.

Ther number of oilseed farming households receiving extension from any source declined between 2023 and 2023. This was driven by a significant decline in public extension. Extension from NGOs also fell significantly. The percentage of oilseed farmers using each type of extension was similar to that of all crop growing households, and oilseed farming households without rice.

Table 13. Percentage of source of extension services

Source	All crops growing households		Oilseeds growing households		Oilseeds growing households with no rice	
	2022	2023	2022	2023	2022	2023
Private sector agents	22.9	17.8	22.7	19.5	22.9	19.7
Cellphone applications	15.8	17.5	18.2	17.3	18.6	17.7
Public extension agents	17.0	12.7	19.3	12.6	17.6	11.9
NGOs	9.4	6.1	12.5	5.9	12.5	5.9
Extension from any source	38.7	36.2	42.0	35.9	40.4	35.9

Source: Authors' calculation based on MAPS

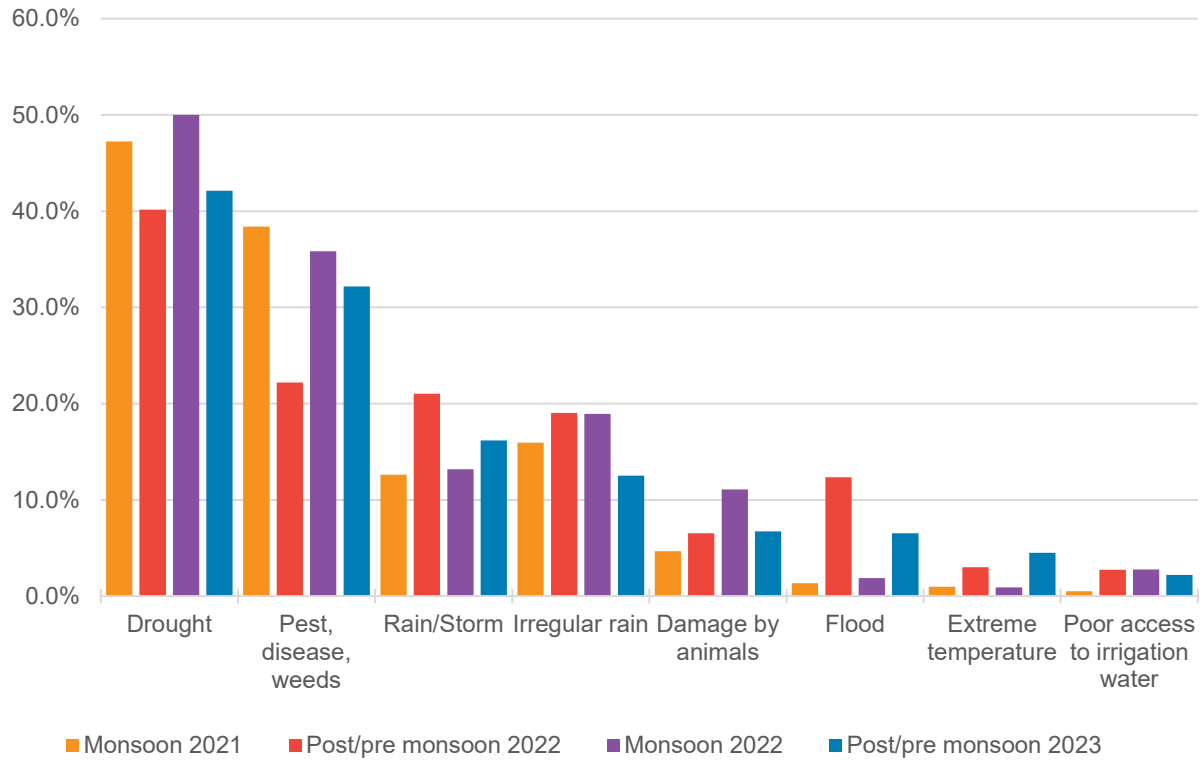
Note: Private sector agents include agents from input companies, traders, and ag-input suppliers. Extension from cellphone applications and the internet include Facebook, Htwet Toe, Greenway, and Golden Paddy, among others. Public extension agents include DoA in person or MOALI call centers.

6. CROP PRODUCTION AFFECTED BY NATURAL AND OTHER SHOCKS BY AGRO-ECOLOGICAL ZONES

Crop farmers were asked about the incidence of natural shocks that negatively affected their oilseed crop production during the post/pre-monsoon of 2023. The share of crop farmers experiencing major production shocks in 2023 was 30 percent at the national level – a decrease from 38 percent in the previous year and season. Compared to the previous year, flooding, rain and storms, and irregular rainfall were less common while loss of production from pests was more common.

