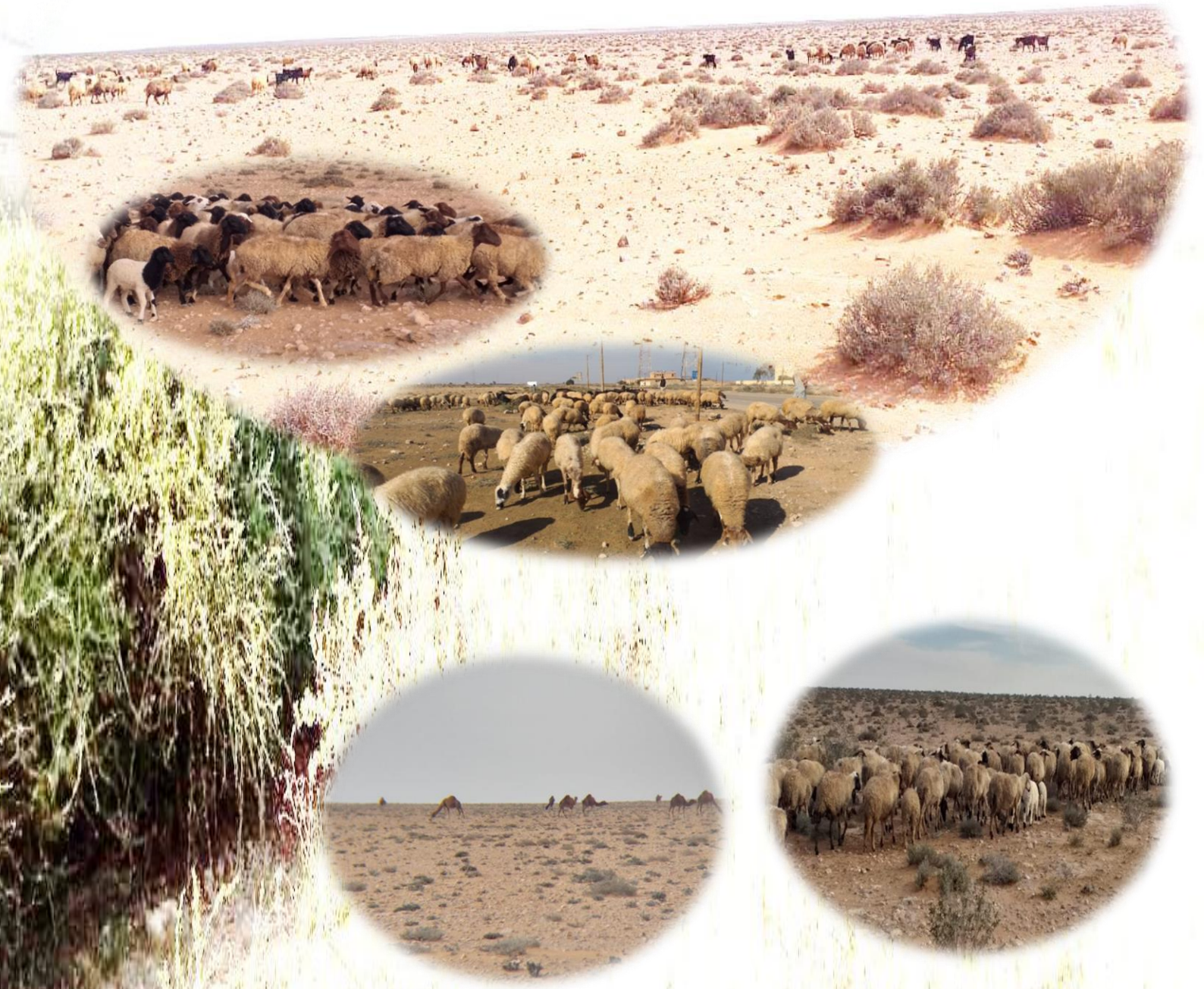
Economic Valuation of Rangeland Ecosystem Services and the Total Economic Value of Pastoralism in Northwest Coast of Egypt



February 2022

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Part 1

Introduction

A- Introduction(*):

Natural rangelands are considered an essential source of elements for preserving livestock in the world, but what the planet has witnessed in terms of severe climatic changes, water scarcity, rain scarcity, desertification and overgrazing all led to the deterioration of rangelands and weak vegetation cover, which negatively affected animal production.

In developing countries, rangelands provide many services of economic value, as well as some woody plants on which animals can feed. There are a variety of subcategories under the grasslands, including steppes, meadows, and grasslands.

The craft of grazing is one of the oldest traditional crafts known to the ancient Egyptians, and the nature of the ancient land of Egypt helped spread this craft.

Matrouh governorate has suffered during the past ten years from a lack of rainfall during the winter season, which greatly affected the natural pastures of the Matrouh Desert. The lack of natural pastures had a clear impact on livestock, especially the sheep that depend on these pastures, causing a decrease in their numbers, especially in light of the high costs of feed.

The people of Matrouh also suffer from a lack of pastures and drought due to the lack of rain and their having to buy fodder at a very high price, which led to the sale of some sheep to buy fodder to feed the rest of the sheep, in addition to the high cost of selling animal heads, and raising the price of meat, other than its impact on the quality of sheep, due to the difference in nutrition on Forage for feeding on natural pastures.

Within the framework of the implementation of the HERD project, which aims to promote the rehabilitation and sustainable management of rangelands, in order to provide ecosystem services and protect biodiversity in

(*) At end of study contains a list of references and sources include all that was used.

Egypt and Jordan, and stimulate expansion at the regional and international level. So, This study is part of the UNEP-GEF funded project "Healthy Ecosystems for Rangeland Development (HERD): sustainable rangeland management strategies and practices" the output 1.2.2 cost-benefit analysis of sustainable rangeland management policies and practices using economic methodologies.

UNEP is conducting the Economics of Ecosystems and Biodiversity for Agriculture and Food (TEEBAgriFood) study, which seeks to bring together scientists, economists, policymakers, business leaders, and farmers organizations in order to undertake a comprehensive economic evaluation of agricultural systems, practices, products, or policy scenarios against a comprehensive range of impacts and dependencies across the value chain. The study will seek collaboration options with the TEEBAgriFood initiative.

