Fezzan Agricultural Assessment

Executive Summary

November 2023

Contents

INTRODUCTION

In 2022, the World Food Programme and Tatweer Research implemented a project to improve Al Kufra and Al Rubyana food systems. Although the project was a success, it became evident to both partners that, to create people-centered interventions and to orient better targeting, there was a need to generate sound evidence assessing the needs of farmers and portraying the agricultural political economy of Libya.

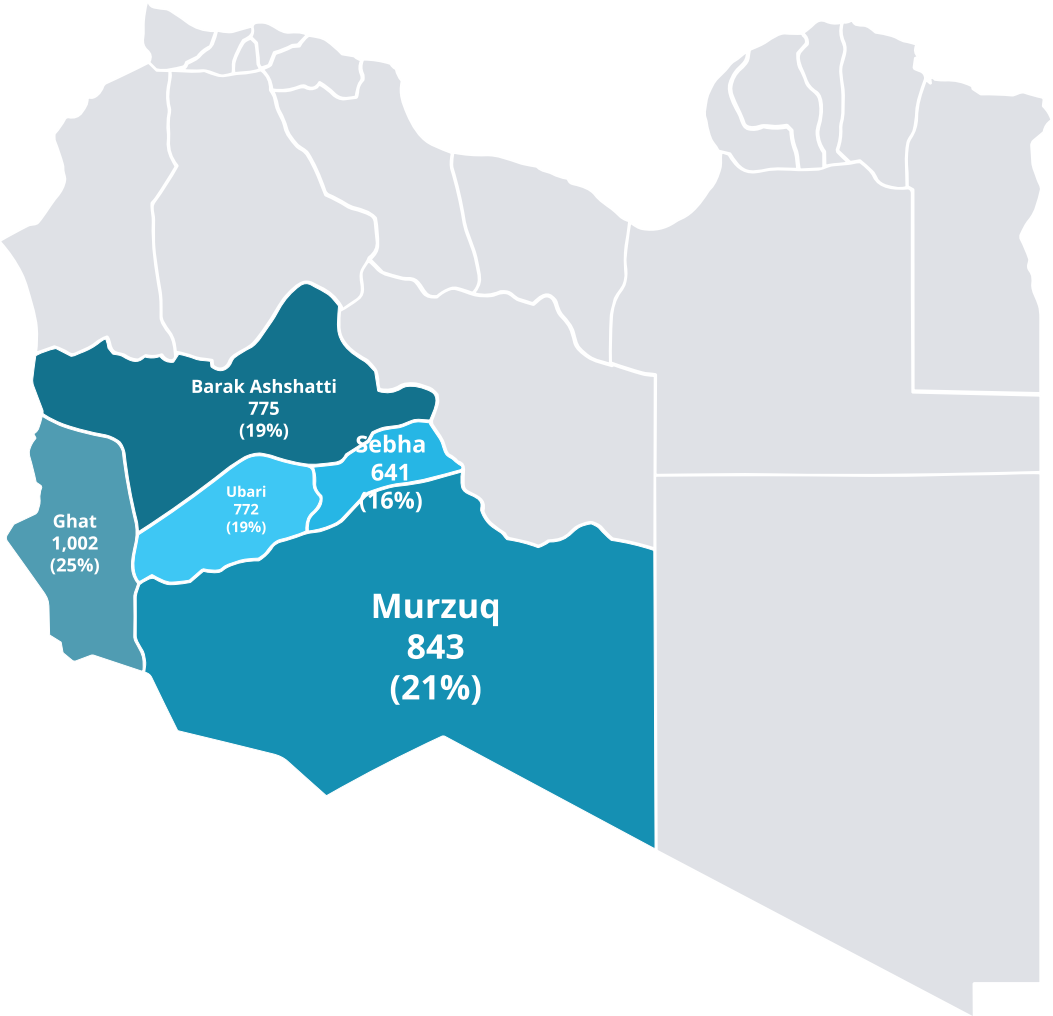
This common understanding resulted in a cooperation between the Ministry of Agriculture and Livestock, Tatweer Research and the World Food Programme. Thanks to the support of the German and Italian governments, the Fezzan Agricultural Assessment was compiled, marking the first assessment of smallholder farmers since 2006.

The Assessment provides a series of pathways paving the way to resilient and adaptive agricultural development for the Fezzan region.

METHODOLOGY

The Assessment used a mixed methods approach to gather baseline data from farmers to better understand the agricultural sector in the Fezzan region. The Assessment's objectives were to understand the characteristics of farms in the region, including productive units, as well as the profile of farmers and the challenges they face. As such, purposive sampling was used to select participants of the Assessment. The in-person data collection took place from February 2023 to April 2023 and included both quantitative survey and semi-structured interviews.

Although the aim was to survey all farmers in the region, this was not feasible due to security and logistical challenges. Of the estimated 6,700 smallholder and livestock farms across Fezzan, 4,118 were visited, with 4,033 agreeing to participate in the survey. A total of 3,988 farmers were interviewed, with some owning or managing multiple family farms. Farmers from five major cities in Fezzan were assessed, namely Sebha, Ubari, Murzuq, Barak Ashshatti and Ghat.



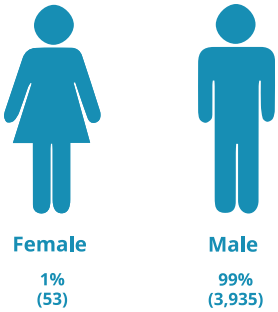
KEY FINDINGS

SECTION I. FARMERS' PROFILES

The study sample was composed of 3,988 farmers.

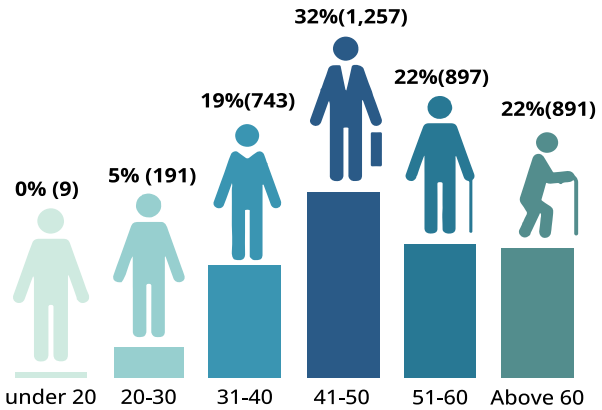
GENDER COMPOSITION OF FARM OWNERS

According to the study findings, the vast majority of surveyed farm owners in the Fezzan region were men, with women accounting for just 1 percent.