Over time, the most common shock negatively affecting oilseed production is drought (Figure 5). More than 40 percent of farmers in each season who reported that they had been negatively impacted by natural shocks reported drought as the cause. Drought was the most common natural shock in the Dry Zone and the Coastal Region. Farmers were also negatively affected by pests, diseases, and weeds. This includes more than 20 percent of the sample of negatively affected farmers in any given season. More than 10 percent of farmers also reported rainstorms and irregular rains to be damaging their oilseed crops. Farmers in the Hills and Mountains region reported that rain and storms were one of the major problems affecting their production, while irregular rains were more frequently reported in the Delta Region. Damage by animals, or due to floods, extreme temperatures, or poor access to irrigation water were lesser issues for oilseed farmers.

Figure 5. Oilseeds negatively affected by shocks, 2021-2023



Source: Authors' calculation based on MAPS

7. GROSS MARGIN ANALYSIS OF OILSEED CROPS

In Table 14, we analyze the change in total expenditure among oilseed farmers on their largest plots. All fertilizers including other fertilizers such as potash, ammonium sulfate, and gypsum were included in the calculation of total expenditure as well as other costs including hired labor, tractor or draught animals, hired labor, and other inputs. The estimated total expenditure per acre for groundnut was the highest among the four oilseed crops. Fewer groundnut farmers applied fertilizer, rented animals, or rented tractors. Most hired labor, and it may be that the higher total expenditure is a result of high labor costs for groundnut farmers.

Sesame had the second highest total expenditure, and the largest jump in nominal expenditure between the two seasons. Sesame farmers applied more fertilizer than other farmers, and this jump in total expenditure may be a result of the increase in fertilizer prices. Soybean farmers had the third highest total expenditure per acre. Unlike sesame and groundnut farmers, soybean farmers lowered their total expenditure in nominal terms between the 2022 and 2023 pre/post monsoon seasons. There was a significant decrease in the number of soybean farmers using fertilizer between 2022 and 2023, and this drop is reflected in the decreased total expenditure. Despite a slightly higher level of fertilizer use among sunflower farmers, compared with groundnut and soybean farmers, sunflower farmers had lower total expenditure per acre. Sunflower farmers rely mainly on their own tractors instead of hired animals or tractors, which may decrease some costs. Finally, it should be noted that in real terms, total expenditure decreased between the post/pre-monsoon 2023 and 2022 seasons for all oilseed crops.

Table 14. Changes in total crop production expenditure per acre by oilseed crop

	Monsoon 2021	Monsoon 2022	P-value difference	Post/pre-Monsoon 2022	Post/pre-Monsoon 2023	P-value difference
Nominal						
Sesame	136,443	154,926	*	154,924	193,869	
Groundnut	213,239	182,806	**	238,302	246,754	***
Sunflower	122,540	143,283	*	122,964	134,711	***
Soybean	147,933	173,718	**	186,113	184,434	***
Real						
Sesame	235,610	201,404	*	238,582	209,379	***
Groundnut	300,823	237,648	**	366,985	266,495	***
Sunflower	222,680	186,268	*	189,365	145,488	***
Soybean	294,315	225,833	**	286,614	199,189	***

Source: Authors' calculation based on MAPS.
Note: Total expenditures are for the largest oilseed plot only. Stars denote significant differences between the two monsoon seasons and the two post/pre monsoon seasons at p-values * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. To calculate the real total crop production expenditure values the post/pre monsoon 2023 season is used as the base period and earlier periods are inflated based on a cpi calculated from the MAPS food vendor surveys.

Table 15 shows the yield, farmgate price, and total output value per acre for oilseed crops between 2022 and 2023. The values are in nominal terms, while the real values are in Appendix Table 4. In 2023, soybean yields were 609 kg per acre, compared to 456 kg per acre for groundnut, 232 kg per acre for sunflower, and 172 kg per acre for sesame. Among Myanmar's neighboring countries (China, India, and Thailand), China has the highest yields of soybean (790 kg/acre), groundnut (1,565 kg/acre), sunflower (1,227 kg/acre), and sesame (660 kg/acre), significantly higher than yields in Myanmar (Table A.3). India had higher yields than Myanmar for sesame, groundnut, and sunflower, but not soybeans. In contrast, compared with Thailand, groundnut yields are higher in Myanmar, while sunflower yields are similar, and sesame and soybean yields are lower in Myanmar. Overall, sesame yields in Myanmar are the lowest compared to its neighboring countries, followed by sunflower, and then groundnut yields. Soybean yields are comparable to neighboring country yields.

The farmgate prices were collected from farmers for sales from their largest plot for each oilseed crop. In nominal terms, the farmgate price of sesame increased by nearly 37 percent in 2023 compared to the same period last year. It increased by 72 percent compared to the 2021 monsoon period. The price of groundnuts also increased in nominal terms compared to the same period last year, but by a slightly lesser degree, 25 percent. On the other hand, the price rose more sharply compared to the 2021 monsoon season. The price of sunflowers also rose significantly in nominal terms by 48 percent in 2023 compared to the same time last year. It also skyrocketed compared to the 2021 monsoon season. The increase in the price of soybean was the lowest in nominal terms at 4 percent. The sharp increase in the farm gate price of sesame, groundnut, and sunflower was the result of the relaxation of the export ban on oilseed crops and the depreciation of the Myanmar currency.