B- Methodology

B-1- Scope of the study:

The geographical scope of the study is represented in the north western coast of Egypt, which is represented in Matrouh governorate.

B-2- Data collection

The study depends on the information obtained from the governmental agencies, economic statistical and social studies related to the scope of the study and in line with its objectives. In addition, it depended mainly on the information gathered, with the help of stakeholders' questionnaire, which was in harmony with the study objective, from studied samples and communities. It depends on personal meetings with various stakeholders. Several meetings with researchers' staff, traders, herders are of quite gain in drawing the outlines of the study and planning the final policy options.

The target stakeholders that represent the community under study are divided into:

1. Breeders (Herders)
2. Community leaders
3. Non-Governmental Organization (Association of Ramsa and etc.,)

4. Traders (Sheep market)
5. The officials sector

B-3- Questionnaires

B-3-1- Breeders (Herders) Questionnaire:

The first axis: Sample database of elements associated with natural pastures: this topic covered three main sections:

- Personal data about the herding breeder: this section dealt with: the name of the breeder, gender, age, basic occupation, number of years of experience and pastoral practice, educational level
- Data on the characteristics of the grazing area and the types of grazing plants: this section deals with a set of questions about the types of plants in the area previously and currently, the type of grazing that is practiced and whether the pastures are sufficient in the dry season, the past and present condition of the pasture and whether the pasture is completely relied on or is the deficit satisfied with fodder, the best grazing seasons and the length of the season, and the types of plants that Animals prefer it and are there any unpalatable ones?
- Data on the grazing herds in the region: this part shows: the types of animals that were grazing in the area before and now, the tenure situation of the grazing herd

The second axis: Factors affecting the natural pastures: this topic covered three main sections:

- Data on climatic changes and their impact on the grazing area: this section dealt with: a set of questions about the occurrence of natural disasters and their impact on the region and climatic changes and the types of these changes.
- The impact of urban or agricultural expansion on the natural grazing areas: this section presents a statement of agricultural expansion and urban encroachment on grazing areas and the extent of damage resulting from this encroachment
- The impact of Eco-tourism activity on natural pastures: this part

included questions about the practice of Eco-tourism, the benefits that accrue to the breeder, and the practice of fishing.

- The effect of natural pastures on the ecological balance: this last section in the second axis also shows the inquiry about the presence of migratory birds' activity, and the extent to which the breeder notices the deterioration of the natural plant as a result of the bad use of grazing and the deterioration of the soil and its manifestations.

The third axis: Benefits obtained from the use of natural pastures: this topic covered five main sections:

- Quantity and value of benefits from using natural pastures for grazing: this part deals with the length of the period of raising the herd, and the benefits represented in (the sale of animals, dairy production, wool and lint and production of organic fertilizers)
- Quantity and value of benefits from the use of natural pastures in the activity of eco-tourism: this part dealt with questions about the benefits of eco-tourism activities such as safari and others.
- Quantity and value of benefits from the use of natural pastures for fishing: this section presents questions about the benefits and types of fishing.
- Quantity and value of benefits from the use of natural pastures to balance the ecosystem: this section addressed questions about the benefits of a natural balance such as the activity of migratory birds.
- The quantity and value of the benefits from the use of natural pastures in other utilitarian activities: ask a question about whether there are other activities carried out by the breeder besides grazing that represent benefits for him.

fourth Axis: Problems and solutions for natural pastures from the point of view of breeders: finally, the fourth and final axis dealt with a set of important questions related to natural pastures, represented in whether the breeder attended scientific seminars related to natural pastures and is he willing to

attend other seminars, and what are the problems and solutions related to natural pastures from the breeder's point of view.

B-3-2- Officials Questionnaire:

The first axis: pastoral units as one of the means of expanding the pastoral services: where this axis dealt with a set of questions represented in inquiring about: have pastoral units been established in the area, and did those units satisfied part or all of the forage gap, as well as the official's recommendation about the areas in which pastoral units should be established, the areas of pastoral units that should be established and the plant varieties that must be cultivated.

The second axis: the role of the authorities responsible for the process of sustainable development of the pastures in the study area: this axis dealt with a set of questions for the officials, including: has the Directorate of Agriculture improved and developed the pastures in the area, the problems and obstacles facing the pastoral communities, solutions and proposals from the point of view of the official

B-3-3- Rapid Rural Appraisal:

The discussion sessions dealt with a set of questions that were directed to the educators, the most important of which were what are the benefits obtained in the case of: selling some of the herd, producing dairy, producing wool and lint, producing organic fertilizers per year? In addition to what are the benefits obtained from Eco-tourism and fishing activity, and what are the types of feed that the breeder buys and their value? They were also asked about the areas that should be established as pastoral units and the plant varieties that should be planted in those units? Also, what is the impact of climatic changes, expansion of urbanization and agricultural on the grazing area?

B-4- Analysis:

B-4-1- SWOT analysis:

SWOT analysis is considered an analytical method that helps in determining the points of weakness and strength, and in realizing the type of

threats and the nature of the available and affecting opportunities in a particular organization or sector. And the analysis aims to study the internal environment from a set of circumstances, variables and resources that directly affect the target business sector. While the external environment is a group of forces and variables that directly or indirectly affect the activities and decisions of that business sector, the quadruple analysis includes four elements, strengths, weaknesses, opportunities, and potential threats, which aims to set a future vision for development of a particular organization or sector.

SWOT can be used either on the scale of companies and organizations or on a smaller scale such as projects, products or even individuals.

SWOT method is also considered one of the useful tools in complex situations that characterize the nature of strategic decisions, and business organizations are interested in analysing and evaluating all internal factors, with the main purpose of showing the strengths and weaknesses of each of the internal factors, with using the results of the analysis of external factors to make strategic decisions and choose appropriate alternatives for it.