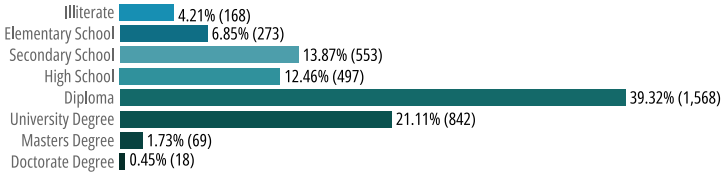
AGE GROUP

The largest proportion of surveyed farmers (54 percent) fell within an age range of 41 to 60 years, followed by 22 percent who were over 60 years of age. In contrast, the younger age groups, consisting of 31 to 40 years and 20 to 30 years, made up 19 percent and 5 percent, respectively. Only nine farmers (<1 percent) were under 20 years of age.



LEVEL OF EDUCATION

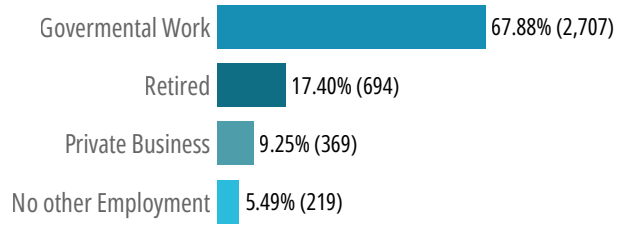
The farmers surveyed exhibited diverse educational backgrounds.



The majority (39 percent) held higher diplomas, while 21 percent possessed university degrees. The rest had education levels spanning from high school (12 percent) middle school (14 percent) to primary school (7 percent). A small minority (4 percent) were illiterate, and 2 percent held masters or PhD degrees.

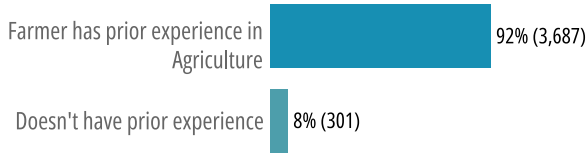
FARMING MAINLY AS PLURIACTIVITY

Most farmers surveyed in the Fezzan region (68 percent) indicated being concurrently employed in regular public sector jobs. 9 percent of the farmers were engaged in the private sector, and 17 percent were retirees.



PRIOR EXPERIENCE IN AGICULTURE

92 percent of the farmers surveyed indicated they had agricultural experience, with 8 percent stating they did not.



HOUSEHOLD ECONOMIC PROFILES

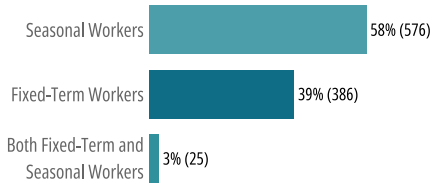
Households counting on non-agricultural income contributions

While 57 percent of the surveyed farmers said they were the primary breadwinners solely responsible for generating income, primarily through agricultural activities, 43 percent indicated that, within their households, multiple individuals contribute to the households' income. Specifically, it was noted that 2,959 individuals were involved in income generation, with females comprising 36 percent of them, highlighting the diverse and shared economic roles within these agricultural households.

Additionally, 79 percent of these individuals, who bring non-agricultural economic contributions, earn their income through public sector employment, with the remaining relying on income from the private sector or pensions.

INCOME SOURCE OF HOUSEHOLD MEMBERS

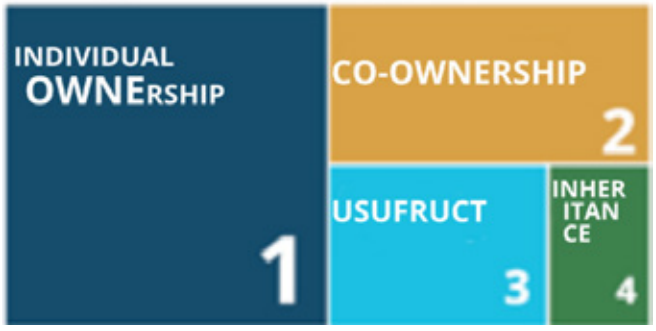
PUBLIC SECTOR	PRIVATE BUSINESS	PENSION
79%	11%	10%



Of the 1,774 workers hired by the assessed farms were non-Libyans,with only 1 one being Libyan.

LAND OWNERSHIP PATTERNS

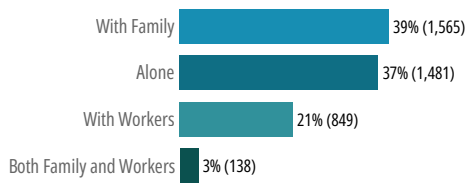
73 percent of the surveyed farms are held through individual ownership, with the remaining 27 percent via co-ownership, usufruct, inheritance, or leasehold arrangements.



SECTION II .FARM PROFILES

LABOUR PRACTICES ON FARMS

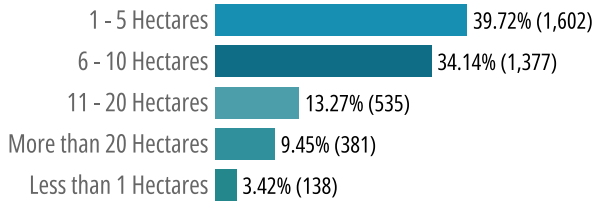
More than one family member operates 39 percent of the farms surveyed, 37 percent are solely operated by the owner, 21 percent employ labour, and 3 percent combine the efforts of family members and hired labour.



Most farms (58 percent) employ fixed-term workers, while 39 percent hire staff on a seasonal basis, and a small fraction (3 percent) hire both year-round and seasonal workers.

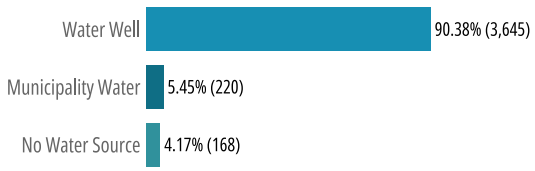
FARM SIZE

The farms surveyed exhibited a wide range of sizes. Most of the farms (43 percent) occupied less than 5 hectares. About 34 percent fell within the 6-to-10-hectare range, while 13 percent covered an area between 11 and 20 hectares. In contrast, only 10 percent of the farms exceeded 20 hectares in size.