In April 2022, the world's top palm oil exporter, Indonesia, declared an export ban on cooking oil exports to reduce the domestic shortage in Indonesia and control the volatile market prices. This export ban on palm oil in Indonesia, combined with a drop in sunflower exports due to the war in Ukraine negatively affected the edible oil market in Myanmar. As a result of this, Myanmar's Trade Department under the Ministry of Commerce temporarily suspended exports of oilseed crops

(groundnut and sesame except black sesame) beginning in May 2022 in order to have oil self-sufficiency. The Trade Department released the export ban on oilseed crops in July 2022 as Indonesia announced the end of the palm oil export ban[6].

Additionally, the prices of groundnut and sesame seeds increased due to the increasing demand from China and local oil mills in Upper Myanmar. China re-opened some border trade gates between Myanmar and China in January 2023, which had been closed for nearly three years. Finally, the price of oilseeds also increased because of the depreciation of the local currency. According to the official exchange rate, the Myanmar Kyat depreciated by 37 percent against the US dollar over the period December 2020 to December 2022 (World Bank Group 2023). This caused the price of imported commodities to rise.

In real terms, however, there was a negligible increase in the prices of oilseeds. There was a 1 percent increase in the price of sesame and sunflower between the pre/post monsoon season of 2022 and 2023, while there was an 11 and 21 percent decrease in groundnut and soybean prices, respectively.

In nominal terms, the combination of the sharp increase in the farm gate price of sesame, groundnut, and sunflower and non-decreasing yields for those crops, led to an increase in the total value of those crops during the post/pre-monsoon 2023. Sunflower had the highest increase in total value per acre (119 percent), followed by sesame. The negligible increase in price and yields for soybean meant that the total value per acre was the lowest compared to other oilseed crops. Table A.4 presents the real values of the farm gate prices and the real values of the total values per acre. Since groundnut, sesame and sunflower farmers reported higher yields in 2023, there was a real increase in total value per acre for those crops. If these yield increases are simply a result of our small oilseed sample, then there would be a negligible increase in real value per acre for those three crops. The real total value per acre of soybeans decreased between the 2022 and 2023 post/pre monsoon season.

[6] https://www.gnlm.com.mm/export-ban-on-myanmar-edible-oil-crops-lifted-following-regular-global-palm-oil-export/

Table 15. Change in yield and farm gate price of oilseed crop between 2021 and 2022

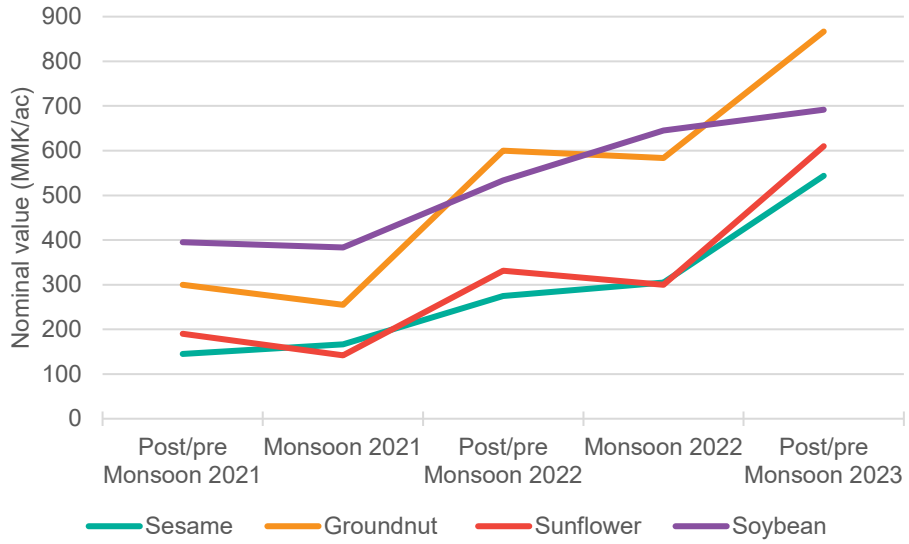
Oilseed crops	Yield kg per acre				
	Post/pre-Monsoon 2021	Monsoon 2021	Post/pre-Monsoon 2022	Monsoon 2022	Post/pre-Monsoon 2023
Sesame	123	139	123	123	172
Groundnut	489	342	456	365	456
Sunflower	232	164	218	145	232
Soybean	556	491	556	491	609
	Farm gate price (MMK/kg) nominal				
	Post/pre-Monsoon 2021	Monsoon 2021	Post/pre-Monsoon 2022	Monsoon 2022	Post/pre-Monsoon 2023
Sesame	1837	2449	3061	3265	4204
Groundnut	1053	1053	1754	1930	2193
Sunflower	1379	1227	1862	2147	2759
Soybean	920	1223	1468	1529	1534
	Total Value (MMK/Acre)				
	Post/pre-Monsoon 2021	Monsoon 2021	Post/pre-Monsoon 2022	Monsoon 2022	Post/pre-Monsoon 2023
Sesame	100,000	195,000	275,000	285,000	520,000
Groundnut	250,000	210,699	600,000	552,761	850,000
Sunflower	210,000	116,871	280,000	93,497	613,333
Soybean	320,000	460,000	600,000	645,000	640,000