The main objective of the SWOT analysis is to clarify the strategies that describe, commensurate with, and align with the resources and capabilities of a particular organization or sector to facing the requirements of the surrounding environment, and SWOT analysis can clarify the opportunities, risks, strengths and weaknesses of the position of a particular organization or sector.

Internal Environment: Strengths and Weaknesses

Internal environment contains strengths and weaknesses, which are elements for analysing the internal environment of the company, organization, or institution that identifies the negatives and positives within it.

Strengths: They are the characteristics of the company, organization or institution that give it a competitive advantage over other organizations or institutions.

weaknesses: they represent the negatives that may hinder the company, organization or institution from achieving its goals, such as a lack of capabilities and capabilities.

External environment: Opportunities and Threats

These elements are used to analyse external environment that may affect the performance of the company. Using SWOT analysis, the company, organization or institution can understand the threats that it may face, for example, economic changes, certain changes in laws and regulations that may affect negatively.

At the same time, the company, organization or institution can explore opportunities that can be applied to increase its effectiveness.

These elements can change quickly and suddenly. What appears to be an opportunity for the organization quickly turns into a threat. Certain problems in the strengths may turn into a weakness. Therefore, it is not enough to only identify points, but to ensure continuity by taking important measures such as hedging against dangerous threats and maintaining and strengthening strengths.

Figure (1) General form of the quadrilateral environmental analysis matrix (SWOT).

Degree of oversight and control by the entity		
	uncensored	censored
desirable	Opportunities	Strength
un desirable	Threats (risks)	weakness

The SWOT matrix seeks to present the strategic decision in light of four dimensions of strategic directions, which depend on the results of the internal and external environmental analysis shown in the following form:

Figure (2) Dimensions of the strategic directions of the SWOT matrix.

Internal / External	Strengths (S)	Weaknesses (W)
Opportunities (O)	strategy (S - O) MAXI – MAXI Relying on internal strengths to maximize external opportunities	strategy (W- O) MINI – MAXI Rely on development and development to cover weaknesses so that they can be used to maximize external opportunities
Threats (T)	Strategy (S-T) MAXI – MINI Relying on strengths to be at the level of threats, reduce them, and	strategy (W-T) MINI - MINI Develop and develop weaknesses so that they have the ability to confront and limit external

	mitigate their effects	threats

SWOT analysis is generally done in 5 stages:

The first stage: collecting internal and external environment data for a particular organization or sector

The second stage: processing the information collected during the diagnostic process

The third stage: organizing sessions for thinking and consideration (brainstorming)

Fourth stage: conducting the analysis

Fifth stage: decision making

Some may think that SWOT analysis is an individual work, so they do it individually and in their offices, and this is a mistake because this analysis does not succeed in achieving its goal unless it is a group work, then it is a field work that cannot be done in offices, and it is preferable to present the SWOT analysis to the owners interest to discuss

B-4-2- PESTEL analysis:

PESTEL analysis is a tool used to analyse and monitor the external marketing environmental factors that affect a particular organization or sector, and the external factors that may change in the future, in order to exploit these changes as opportunities, or to find solutions to potential threats better than competitors.

The word “PEST” comes as an acronym, and it is the initials of the basic factors affecting the overall economy of countries, which are: Politics, Economics, Social Society, Technology, while in the term (PESTEL) two other criteria are added: Environment and Law, and sometimes includes Some of these two axes are under the four “PEST” axes.

PESTEL analysis focuses on six main factors: political, economic, social, technological, environmental and legal. The results of this tool are usually used to identify opportunities and threats used in SWOT Analysis

The factors that PESTEL analysis focuses on are as follows:

Factors	Explanation of factors

Political Factors (P)	– Governmental Policies and Legislations – The degree of political stability in foreign markets – foreign trade policy, trade restrictions – Tax policies and facilities granted – law of work and workers
Economic Factors (E)	– Economic growth rates – Inflation and price hikes – Unemployment rates – Exchange rates and interest rates – Disposable Income
Social Factors (S)	– Census, population growth and demographics – Population health and education levels – Moral beliefs and values
Technological Factors (T)	– Infrastructure – Levels of creativity and innovation – Tech Awareness
Environmental Factors (E)	– Climate and Pollution – Environmental laws and policies – Recycle and reduce pollution – Renewable energy sources
Legal Factors (L)	– Employment Laws – Property rights – International Trade Laws – Health and safety laws – Product safety and labelling

B-4-3- Financial evaluation criteria:

Estimate the financial evaluation criteria by calculating the following criteria:

1- Net Present Value (NPV): It is the equivalent value in the present time for a group of sums of money paid at different times.

2- Benefit Cost Ratio (B/C): It has the same implications as in the NPV criterion.

3- Internal Rate of Return (IRR): It is the discount rate at which the ratio of the current returns to the current costs of the project is equal to the correct one.

Part 2

The main ecosystem services the rangelands provide in Egypt

Introduction:

Natural pastures occupy vast areas in most Arab countries, estimated at about 468 million hectares, or 33.3% of the total area of the Arab world, and contribute at least 25% of the forage resources.

The natural pastures in the Arab republic of Egypt, despite the deterioration they are experiencing, are considered one of the most important natural renewable forage resources, as they provide a large part of the low-cost fodder resources for pasture animals, in addition to their importance in soil maintenance and water conservation, as well as their role in supporting wildlife and conservation the ecological balance and others, of the benefits that are difficult to estimate financially. The rangelands are characterized as multi-use lands. The animal product is not only considered the main product of the pastures, but it is used for other purposes such as providing clean water, clean air, hiking, plant products, medicinal herbs, timber ..... etc.

The area of natural pastures in the Arab republic of Egypt is about 11 million feddans (4.9 million hectares), distributed in the areas of the Northwest Coast (1.7 million hectares), the Northeast Coast (1.2 million hectares) and (2 million hectares) distributed on the Sinai Peninsula, the Red Sea, Halayeb and Shalateen.