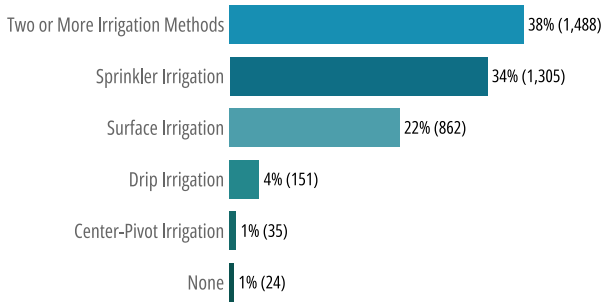
IRRIGATION IN THE FARM

90 percent of surveyed farms source water for irrigation through water wells, while 5 percent source it from the public water system. **There were 4 percent with no access to a water source.**



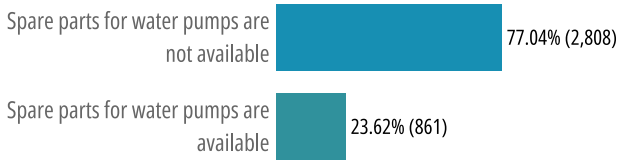
Of the farms relying on the public water system for irrigation (n=220), an overwhelming **94 percent of farmers voiced dissatisfaction with its capacity to fulfil their farms' water needs.** Consequently, most of them opted for well excavation as an alternative. A small minority (6 percent) considered the system adequate, mainly observed among small-scale farms.

Of the surveyed farms that indicated having a water source (n=3,865), the majority (38 percent) used a combination of two or more irrigation methods, 34 percent employed only sprinkler irrigation, 22 percent used surface irrigation, 4 percent adopted drip irrigation, 1 percent utilized the Centre-Pivot irrigation, and 1 percent did not utilize any irrigation methods.



MAINTENANCE OF WATER WELLS

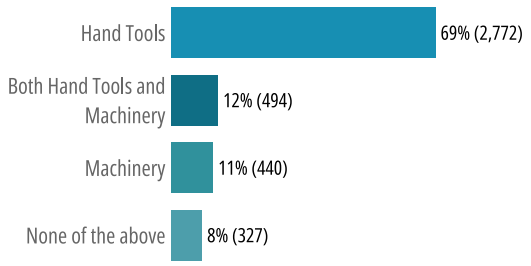
Among the farmers surveyed where farms have a water well (n=3,645), 87 percent reported a shortage of nearby maintenance centres, while only 13 percent indicated the presence of such facilities in their region.



Most of these farmers (77 percent) also reported that spare parts are unavailable in the market, while almost a quarter (24 percent) said the opposite.

USE AND AVAILABILITY OF AGRICULTURAL MACHINERY AND EQUIPMENT

Approximately 69 percent of farms surveyed rely solely on manual tools, while nearly 12 percent have both manual tools and machinery, and 11 percent use machinery only. The remaining 8 percent indicated not having any equipment.

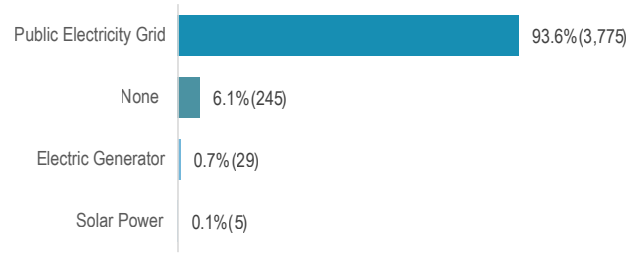


Among farms equipped with machinery, 364 are fitted with harvesting machines, 444 use ploughs, 226 employ seeding mechanisms, 218 operate hay-pressing machines, 234 employ agricultural pesticide spraying machines, and 237 utilize trailers.

The study highlighted that, **due to the high market prices of machinery in the region,** it is not economically viable for most small farms to buy machinery.

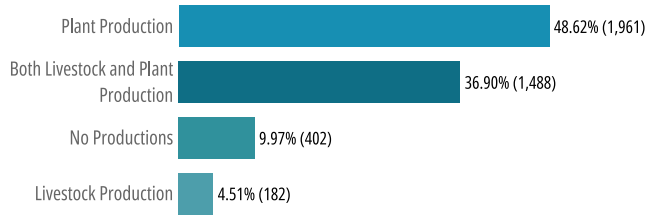
SOURCES OF ENERGY

Most farms surveyed (93 percent) depend on the public electricity grid, while 6 percent do not utilize electricity, 1 percent resort to electric generators, and less than 1 percent employ solar energy. Efforts are underway to enhance the use of renewable energy sources in the Fezzan region.



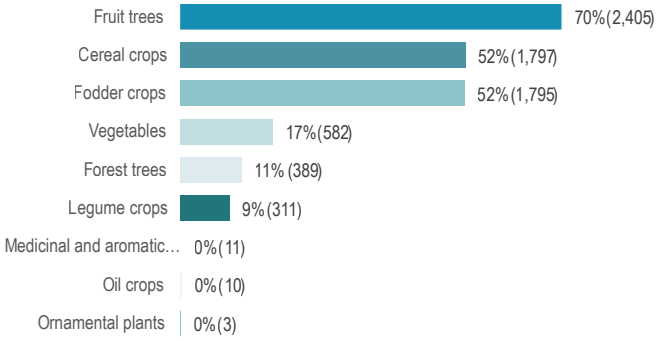
SECTION III. AGRICULTURAL ACTIVITIES AND PRODUCTION PATTERNS

Out of the 4,033 farms included in the survey, the majority (49 percent) focus exclusively on plant production. The second-largest group, accounting for 37 percent, is involved in plant and animal production. A smaller proportion (5 percent) exclusively specialize in livestock production. Additionally, 10 percent of these farms face challenges related to non-productivity, often stemming from factors such as war, drought, electricity shortages, and various other obstacles.