Source: Authors' calculation based on MAPS.
Note: Median values for the largest oilseed plot only

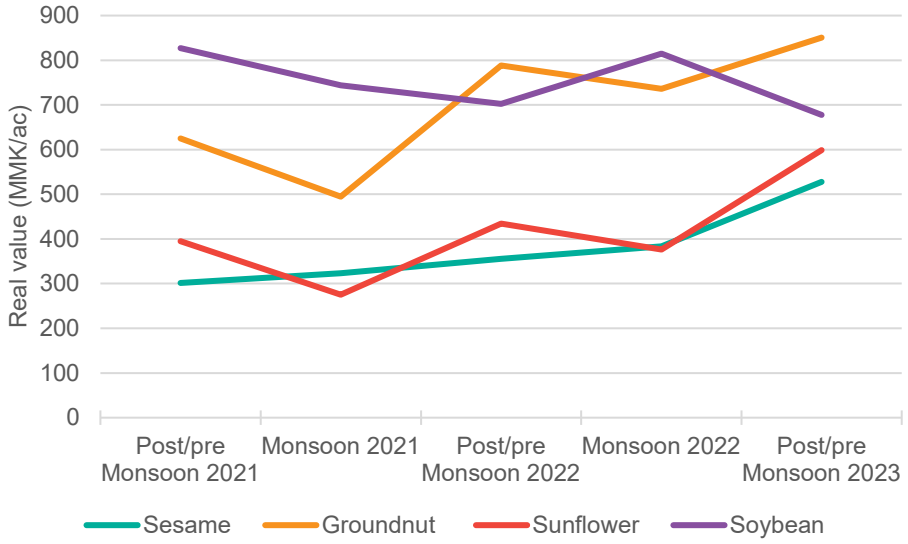
The comparisons of gross margins over time are presented in Figure 6. The results indicate that in nominal terms the gross margins of oilseed crops increased significantly between the 2021 monsoon season and the 2023 post/pre-monsoon season apart from soybean. Since only half of oilseed farmers apply fertilizer the increase in the price of fertilizer had a relatively small impact on the average total expenditure for oilseed crops. Therefore, because of the price hikes for oilseeds, in nominal terms gross margins increased significantly.

In real terms, the picture is more nuanced. The gross margin for soybeans declined significantly in real terms over 2022 and 2023. On the other hand, the gross margins of groundnut, sesame, and sunflower increased in real terms. The gross margin of sesame increased by 48 percent between the 2022 and 2023 post/pre-monsoon season, while the gross margin of sunflower increased by 38 percent, and the gross margin of groundnut increased by 8 percent. Over the entire period, from the post/pre-monsoon 2021 season, the real value of sesame increased the most by 75 percent.

Figure 6. The gross margin of oilseed crop per acre (above nominal, below real)



Source: Authors' calculation based on MAPS.
Note: Median values for the largest oilseed plot only. The gross margins are expressed in real terms with the post/pre monsoon 2023 season as the base period and earlier periods inflated based on a CPI calculated from the MAPS food vendor surveys.