The northwestern coast represents the largest part of the area of rangelands in Egypt and is the most important. This coast extends from Alexandria in the east to Salloum in the west, with a length of more than 550 km and a depth of 20-35 km. This area includes about 50% of the Egyptian plant species, or nearly a thousand plant species out of the total plant species that make up the Egyptian flora, which number between 1800-2000 plant species. Similar to other countries in the Middle East and North Africa, the

Arab republic of Egypt is considered a dry country that tends to be exposed to drought. It has large areas of desert and semi-desert lands that are too weak to be cultivated, but they are nonetheless able to provide feed for a number of herds of sheep, goats and camels.

Most of the rangelands areas in the Arab world in general and in the Arab republic of Egypt in particular have been subjected to a state of severe deterioration and desertification as a result of several factors.

The importance of rangelands

1- One of the sources of feed for livestock feeding.

2- Soil and water conservation.

3- Soil fixation and stopping desertification.

4- Preservation wildlife.

5- Tourism, hunting and recreation.

6- A source of medicinal and aromatic plants.

The current status of rangelands in Egypt:

Natural pastures in many developing countries, including Egypt, are under great stress due to population growth, which is followed by an increase in demand for animal products, and thus increased pressure on rangeland lands to cover human needs in light of a sharp decrease in the growth characteristics of vegetation plants (plant density, plant coverage, and lack of abundance) Thus, a decrease in the pastoral productivity, as well as a decrease in the number of palatable pastoral plants, an increase in the number of low palatable plants, and therefore a decrease in the quality of the forage product.

Causes of deterioration of natural pastures:

The deterioration of vegetation cover and grazing resources was and still is a result of the continuous exploitation or mis-exploitation of the natural pastures in the past, or some wrong practices or climatic fluctuations.

The following are the most important reasons for the deterioration of natural pastures:

1- Overgrazing and early grazing, where grazing is done at an inappropriate time, which does not give an opportunity for plant species to complete their life

cycle in order for the natural or self-seeding of these species to occur, or increase the carrying capacity where the number of animals inside the pasture does not agree with the carrying capacity.

2- Relying on the wood of pastoral shrubs as a source of energy.

3- The occurrence of floods in the rangeland areas and the loss of rainwater by surface runoff and not benefiting from it.

4- Climate fluctuations such as the scarcity of rain in some seasons and its poor distribution during the season.

5- Lack of interest in applying rain full harvesting methods to benefit from it when needed.

6- The lack of legislation regulating grazing rights.

Manifestations of deterioration of rangeland:

1- The lack or elimination of important grazing plants and the spread of some spiny plants to replace the good grazing plants.

2- Many of the perennial natural rangelands were transformed into annual pastures.

3- Soil erosion and loss of fertility.

4- Formation of grooves and cracks in the pasture land.

5- Deterioration of wildlife and the extinction or scarcity of some wild animals.

Since the pastoral resources are an integral part of the state's natural resources, the rangelands development strategy is in harmony with the strategic objectives of the sustainable development of the agricultural sector and the economic and social development of the country.

Approved methods for rangeland evaluation:

The linear intersection method:

The linear intersection method is a method for studying the total and relative vegetation coverage in which a metric tape, usually 100 meters in length, is used to be fixed along the vegetation cover, and then determines the plant species that touch the tape every 100 cm. It can also be determined what was found on the surface of the earth from plant remains, soil and rocks.

Quadrate number is a quadrate used to calculate the number of plants of each plant species in it usually (1 m^2) for annuals and a rectangle of (100 m^2) for perennials.

Clip- quadrate is a quadrate in which plants are stuffed or cut to determine their weight, green or dry after tamping.

The most important indicators used to monitor rangelands:

Plant coverage%:

Vegetation cover % is the percentage of soil surface covered by the aerial parts of a plant when viewed from a vertical view from above, or it is the part of the soil surface covered by a vegetation when looking at the ground from above, or it is a measure expressing the portion of land covered by the aerial parts of plant species.

Plant Density (plant/m^2):

Plant density (plant/m2) is the Number of plant members per unit area.

Plant Frequency %:

Frequency% is the number of points at which the species or plant species appear to the total number of points at which the measurement was made, expressed as a percentage, and used to express the degree of uniformity of the species' distribution over the land.

Plant productivity (kg dry matter/ha) or Biomass (Kg/ha):

Biomass (Kg/ha) is the amount of organic matter produced by plants per unit area at a given time.

Pastoral productivity (kg dry matter/ha):

Rangeland production (Kg/ha) is the amount of grazing organic matter produced by plants per unit area and at a specific time that is available to the grazing animal.

Floristic composition or species composition:

Floristic composition is all plant species that are survey to a specific area or plant composition.

Vegetation cover:

Coverage is the area covered by individual plants, members of a species, or all plant species in a plant community. It is expressed as a percentage of the plant community area. A percentage of 100% means that the soil surface is completely covered, and 80% means that 20% of the soil surface is not covered by plants if we look at it from the top.

Vegetation coverage is estimated by the cross-point method. This method is summarized by taking 100 readings in each direction and taking a reading after every 100 cm. They all start from the selected fixed point along a longitudinal line in three different directions at an angle of 120 degrees. The first direction follows the north, the second direction is southwest, and the third direction is toward the southeast. The data is recorded regularly and uniformly in the field form (three forms for each point), at the target site, so that each form represents a longitudinal section containing 100 readings).

The number of iterations for each of the plants is recorded for each, bare soil, plant and animal remains and rocks in each line, and therefore the number of readings for one treatment is 300 readings in which the observed plant species and the vegetative coverage are recorded for one point within the site, and the coverage is calculated as follows:

Relative coverage of the species = the points number that touched the plant species / Total coverage for all species x 100.

Total plant cover = Number of points there is at least one plant species at each point/ Total points number x 100.

Plant Density:

Plant density is defined in ecology as the average number of plants per unit area, and it is characterized by its impact and sensitivity to small changes in vegetation cover. It is estimated by calculating the number of plants in the sample frame, where the area of the frame for the sample depends on the plant species to be measured. Small herbage are enough to measure a small frame, while the distant desert plants need the largest area. It can be said that this method is directly affected by the area of the sample frame and the difficulty of identifying the individual plant.