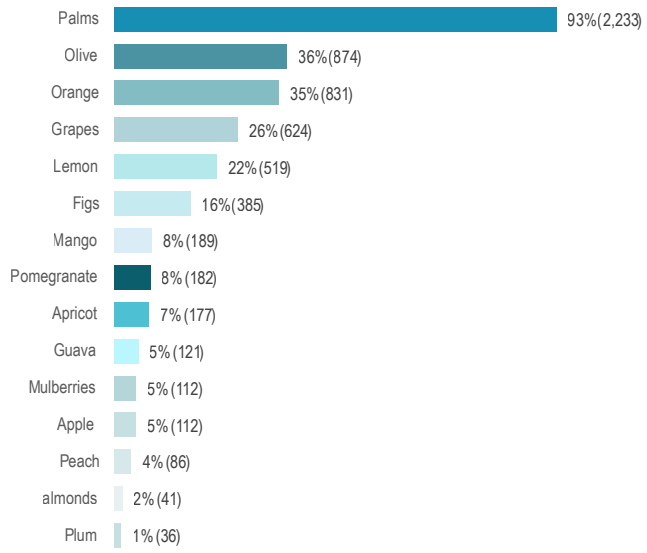
PLANT PRODUCTION

Of the surveyed farms that cultivate crops (n=3,499), a notable variety was reported. The most cultivated plants were fruit trees, which were found in 70 percent of the surveyed farms. Additionally, grain and fodder crops were almost equally distributed, with 52 percent of farms surveyed engaged in their cultivation. In contrast, vegetables, forest trees, and legume crops were reported less frequently.



DIVERSITY IN FRUIT TREES CULTIVATION ACROSS FARMS

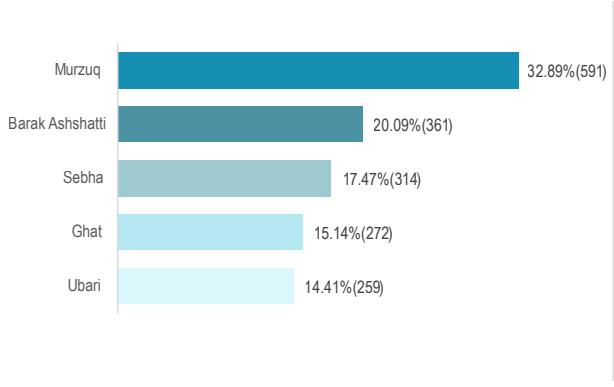
The research findings indicated that palm trees were most prevalent among fruit trees in the region, cultivated in 93 percent of the surveyed fruit tree-cultivating farms. After palm trees, olive, and orange trees were the most frequently grown, appearing in approximately 36-35 percent of the farms. Grapes, lemons, and figs were observed in 16-26 percent of these farms. In contrast, fruits like mangoes, pomegranates, apricots, apples, berries, peaches, and plums were less frequently encountered, with fewer than 8 percent of the surveyed farms reporting their cultivation.



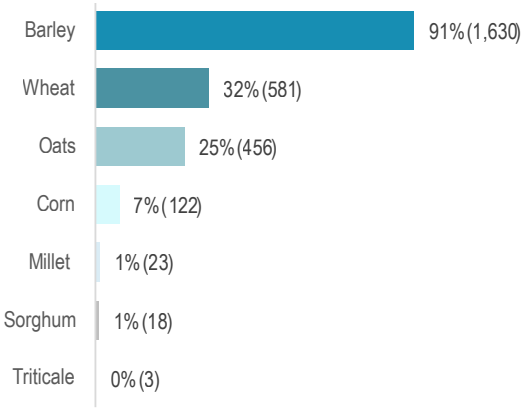
GRAIN CULTIVATION IN THE REGION

The study indicates that the total area dedicated to grain cultivation in the Fezzan region amounts to about 26,187.06 hectares, of which 52 percent of this area was not harvested or faced issues in harvesting, and 48 percent of which was harvested.

Grain production ranked as the second most commonly reported plant cultivation activity in the Fezzan region, with Murzuq emerging as a leading producer.

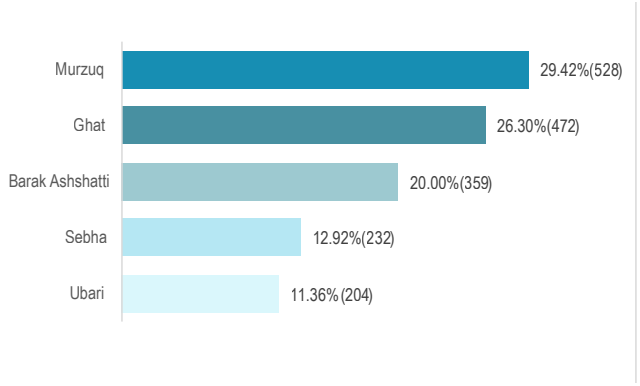


The research reveals that a variety of grains are grown in the regions, including barley, wheat, oats, corn, millet, sorghum, and triticale, with barley being the most common.



FARMS ENGAGING IN FODDER CULTIVATION BY CITY

Fodder ranked the **third most commonly produced crop**, with 1,795 surveyed farms reporting their cultivation. The cities of Murzuq and Ghat were the top producers.



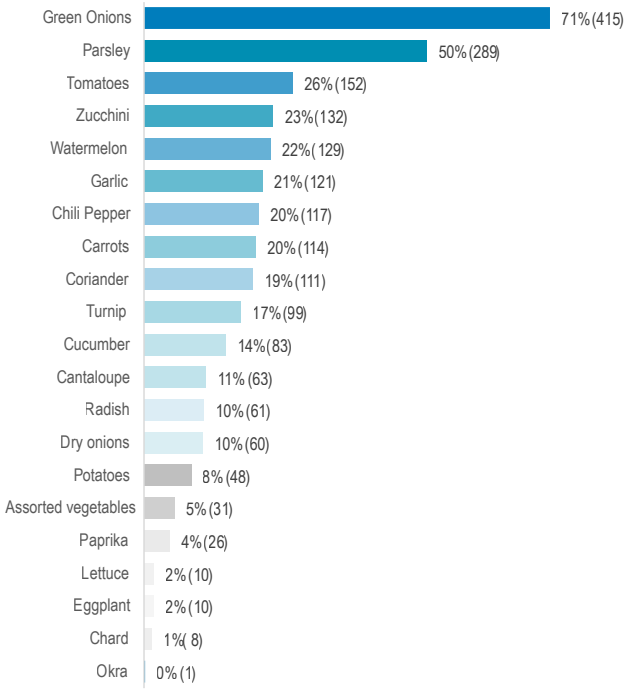
VEGETABLE CULTIVATION IN THE REGION

This study reveals that approximately 992.74 hectares of land was dedicated to vegetable cultivation within the Fezzan region. Among these, 78 percent of the total area was successfully harvested, while the remaining 22 percent still needed to be harvested or encountered various issues that hindered productivity.