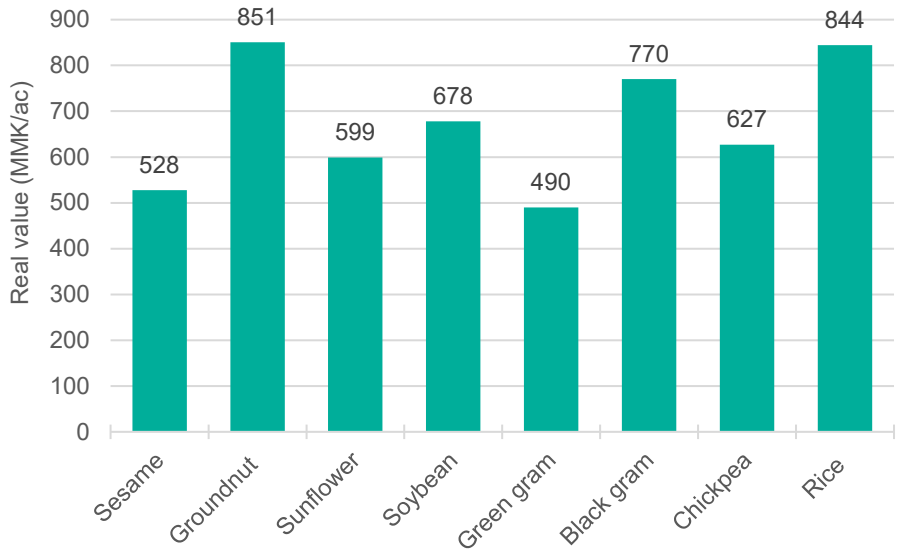


Source: Authors' calculation based on MAPS.
Note: Median values for the largest oilseed plot only

7.1 Gross Margins of Oilseed Crops and Other Cash Crops in 2023 Post/Pre-Monsoon

The gross margins of oilseed crops, rice, and pulses are presented in Figure 7. The gross margins of groundnut were relatively high compared to rice and pulses in the 2023 post/pre-monsoon season. Although soybean prices did not increase over the 2022/2023 period, gross margins from soybeans remained competitive compared with pulses. Soybean yields are comparable to yields in neighboring countries, around 609 kg/acre. Sunflower and sesame gross margins are lower than gross margins for rice and major pulses. While sesame and sunflower have similar total expenditure per acre to the other oilseed crop, they have relatively lower total value per acre, and hence lower gross margins. If prices for sesame and soybean continue to rise, these crops could be comparatively lucrative.

Figure 7. Gross margin of oilseed crops and other cash crops post/pre-monsoon 2023



Source: Authors' calculation based on MAPS; MAPSA (2023a)
Note: Oilseed and pulses farmers from the largest plot, real, median value

8. CONCLUSION

Growing oilseeds is lucrative for farmers due to its high demand in both domestic and international markets and rising prices. Groundnut, sunflower and sesame seeds are mainly used for oil extraction, and soybean is eaten and used in animal feed in poultry and fish farms. Among oilseed crops, sesame is the largest export crop, contributing around 94 percent of total oilseed exports in 2017-2018[7]. The other oilseed exports from Myanmar are very low.

Nationally, nearly 15 percent of crop farmers were engaged in oilseed cultivation during the 2023 post/pre-monsoon season and 17 percent farmed oilseeds during the 2022 monsoon season. Among them, 7 percent of all crop farmers grew sesame across the country and 6 percent grew groundnut. Of the land devoted to oilseeds, sesame occupied 55 percent followed by groundnut, which was grown on 30 percent. In the 2023 winter season, soybean, sunflower, and niger covered smaller areas accounting for 11 percent, 9 percent, and 1 percent, respectively.

Oilseed farmers used their recycled seeds from the previous season except for sunflower farmers who purchased their seeds. Private extension agents were a key player in providing extension services to oilseed growers, followed by cellphone applications and the internet. There was a large decrease in extension provided by public extension agents and NGOs for all crop farmers as well as for oilseed farmers. Quality seeds in combination with agricultural extension services can help improve the yields of oilseed crops. The private sector should be encouraged to sell quality seeds to increase yields per acre and to improve crop quality. Further, reliable internet is needed to ensure that extension can be delivered through cell-phone applications, which is becoming a necessary way to deliver these services.

The share of households receiving loans from agricultural input suppliers increased significantly among credit sources, while the share of farmers taking loans from MADB and MFIs decreased in 2023 compared to the previous season in 2022. Although farmers can borrow agricultural loans from the MADB, the amount of the loan covers only half of the production costs for groundnut, sesame,

[7] https://myantrade.gov.mm/files/2018/9/5b95304a6ba2c3.37436639.pdf

and soybean. Agricultural input suppliers are now playing a key role in the oilseed sector, so ensuring these actors can continue to loan to oilseed farmers will be essential.

Nearly half of oilseed farmers do not use fertilizer. For those who do, they apply the recommended amounts to their oilseed crops, and as a result their expenditures increased along with rising fertilizer prices. Due to the high population of cattle in the Dry Zone, farmers should be encouraged to increase backyard manure use in place of chemical fertilizers. This will help insulate farmers from fertilizer price changes and possibly make fertilizer use more ubiquitous.

The yields of oilseeds, especially groundnut, sesame, and sunflowers are lower than neighboring countries, indicating the need for the oilseed sector to increase productivity. But this will require a combination of access to quality seeds, credit, and extension, and the increased use of fertilizer. Additionally, the adoption of cropping patterns that are compatible with agroecological conditions across the different zones is important to foster sustainable growth in the sector. Given the profitability of oilseeds, oilseed crop production should be expanded both through planting different types of oilseed crops, and by expanding oilseed crop production across agro-ecological zones.