The quadrate method is used to estimate the density of herbaceous plant species, where the plant species are restricted to five quadrates, each of 1 m^2, while three quadrate of 100 m^2 (100 x 1 meter) are used to estimate the density of perennial shrubs within the study lines of the site.

The rate of plant density is calculated as follows:

Plant density = Number of plant species / unit area

Frequency:

Frequency is defined as the number of times a plant appears or is present at a number of points that are read along the bar, expressed as a percentage. It is used to monitor a specific place over time and compare different sites as the entry of undesirable plant species. The results of this method are sometimes difficult to interpret and are not suitable for large or rare shrubs.

Along the strip, the frequency is calculated by the presence or absence of plant species along the line, from which the relative frequency of each species is calculated according to the following two equations:

Frequency = The number of points of species / the total number of points of all species x 100

Relative Frequency = plant species Frequency/ total frequency of all plant species x 100

Plant biomass:

For annual plants, a frame of a known area (1 square meter) is placed randomly on the surface of the soil and then harvested from the plant inside, each plant species separately and its weight. As for the perennial plant species, direct methods are used to calculate the plant density with harvesting or cutting the vegetation cover in a specific area (100 m^2). To ensure the continuity of plant growth, the biomass was calculated on the basis of the branches.

In this method, the number of individuals belonging to the species whose live mass is to be estimated is collected, representing the volumetric variance of the group, then these individuals are weighed and the weight of one individual is calculated, then multiplied by the density of this species per unit area as follows:

Biomass (kg dry matter/ha) = average individual weight of plant species (kg/hectare) x its density per hectare.

Pastoral productivity or Rangeland production:

The pastoral productivity of grazing species that an animal can graze is calculated from the total available biomass per unit area without any damage to the rangeland. It was estimated at about 50% of the total dry matter production from annual and perennial plants.

Dry mass = dry plant weight /unit area

Pastoral productivity = dry plant weight / area over a period of time (usually a year)

The current status of the study area (a review of previous studies)

- **Vegetation cover of the study area**

The vegetation cover in the study area was described by Rizk et al (2020) as follows.

- Land cover vegetation based on 2019 classification images is presented in. Abou Mazhoud (site 1) contains 1308.56 Km2 vegetation coverage available in winter that occupies 50.8 %. In summer 2019, there was 4.0656 km2 vegetation coverage available of site 1 that occupy 0.16 % of site 1. While Al- Gaaween (site 2) contains 628.08 km2 vegetation coverage available in winter that occupies 45.7% of site 2. In summer, there was 3.6677 km2 vegetation coverage available of site 1which occupy 0.27 % of site 2.
- The vegetation cover in summer is very low in comparison to winter (site 1, was 0.16 % vs 50.8 % and site2, was 0.27% vs 45.7%). That will reflect negatively on the natural fodder available for grazing animals. Consequently, the livestock keepers have to provide their animals with additional feeds like grains, concentrates, agricultural by-products, and etc. instead of the free forage from the pasture to cover the feed gap between summer and winter.

- In the study area, the vegetation cover curve reaches the maximum in March then started to fall in April until reaching the minimum point in November every year. The growth of the vegetation cover in the study areas depends on rainfall quantity and its space range in the winter, while the spring represents the maximum vegetation cover and density, on contrary the autumn remains the minimum vegetation cover and density.
- Generally, the vegetation cover in summer is very poor, while the wild plant cover is moderately dense. The density of vegetation in the study areas response to rainfall quantity and area. The vegetation cover fluctuates from year to year, in site-1, the vegetation cover was low in 2017 and 2018, while in 2016 and 2019 it was relatively good. In site-2, the vegetation cover was very low in 2017 and 2018, while in 2016 and 2019 it was relatively good. This data is very important to regulate the grazing and initiate a grazing calendar in the study area to avoid overgrazing, which considers one of the main factors leads to deterioration and degradation of the rangeland.
- The density, frequency and plant cover of annual species are highly affected by the rate of precipitation. The precipitation period starts from November to March with a high percentage in January. The annual species are started to appear in the winter season and flowerishing in the spring season (March-May). Due to that most grazing species are annual, the grazing in winter-spring season is more appropriate for the herders.
- The grazing area must be subjected to artificial preparation for the grazing season; rehabilitation of the grazing species such as sowing seeds of selected species, especially the annual and perennial.
- It is necessary to emphasize that the grazing species in the study areas require urgent management action to conserve its threatened status since they represent an important feeding source for both livestock and wild animals. The active cultivation is vital to sustain the grazing lands in the

study area whereas the grazing land is soon degraded and lost forever if it is not regularly propagated by the target grazing species under the umbrella of a management strategic plan to develop the target area. Because the human culture of local communities has a heritage associated with the grazing system, the conservation and sustainable utilization of this area must be considered as a social enthusiastic.

- Most of the grazing plants of the study area (thirty-one species) have highly grazing value, followed by the very high value (twenty-four species) finally low grazing value is recorded in twenty-six species. According to the livestock species, Goats and sheep graze most of these species of (seventy-eight and seventy-six species, respectively), while camel graze thirty-three plant species only. Regarding the parts consumed of the plants, the young branches of thirty two species are edible, followed by leaves of twenty-two species and flowers of fourteen plants. All parts consumed of thirty-one species as well as the above-ground parts of only two species.
- Generally, the grazing ecosystem in the study area exposed to different types of stresses such as overgrazing, uprooting, woodcutting, aridity, different types of anthropogenic activities, and erosion of soil surface. Moreover, overgrazing caused ecosystem degradation by various kinds of mismanagement of the rangeland. This includes the extensive grazing of livestock and multiple-use of the land to develop tourism.
- The rangelands at the studied area are in a poor condition due to pressures of different types of stress that have either altered or destroyed the ecosystem because of overgrazing, uprooting of plants and off-route use by vehicles. These factors have resulted in an almost decrease or complete removal of vegetation cover and speeding up the desertification process in the study area.
- Overgrazing is a widespread problem where the meagre winter rainfall produce a scant plant cover. Overgrazing is severe in the study area. The problem is increasing as the number of Bedouins and their livestock

continues to grow over the stocking carrying capacity. Unregulated use of off-road vehicles particularly for recreation and tourism has increased