The research findings shed light on the factors contributing to the substantial portion of uncultivated or unproductive land. These factors encompass agricultural pests, insufficient water resources, and the lack of necessary production input.

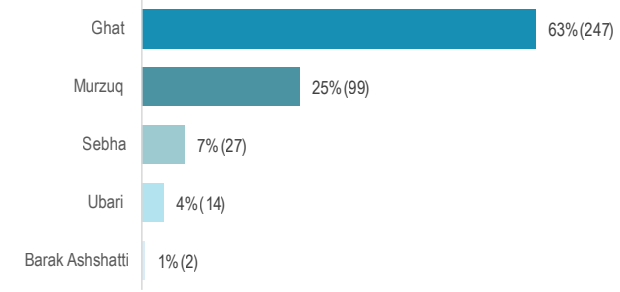
TYPE OF VEGETABLE CULTIVATION BY FARM

Of the 21 types of vegetables grown in the region, green onions were the most prevalent, cultivated in 71 percent of the surveyed vegetable-producing farms, while parsley followed closely behind in 50 percent of these farms. Various other vegetables, including tomatoes, zucchini, watermelon, garlic, chili pepper, carrot, coriander, and turnip, were reported to be produced in a range of 26 percent to 19 percent of the farms.



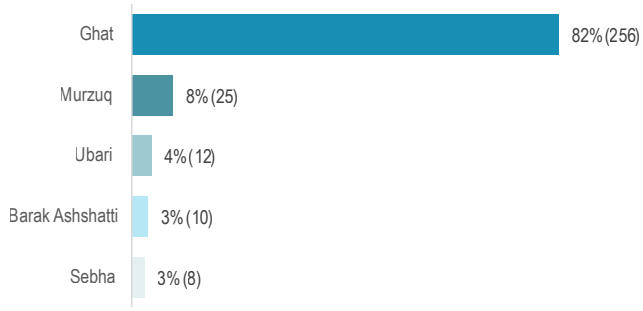
FARMS ENGAGED IN FOREST TREES CULTIVATION

Among the farms surveyed, a total of 389 farms are dedicated to cultivating forest trees. Of these, 241 farms focus on casuarina trees, 138 farms on tamarisk, 80 farms on columnar cypress trees, 18 farms on pyramidal cypress trees, 10 farms on Ziziphus spina-Christi, 7 farms on pine trees, 6 farms on acacia, and 4 farms on eucalyptus trees.

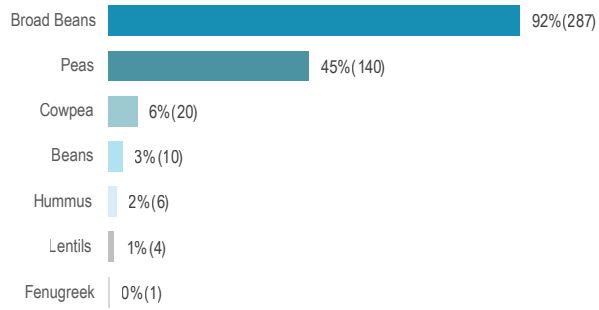


LEGUME PRODUCTION IN THE REGION

Legumes were produced in only 311 of the farms surveyed, and Ghat was the primary contributor to their production.

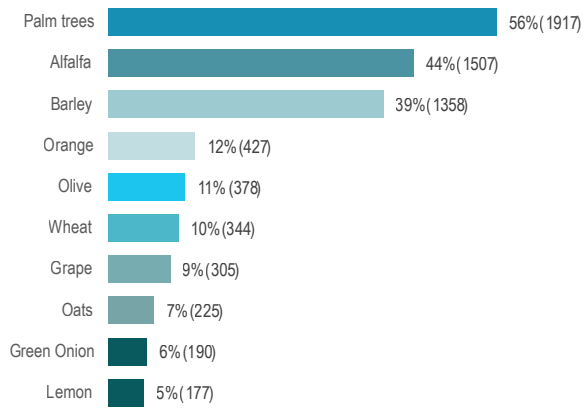


The study indicates that 287 of the surveyed farms cultivate broad beans, 140 grow peas, 20 farms cultivate cowpeas, 10 farms produce beans, 6 farms cultivate chickpeas, four farms cultivate lentils, and one farm cultivates fenugreek.



FARMERS' PERCEPTIONS OF CROP PROFITABILITY

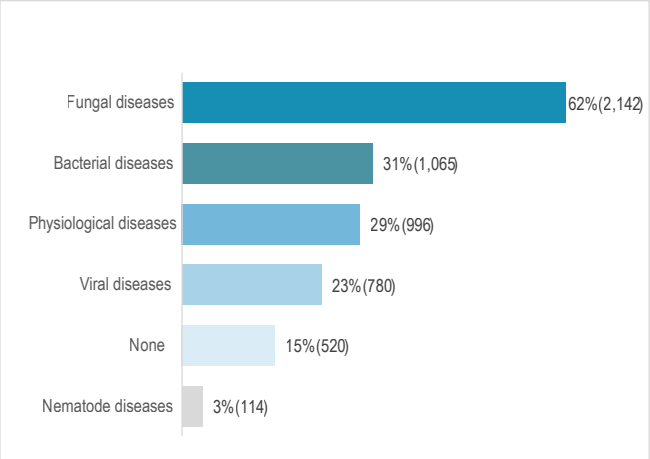
According to the farmers from crop-cultivating farms (n=3,449), their perception is that the crops with the highest economic return are palm trees, alfalfa, orange trees, grape trees, olive trees, lemon trees, barley, wheat, oats, and green onions.