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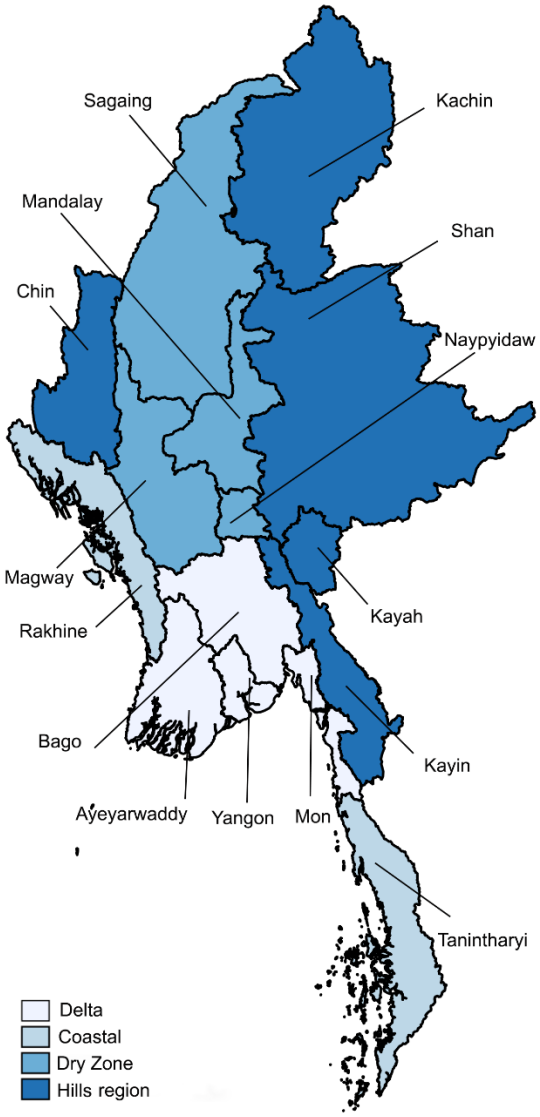
APPENDIX

Figure A.1 Myanmar's agro-ecological zones



Source: Authors

Figure A.2 Share of farmers by type of oilseed crop by Agro-Ecological Zones in 2022