- dramatically in recent years. This leads to severe degradation of vegetation, disruption of top soil, and long term scarring of the landscape.
- Agriculture considers one of the main economic activities and sources of income in the study area. Crop production fluctuates according to the region and from year to year along the north-western coast as it based mainly on rainfall rate and the availability of other sources of water. In the study area, according to the data obtained from the agricultural directorate of Matrouh governorate, the low precipitation rate in 2018 at
- Al-Nagila and Marsa Matrouh districts, led to no vegetable crop plantation on these areas while it reached a very low cultivated area at Barani district as only 6 Feddan vegetables and 4 feddans with melon, which clearly indicate that rainwater is the limiting factor for cultivation in the study area (Rizk et al., 2020).
- Rain-fed barley is the dominant cultivated crop in the study areas. As mentioned above, rainwater is the key factor for cultivating crops, so the highest barley yield was in the rainy seasons 2015/2016 and 2018/2019. The most barley yield comes from Barrani district. Regarding the wheat crop, the high yield observed in seasons 2015/2016 and 2016/2017. Barani district recorded the largest production area of wheat crop.
- Climate change further increases the risk of producing cereals in marginal lands, pastoralists may be in a position to reclaim these areas for grazing their animals. Increasing the designated area for cereal production and decreasing the area as pasture for livestock feeding maybe not wise. Cereals need high inputs and irrigation and are therefore unsustainable under desert conditions. Cereal production favours the pockets of rich people but does not enhance food security.

- The most important horticulture crops are figs, olives, grapes, date palm and almond. The leading district of cultivating horticulture is Marsa Matrouh followed by Barrani and El-Negila.
- Rain-fed agriculture is generally risky due to high spatial and temporal variability of rainfall. The productivity of cultivated rain-fed crops is affected mainly by the amount and fluctuation of precipitation. Ouda et al. (2016) studied the effect of climate change on rain-fed agriculture of Marsa Matrouh. They expect that rainfall in Marsa Matrouh will be highly reduced in 2029/2030. The frequency of rainfall will increase; however, the amount will be much lower. Therefore, the productivity of cereal crops will be highly reduced to the extent that no grain yield will be produced in Marsa Matrouh. The biological yield will be reduced by 85 and 90% for barley and wheat crops, respectively. Olive yield will be reduced by 56% in Marsa Matrouh. Consequently, this will reflect negatively on livestock production (the main land use) in this area. They suggested also that productivity of fruits will be affected at lower rate than field crops. Therefore, a production package should be implemented in this area to increase its resilience to cope with rainfall variability in the future.

A detailed inventory of the vegetation cover was carried out by **Ahmed and El- shesheny (2019)** in the two study areas in the northwestern coast during the spring season of 2014. The data and information obtained from the land inventory included the definition of the dominant plant communities, the dominant natural plant species, plant species composition, plant coverage and other vegetation cover measurements. The results showed that the values of the vegetation coverage index for the West Matrouh region ranged between -0.73 to 0.417, while the values of the vegetation coverage index for the East Sidi Barani region ranged from 0.075 to 0.382. Through this study, 6 plant communities were defined prevalent in the two study areas, where one plant community was defined at each of the three levels of altitude that they studied. In general, the plant density was significantly superior in the eastern Sidi

Barani area compared to the study area in the west of Marsa Matrouh. There were also significant differences in the average vegetation coverage between the first and third sea levels in the two study areas.

Abou-Dya *et al* (1996) found that, the highest biomass was recorded in the winter season (2.63/kg/m²) in the Sidi Barani area, (1.49/kg/m²) in the El-Nejila area, followed by the spring season (1.48/kg/ m²) in Barani, (0.99). kg/m²) in the Al- Nejila area.

- **Feed resources**

Bearing in mind the importance of annuals during the grazing season, perennials plants make up the bulk of the grazing animals' feed. Therefore, perennials are valuable in procuring and securing forage during periods of limited forage supply and also during periods of drought. In the same direction, common grazing plants ensure a good abundance of grazing types in the study area (Rizk and Seif Al-Nasr, 2020).

Abou- Deya and Salem (1990a) found that *Haloxylon articulaum* was dominant in summer, winter and autumn seasons due to its highest abundance,density, coverage and frequency. Meanwhile, *Cutandia dichotoma*, *Hordeum leporenium* and *Stipa capensis* ware dominant in winter season. The vegetation parameters of palatable, annual species and grass were higher in spring season than others.

Nourelden, Nemat *et al* (1999) addressed the effect of the age of Acacia shrubs on the development and improvement of some natural plant species during the winter and autumn seasons in the Northwestern Coast of Egypt. The results of the study indicated that, rang measurements of natural plant species such as plant density, abundance and frequency increased under the older age of Acacia shrubs, while the fresh and dry forage yield (tons/feddan) recorded the highest values in the area without Acacia shrubs. On the other hand, the use of Acacia shrubs has improved some rangelands in the Northwest Coast, as it helped the return of some natural species that had disappeared for many years.

El-shesheny *et al* (2014) study the natural vegetation qualitatively and quantitatively in relation to the effect of some ecological factors during the period extended from spring 2011 to autumn 2012 at Sidi-Barrani in the North Western Coast of Egypt under rainfed conditions. They addressed plant communities and growth seasons on some range measurements, botanical composition, plant density, coverage, frequency, importance value, foliage yield and nutritive value of some perennial species. Thirty-eight plant species belonging to 16 families were found; the highest number of plant families, number of plant species and palatable plant species were obtained under *Artemisia herba-alba* community. The highest values of plant density, coverage % and forage yield were recorded under *A. herba-alba* community in spring season during both years. Meanwhile, the lowest values of all studied traits were recorded under *Anabasis articulata* community in autumn season.

- **Feed comsumption**

Feed is the major input cost for livestock production, it is accounting for 65–70% of the total running cost. Poor nutrition of animals has been identified as the major constrain to animal production across the developing world (FAO, 2000). So, the profitability of livestock production is highly correlated with the feeding cost. Consequently, in the rangeland livestock production, the free forage from the pasture is a paramount important factor for reducing the running cost.