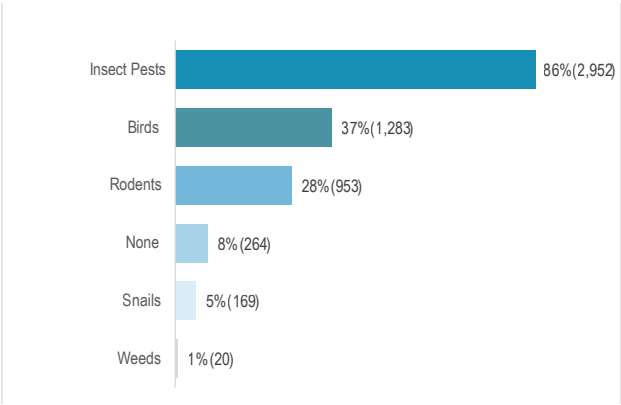
SECTION IV. AGRICULTURAL PATHOGENS AND PREFERRED REMEDIES

MOST COMMON PATHOGENS REPORTED

Agricultural pathogens in the Fezzan region pose a significant threat to crops, impacting overall productivity.



The study reveals that out of the crop-cultivating farms (n=3,499), 86 percent have experienced attacks by insect pests, 37 percent have been affected by bird infestations, 28 percent of farms suffered from rodent attacks, percent have encountered issues with snails, 20 farms (1 percent) have struggled with weed problems.



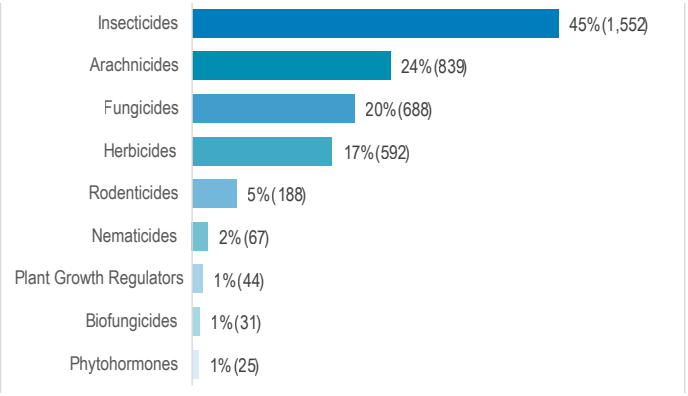
FARMERS' PERSPECTIVES ON PATHOGEN REMEDIES

Out of the 3,449 farmers surveyed from plant-cultivating farms, 49 percent expressed a preference for using pesticides, while 51 percent looked at this unfavourably.

The study highlights that farmers employed various types of agricultural chemicals, including insecticides, arachnicides, fungicides, herbicides, rodenticides, nematicides, biocides, growth regulators, and plant hormones.

The majority (45 percent) reported the use of insecticides. In comparison, 24 percent used arachnicides, 20 percent utilized fungicides, 17 percent applied herbicides, 5 percent employed rodenticides, 2 percent used nematicides, 44 (1 percent) farms relied on plant growth regulators, 31 (1 percent) farms used biopesticides, and 25 (1 percent) farms applied plant hormones.

Additionally, most of these farmers (72 percent) did not favor using integrated pest management (IPM), whereas 29 percent adopted integrated pest management practices.



When queried about the prices and accessibility of pesticides in the Fezzan region, most of those farmers indicated that pesticides are costly. Furthermore, 43 percent reported that pesticides are not readily available in the regional market.

FARMERS' PERSPECTIVE ON FERTILIZERS

The utilization of fertilizers across the Fezzan region exhibits disparities. From the 3,449 Plant-Cultivating Farms, approximately 78 percent of the surveyed farmers indicated the use of fertilizers, with the majority being from the city of Murzuq (26 percent), followed by Ghat (21 percent), Barak Ashshatti (20 percent), Ubari (17 percent), and Sebha (17 percent).

When asked about the cost and availability of fertilizers in the Fezzan region, 97 percent expressed that fertilizers are expensive, and 50 percent indicated that fertilizers are accessible.

The study unveils that the farmers who indicated the use of fertilizers (n=2,678) employed a variety of types, including chemical, organic, and biological fertilizers, along with compost and peat moss. Notably, 59 percent of farms opted for the use of chemical fertilizers, while 56 percent and 5 percent of farms preferred organic and biological fertilizers, respectively. Less than 1 percent used compost and peat moss.

SECTION V. LIVESTOCK FARMING

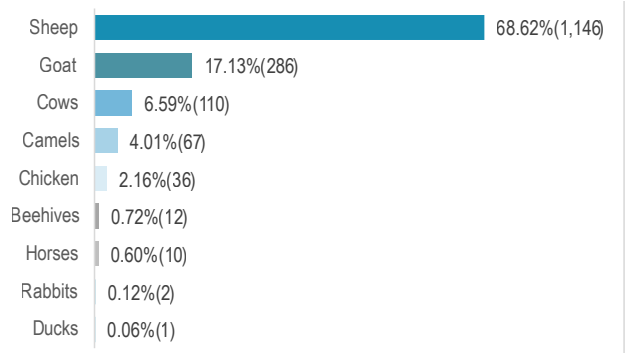
MAIN LIVESTOCK REARED IN THE FEZZAN REGION

Livestock farms accounted for 41 percent (n=1670) of the total surveyed farms in the Fezzan region, where a variety of animals were reported to be reared. Interviews with the farmers showed that sheep, goats, and chickens were the main animals raised.

Among the 1,523 surveyed farmers engaged in sheep farming and the 1,129 surveyed farmers who raised goats, 93 percent and 95 respectively mentioned that they raised local/national breeds, respectively.

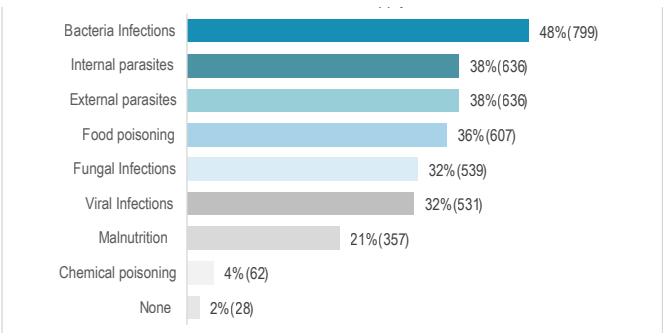
FARMER'S PERSPECTIVE ON LIVESTOCK PROFITABILITY

When asked to assess the profitability of livestock, the majority of surveyed farmers, constituting 69 percent, pointed to sheep as the most financially rewarding.