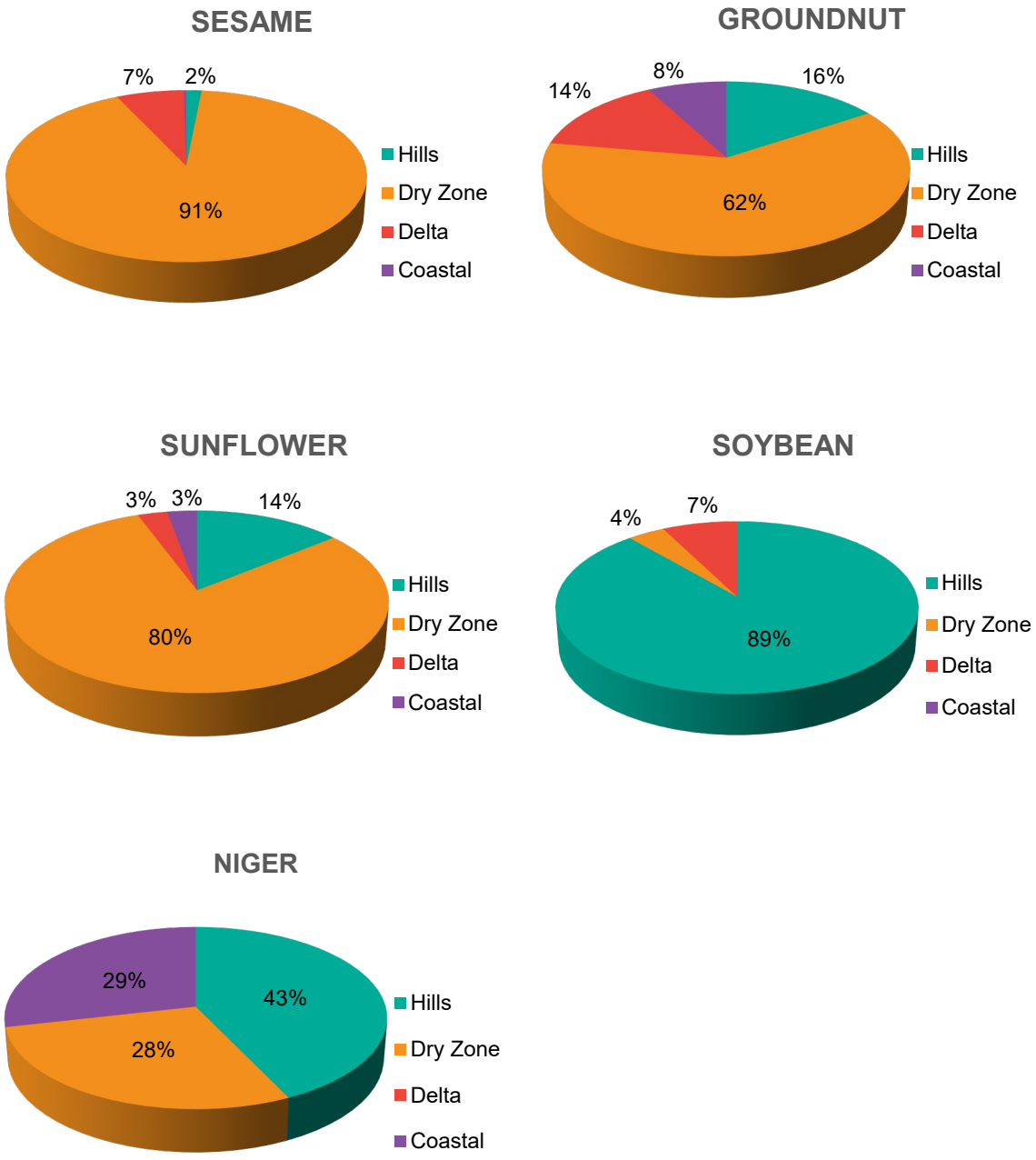
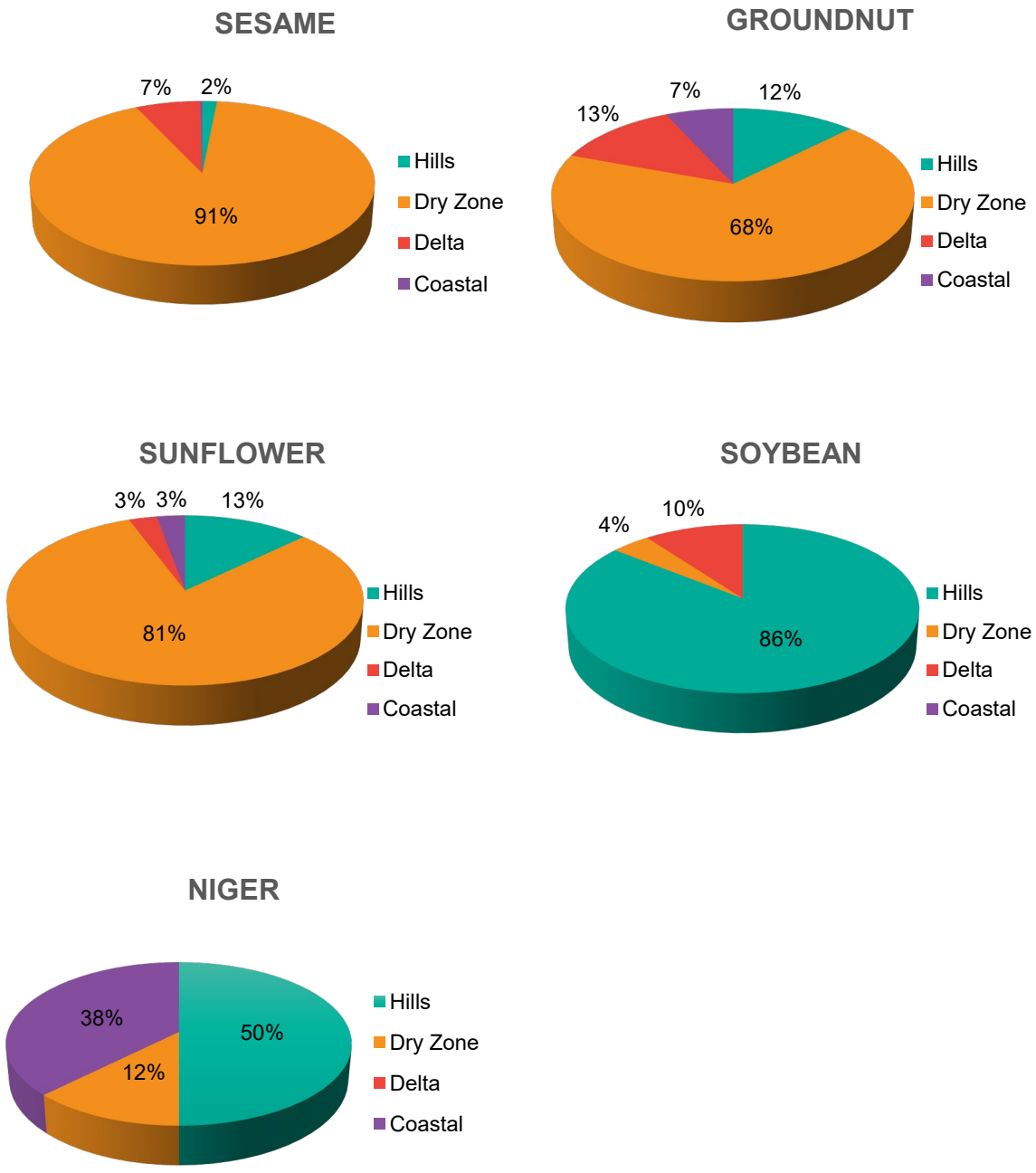