Heneidy (1992) reported that the annual consumption of forage by the grazing animals is about 619 kg/ head (average of 1.696 kg/ head/ day).

- **Livestock in the study area (Rizk and others, 2020).**

Over the past 10 years, both locations of the study have been hit by successive years of drought that negatively affected production of crops,

livestock and vegetation cover, prompting many breeders to sell a large numbers of their herds to feed the rest of the flock.

Flock/herd size is between 50 and 200 but it could reach up to thousands in a few occasions. This small flocks size represent a major constrain for applying new technologies and proper breeding program. Also inbreeding is seen clearly there on the majority of the flocks. Inbreeding consider one of the main problems facing livestock production. Small ruminants' production dominated in the study area (more than 90% of livestock population. Sheep (68%) followed by goats (23%) are the most common species and the ratio between the two varies with the rain condition and the market. Local Barki sheep and Barki goats are the main breeds raised in the area (Heneidy, 1992).

Small ruminants can convert low-quality roughages into meat and milk for human consumption (in addition to produce fiber and hides). Small ruminants are well-suited to foraging on marginal and hinter grazing lands that are unable to support the grazing of large ruminant's species (cattle and buffalo). Therefore, they represent a wonderful opportunity to increase the production of animal source foods thereby reducing problems associated with food insecurity.

The main breeding season is June–July months. Consequently, parturition synchronizes with the beginning of the natural grazing season which usually extends from November to March. This short grazing season is usually followed by a long dry season during which breeding and pregnancy occur. After weaning, male lambs are fattened mainly on grains (mostly barley), feed concentrates and crop by-products, while female lambs used for replacement either for older or compensating numbers sold for cash for supplementary feeding. In summer, straw of barley and/or wheat is an important feed source after ending the grazing season. Straw represents the extent of range produced by rain irrigation during drought summer season which extend for not less than six months of the year.

Part 3

The current situation of the agricultural sector in Matrouh governorate

In this section, a summary of the current and current situation of the area under consideration will be presented, it deals with geographical location, administrative division of centers, cities and villages of Matrouh governorate, total and cultivated area, number of populations, cultivated crops, and livestock, in order to identify study community.

A- Administrative and geographical boundaries of Matrouh governorate:

Matrouh province is characterized by a distinct and unique location and the future of that province promising, where the province of Matrouh is located in the northwest corner of the Arab Republic of Egypt and extends from the west of the city of Alexandria at kilo 61 to the Egyptian-Libyan border at the Salloum city with a length of about 450 km on the Mediterranean coast and south extending at a depth of about 400 km south of the oasis of Siwa and border to the east are Alexandria and Beheira governorates and to the southeast Giza governorate, and the south is the of the New Valley.

B- Area:

Matrouh governorate occupies about one fifth of Egypt's area, extending to about 450 km on the Mediterranean coast at a depth of 400 km south of the oasis of Siwa, the total area of the provinces about 166563 km^2 or about 39.6 million feddan, representing about %16.6 of Egypt's total area.

C- Administrative division of the centers, cities and villages of Matrouh governorate:

Data Matrouh indicates that it is divided administratively for 8 administrative centers are:

- Center and city of Hammam with 6 local units and contains a number of villages are Salam, Shamama, Ealamid, Ouled Jibril, Ouled Massoud and Coast Elamaid.

- Center and city of Al-Alamein including 2 local and village units are Tal Al-Ais and Sidi Abdurrahman.
- Center and city of Dabaa includes 13 local and village units: Al-Harabi, Al-Jafira, Zaytoun, Sharnbia, Ouled Alwani, Jalal, Jamima, Zawiya Al-Awama, Suwani Jaber, Swani Samalos, Sidi Shabib, Ghazal and Fuka.
- Center and city of Morsi Matrouh includes 18 local, village and village units are Zayat, Abu Marik, Abu Lahu Al-Northly, Abu Lahu Al-Southern, Atanuh, Um Al-Rakhum, Dakhla, Al-Sweinat, Qasr, Qawasem, Ras Al-Hikma, Al-Nasr, Alloush, Ouled Merhi, Jaroula, Halaazin, Sidi Hanish and Kashuk Aamira.
- Center and city of Al-Najila with 2 local and village units, the village of Al-Mathani and Zaghariat,
- Center and city of Sidi Barrani. it has 8 local and village units, Abu Stal, Abu Marzouk, Abu Mazhoud, Zuweida, Zafer, Al-Fakhri, Ketarani and Shammas.
- Center and city of Salloum includes 2 local, village and village units: Abu Zariba and Bokbuk.
- Center and city of Siowa with 5 local and village units, including Abu Sharrouf, Agromi, Maraki, Bahi Al-Din and Um Al-Saghir.

D- Total and inhabited area and population of Matrouh governorate centers:

The data of both Matrouh governorate and the central authority for public mobilization and Statistics also indicate that the number of centers on the is about 8 centers, about 166563 km^2, while the populated area is about 3921 km^2 in 2021, with a total of 474275 population of about 248850 male inhabitants and about 225425 inhabitants of females .

E- Cultivated Area with vegetables, crops and gardenes in Matrouh:

As for the planted reins, the data indicate that the total planted area in the centers, cities and villages of Matrouh province amounted to about 354362 Feddan, where the crop area is about 392717 Feddan, while the total area of vegetables in Matrouh governorate amounted to about 43719 Feddan (11.13%) while the area of field crops about 214129 Feddan (54.53%) and the area of

fruit (Gardenes) reach about 134869 Feddan (34.34%) during the period (2019/2020), while the total area of winter crops in the centers, cities and villages of Matrouh province is about 200793 Feddan, and the total area of winter vegetables in the centers, cities and villages of Matrouh province is about 15741 Feddan, and indicates the actual inventory of crops Summer that the total area of summer crops in the centers, cities and villages of Matrouh province is about 16199 Feddan, where he explained the inventory of medical plants and aromatic summer and perennial amounted to about 254.4 Feddan during the (2020) season.