DISEASES AFFECTING LIVESTOCK

Among the livestock farmers surveyed, **nearly half identified bacterial infections as the most prevalent health issue affecting their animals.** Additionally, an equal proportion, approximately 38 percent, reported internal and external parasitic infections. Food poisoning in animals was also noted by 36 percent of the survey participants, while viral and fungal infections were equally mentioned by 32 percent of the farmers. Lastly, 21 percent indicated that their breeds suffered from malnutrition.

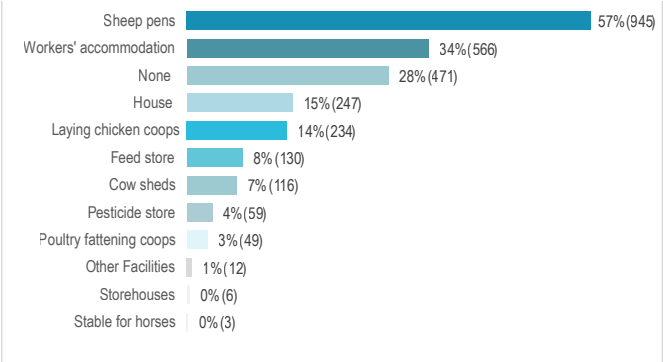


FODDER USE AND AFFORDABILITY

Nearly all surveyed livestock farmers have expressed their dependence on fodders for animal feed. In response to questions about fodder prices, an overwhelming **99 percent found them to be high,** with a mere 1 percent considering them affordable.

STORAGE AND ACCOMMODATION FACILITIES ON LIVESTOCK FARMS

Among the livestock farms, a significant portion, specifically 28 percent, did not possess any storage facility. Out of the surveyed farms, 8 percent were indicated to have a feed storage facility, while 4 percent reported to have a dedicated pesticide storage area, and six of them had multi-purpose storage warehouses. Additionally, 34 percent were reported to offer accommodations for farmers, and 15 percent provided housing for workers.



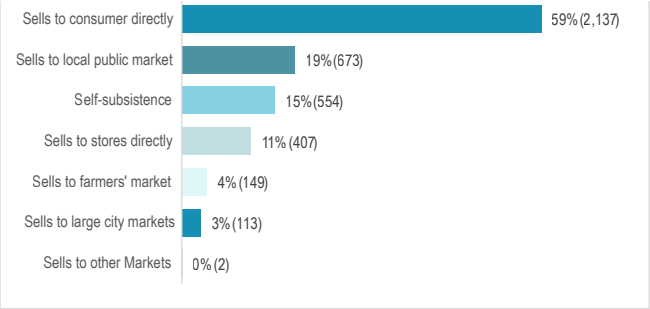
SECTION VI. ACCESS TO MARKETS

TRENDS IN FARM PRODUCTION

The study highlighted that, among the 3,631 livestock and crop cultivating farms in the region, 83 percent typically market their products in villages. Additionally, 59 percent sell their products directly to consumers.

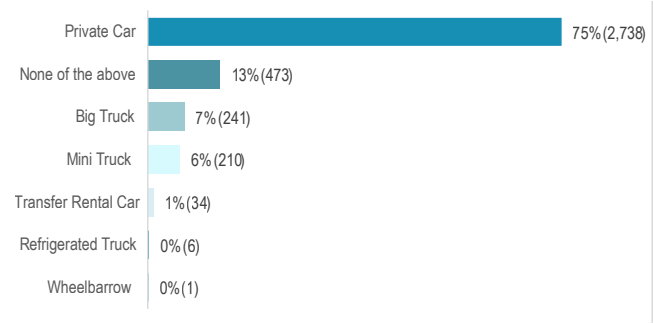
Furthermore, the market outlets in the Fezzan region exhibit considerable diversity. Specifically, 3 percent of the surveyed farms distribute their products to large markets in major regional cities, 4 percent sell their products in the regional local farmers' market, 19 percent in the local public market, and 11 percent directly supply grocery stores.

Finally, the research unveiled that 15 percent of the farms are primarily cultivating for their subsistence.



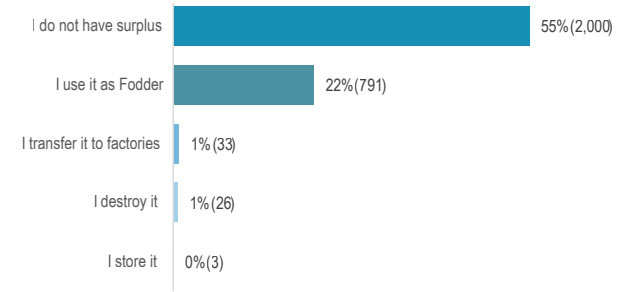
TRANSPORTATION TO MARKETS

The study revealed that farmers (75 percent) primarily use private cars to transport their products to the market.



FODDER POST-HARVEST LOSS AND MANAGEMENT

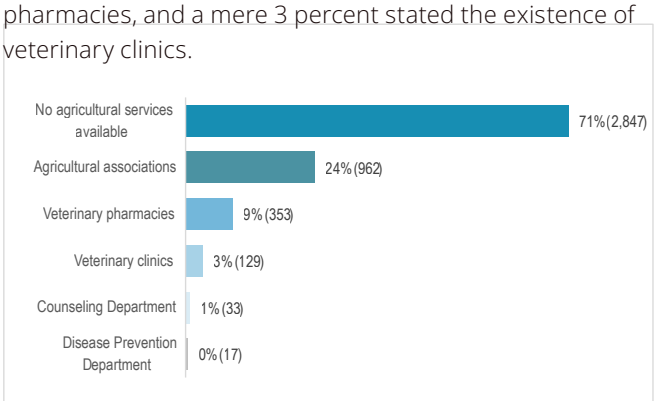
In response to questions about surplus management, half of the farmers surveyed (55 percent) reported that they did not face issues with excess production—meanwhile, 22 percent mentioned using surplus products as animal fodder. A smaller group, consisting of 33 farms, transferred their surplus to factories, and an additional 26 farms chose to dispose of their excess products.



SECTION VII. AGRICULTURAL SERVICES IN THE REGION

The study gathered insights from farmers regarding the availability of agricultural services in the Fezzan region, including but not limited to the disease prevention department, counseling department, veterinary clinics, veterinary pharmacies, and agricultural associations.

Of the surveyed farmers, 71 percent pointed out the absence of these services in the region. In contrast, 29 percent mentioned the presence of agricultural associations, 9 percent noted the availability of veterinary pharmacies, and a mere 3 percent stated the existence of veterinary clinics.