Figure A.3 Share of farmers by type of oilseed crop by Agro-Ecological Zones in 2021



Source: Authors' calculation based on MAPS

Table A.1 Cropping calendar of growing oilseed crops in Myanmar (MOALI)

Oilseed	Cropping pattern	Monsoon				Post-monsoon					Pre-monsoon		
		June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	March	April	May
1.Sesame	Lower Myanmar					Plant				Harvest			
	Upper Myanmar						Plant			Harvest			
	Lowland Crop									Plant			Harvest
	Upland Crop						Plant			Harvest			
				Harvest									Plant
2. Groundnut	Lower Myanmar					Plant				Harvest			
	Upper Myanmar						Plant				Harvest		
	Lowland Crop						Plant			Harvest			
	Upland Crop												Plant
				Harvest									
				Plant			Harvest						
3.Sunflower	Lower Myanmar						Plant			Harvest			
	Upper Myanmar	Harvest					Plant			Harvest			
			Plant		Harvest								
	Hilly Regions				Plant				Harvest				
4.Soybean	Lower Myanmar						Plant			Harvest			
	Upper Myanmar			Plant				Harvest					
	Hilly Regions				Harvest								Plant
5.Niger	Lower Myanmar						Plant				Harvest		
	Upper Myanmar				Plant				Harvest				
	Hilly Regions			Plant				Harvest					

Source: DOA, MOALI (https://www.doa.gov.mm/fes/index.php?route=information/plant_sector), U Than Htut, personal communication, 2017

Table A.2 Mean and median of oilseed cultivated area for oilseed producers

Oilseed crops	Monsoon 2021		Monsoon 2022		Post/pre Monsoon 2022			Post/pre Monsoon 2023	
	mean	median	mean	median	mean	median		mean	median
Sesame	3.2	2.0	3.1	2.0	3.2	2.0	*	3.6	3.0
Groundnut	2.8	2.0	2.6	2.0	2.4	2.0	*	2.3	2.0
Sunflower	2.5	2.0	2.5	2.0	3.7	3.0	*	3.0	2.0
Soybean	3.1	2.0	3.1	2.0	3.1	3.0		3.5	3.0

Source: Authors' calculation based on MAPS
Note: Stars denote significant differences between monsoon and post/pre monsoon seasons at p-values * p < 0.10, ** p < 0.05, *** p < 0.01. Oilseed cultivated areas by season, overall, not only for largest plot

Table A.3 Yield per acre by types of oilseeds by neighboring countries in 2021

	China (kg/acre)	India (kg/acre)	Myanmar (kg/acre)	Thailand (kg/acre)
Sesame	660	183	155	279
Groundnut	1565	695	540	424
Sunflower	1227	361	327	326
Soybean	790	422	630	685

Source: https://www.fao.org/faostat/en/#data/QCL

Table A.4 Change in yield and farm gate price of oilseed crop between 2021 and 2022 in real terms

Oilseed crops	Yield kg per acre				
	Post/pre-Monsoon 2021	Monsoon 2021	Post/pre-Monsoon 2022	Monsoon 2022	Post/pre-Monsoon 2023
Sesame	123	139	123	123	172
Groundnut	489	342	456	365	456
Sunflower	232	164	218	145	232
Soybean	556	491	556	491	609
	Farm gate price (MMK/kg)				
	Post/pre-Monsoon 2021	Monsoon 2021	Post/pre-Monsoon 2022	Monsoon 2022	Post/pre-Monsoon 2023
Sesame	3857	4751	4194	4147	4204
Groundnut	2211	2042	2404	2451	2193
Sunflower	2897	2380	2551	2727	2759
Soybean	1933	2373	2011	1942	1534
	Total value per acre ('000 MMK)				
	Post/pre-Monsoon 2021	Monsoon 2021	Post/pre-Monsoon 2022	Monsoon 2022	Post/pre-Monsoon 2023
Sesame	210,000	378,300	376,750	361,950	520,000
Groundnut	525,000	408,757	822,000	702,006	850,000
Sunflower	441,000	226,730	383,600	118,741	613,333
Soybean	672,000	892,400	822,000	819,150	640,000

Source: Authors' calculation based on MAPS
Note: the farm gate prices and total value per acre are expressed in real terms with the post/pre monsoon 2023 season as the base period and earlier periods inflated based on a cpi calculated from the MAPS food vendor surveys.

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