SECTION VIII. AGRICULTURAL ISSUES AND CHALLENGES

ISSUES COMPROMISING PRODUCTION

1	**Agricultural Inputs** were reported by **80 percent** of surveyed farmers to be **increased in prices**, and by **40 percent** to be **scarce in availability**
2	**Irregularity in electricity supply** reported by **62 percent** of surveyed farmers

3	**Increase in drilling prices was** reported by **62 percent** of surveyed farmers
4	***Spread of weeds and pests*** reported by **59 percent** of surveyed farmers
5	**Inadequacy and malfunction of existing machinery** and **unavailability of new agricultural technologies** were reported by **41 percent** of surveyed farmers.
6	**Salinity of water and soils, depth of underground water,** and **high water surface level** were reported by **24 cent** of surveyed farmers.

ISSUES AFFECTING MARKETING OF PRODUCTION

1	**Transportation issues** related to **fuel scarcity, reported by 59 percent**, and **poor conditions of roads, reported by 40 percent,** challenge farmers when commuting to markets.
2	**Unavailability of clear marketing channels** through which farmers can promote their products was cited by **51 percent** of surveyed farmers.
3	**Instability and fluctuation of prices** were raised by **39 percent** of surveyed farmers.
4	**Long distance of markets** from production sites cited by **33 percent** of surveyed farmers.
5	**Markets where production is stored, are not equipped with freezers and refrigerators**, which comprise preservation of production was mentioned as a concern by **28 percent** of surveyed farmers.
6	**Multiple intermediary interventions between producers and consumers** were cited by **18 percent** of surveyed farmers.

FINANCIAL ISSUES

1	**Unavailability of loans** and **lack of financial support provided to farmers** were reported by 91 percent and 88 percent of surveyed farmers, respectively, as the main issues facing farmers.
2	**Increased wages of seasonal and skilled labor workers** create a financial burden on the farmers as reported by **61 percent** of them.
3	**Low salaries** impose financial challenges on farmers, as reported by **57 percent** of those surveyed.
4	**High-cost of production vis-à-vis low selling price of produce** affects farmers' income, as reported by **46 percent** of surveyed farmers.

POST-HARVEST ISSUES

1	**Absence of specialized surplus management factories** in the region was the primary challenge after the harvest season, as reported by 40 percent of surveyed farmers.
2	**Increased product deterioration** posed a challenge to surveyed farmers, as reported by **35 percent.**
3	**Inadequate product health monitoring within the market** was indicated by **34 percent** of surveyed farmers.
4	**Improper product transportation techniques** from production sites were cited by **20 percent** of surveyed farmers.
5	**Poor product handling, including improper packaging and sorting**, was reported by 16 percent of surveyed farmers.

LIMITATIONS

Due to the challenges faced in reaching all farmers and livestock holders in Fezzan, the results of the assessment offer a partial view of productive and labour relationships across the agricultural sector of the region. The farmers who refused or who were unable to be surveyed may have very different experiences and challenges farming in Fezzan, as well as other profiles.

Additionally, as the overwhelming majority of respondents were male, the assessment offers little insight into the role of women in the agriculture sector. Similarly, beyond basic demographic characteristics such as sex, age, and education level, we know little about the farmers themselves. In a region characterized by many different tribes and migrant groups, being able to disaggregate by sub-group would allow for deeper analysis and might shed light on some of the possible reasons behind the findings.

RECOMMENDATIONS

INSTITUTIONAL TRANSFORMATION

Policy making for social protection and education

ensure the forthcoming social protection and food security strategy adopts a holistic approach, promoting inter-ministerial collaboration to address the needs of farmers and agricultural labourers effectively.

AGRICULTURE FOR FOOD SECURITY

Giving clear indication and communication around national supply needs for agricultural production to reorient production patterns towards food security needs and reduce post-harvest loss and food waste.

CLIMATE CHANGE AND ENVIRONMENT

Establish an integrated regional framework promoting eco-friendly farming practices to improve production, reduce food waste, and enhance climate resilience, with a focus on harnessing alternative energy sources.

PRODUCTION AND FOOD STANDARDS

Strengthening, creating, and monitoring production and food standards across the whole food chain

RESEARCH, EDUCATION, AND CAPACITY BUILDING

Enhancing the availability of academic and technical education focused on agricultural topics and fostering academic research in this field to ensure that this education is grounded in top-notch evidence that trickles

Generating evidence on the political economy of the Libyan agricultural sector is fundamental to facilitating the creation of people-centred interventions and tailor targeting.

Formalization

Promote agricultural and food enterprise formalization to improve compliance with export standards, attract entrepreneurs, enhance food safety, and advance agrarian production and standards, thereby bolstering food security and regional economic development.

Women

Advocating for equitable land ownership and fostering societal acceptance of equal employment opportunities.

Creating the enabling environment for equal and fair job opportunities across the food chain

Create a policy and investment-enabling environment across the food chain that encourages the creation of equal and fair job opportunities across the Libyan society.

Agricultural Finance

Promote the adoption of top-notch financing policies by both public and private financial institutions to make agricultural enterprises a more appealing lending market, with a strong emphasis on creating farmers-centred financial products that ensure equal access to credit by embracing a strong gender lens.

Access to Market

Work across central and local government bodies to develop the infrastructure for establishing effective market channels.

Service and input provision

Create investment opportunities for the public and private sectors that increase the availability of agricultural input, technology, and efficient agricultural support services.

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Associativity

Establishing a conducive policy environment to support the formation of agricultural cooperatives that streamline input procurement and offer essential agricultural services.

Irrigation

Promote efficient irrigation methods which minimise water waste and implement the existing national policies that preserve the exploitation of groundwater reserves.

Food processing, storage, and waste

Encouraging investments in food processing and storage facilities to enhance the absorption of agricultural products, ensure food safety within markets, and minimize food waste.

Pathogens

Strengthening the state role in monitoring pathogen and pesticide usage, promoting alternative pathogen control methods, and communicating its advantages at the farm level.

Digitalization

Promote the adoption of digital technology among farmers and breeders to boost productivity, improve operations, and enable data-driven decision-making across the food system.

Food processing, storage, and waste

Encouraging investments in food processing and storage facilities to enhance the absorption of agricultural products, ensure food safety within markets, and minimize food waste.

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