F- Limiting areas of fruit orchards in Matrouh governorate:

Limiting total, areas of fruit Matrouh indicates that the area of Figs, Olives, Palms, Almonds, Grapes, Citrus, Guava, Pomegranate, Bananas, Apricots, Pears, Apples, Peaches, Plums, Mangoes, Carob, Prickly Pear, Kaki, respectively, is about 60331, 39505, 10385, 7255 5973, 2282, 2929, 1223, 14, 31, 1702, 6447, 3131, 104, 45, 8, 17, 18 Feddan respectively in 2019/2020.

G- Total of livestock in Matrouh governorate:

The data of the general survey of livestock in the centers, cities and villages of the Matrouh governorate indicate that the number of local fattening calves reached about 5425 heads, while the female cows amounted to about 11730 local heads and about 297 heads of imported ones, as for the sheep, it amounted to about 297529 heads, and goats amounted to about 49444 Head, camels about 7739 heads, The number of animals in the country was about 3,476 animals in 2020.

H- Production of red and white meat:

As for the production of red and white meat in the centers, cities and villages of Matrouh, it was found that the production of red meat amounted to about 1947 thousand tons/year, while the production of white meat reached about 4785 thousand tons/year, on January 1, 2020.

I- Farms, massacres and veterinary units:

It is clear that the total number of poultry farms reached about 1058 farms, where the number of livestock massacres about 9 massacres and the total

capacity of livestock massacres about 11.3 thousand tons/year of livestock, and the number of veterinary units about 16 veterinary units.

It is noted on the published data that there is no data on pastures, whether in terms of area, size of animal holdings in which they are grazing, or plant varieties spread there, or their distribution.

Table 1. Administrative division of the centers, cities and villages of Matrouh governorate, 2021.

Series	Centre	City	Local village units	Village
1	El-Hamam	El-Hamam	6	El-slam, El-shmama, El-Aamid, Ouled Jibril, Awlad Masood, Sahel El-Aamid
2	Al-alamein	Al-alamein	2	Tel Al-Ays, Sidi Abdurrahman
3	El-Dabaa	El-Dabaa	13	Al-Harabi, Al-Jafira, Al-Zaytoun, Al-Sharnbia, Ouled Alwani, Jalal, Jamima, Zawiyat Al-Awama, Swani Jaber, Swani Samalos, Sidi Shabib, Ghazal, Fouka
4	Marsa Matrouh	Marsa Matrouh	18	Al-Zayat, Abu Mariq, Abu Lahu al-Navy, Abu Lahu Al-Sa'id, Atanuh, Um al-Rakhim, Dakhla, Al-Sweinat, Al-Qasr, Al-Qawasem, Ras al-Hikma, Al-Nasr, Alloush, Ouled Meraai, Jaroula, Halazin, Sidi Hanish, Kashuk Aomira
5	El-Negaila	El-Negaila	2	El-Mthani, El-Zoghirat
6	Sidi Barani	Sidi Barani	8	Abu Steeyl, Abu Marzouk, Abu Mazhoud, Al-Zuweida, Al-Zafer, Al-Fakhiri, Al-Qtrani, Shmas
7	Salloum	Salloum	2	Abu Zariba, baqbaq
8	Siwa	Siwa	5	Abu Shrrouf, aghruomi, Al-Maraqi, Bahiuddin, Um al-Saghir
Total			56	

Source: Information Note, Information and Decision Support Center, Matrouh governorate, 2021.

Table 2. Total area, inhabited area and population of Matrouh governorate centers during the period 2021.

series	Centre	Total area km^2	Inhabited Area km^2	% for total inhabited area km^2	*Population		
					males	females	comprehensive
1	El-Hamam	12000	153	3.9	32035	28453	60488
2	Al-alamein	24500	48.3	1.2	5970	5065	11035
3	El-Dabaa	7800	391	10.0	28437	26021	54458
4	Marsa Matrouh	13800	690	17.6	109274	99874	209148
5	El-Negaila	2200	197	5.0	15557	14812	30369
6	Sidi Barani	6500	659	16.8	31871	28130	60001
7	Salloum	4500	425	10.8	9156	8445	17601
8	Siwa	94263	1358	34.6	16550	14625	31175
Total province		166563	3921	100	248850	225425	474275

Source: Information Note, Information and Decision Support Center, Matrouh governorate, 2021.

*** Central Agency for Public Mobilization and Statistics, Population, on1/7/2019.**

Table 3. Cultivated area vegetables, crops and orchards for the 2019/2020 season, Matrouh. (Unit: Fed).

Centre	Cultivated area	Crop area	Crop area		
			vegetables	Field crops	Fruit (Gardens)
El-Hamam included (Villages of Young Graduates)	65469.18	103703.6	39923.6	38667	25113
Al-alamein	17811	17811	1755	2147	13909
El-Dabaa	31584.22	31584.22	-	20000	11584.22
Matrouh	38685.3	38685.3	55.12	4500	34129.15
El-Negaila	25229.2	25229.2	150	20150	4929.2
Barani/Salloum	146932.8	146932.8	1665	128500	16767.8
Siwa	28650.18	28772.6	171	165	28436.6
Total	354362.23	392717.23	43719.18	214129	134869.5
%			34.34	54.52	11.12

Source: Matrouh governorate, Directorate of Agriculture, Information Centre.

Table 4. Actual survey of cultivated winter crops in Matrouh governorate, season 2019/2020. (Unit: Fed).

Centre	Total area (Fed)	wheat		barley		Bean	Alfalfa	onion	garlic	beets sugar
		irrigated	Rain	irrigated	Rain					
El-Hamam included (Villages of Young Graduates)	5319	2292	355	130	215	1565	432	150		180
	72004	12342		59		2052	3645	4	3	1942
Al-alamein	2112	50	50	7	1200	500		300	5	
El-Dabaa	20000				20000					
Matrouh	4500				4500					
El-Negaila	20150		150		20000					
Barani/Salloum	128500		3500		125000					
Siwa	165	85				3		73	4	
Total	200793	14769	4055	196	170915	4120	4077	527	12	2122
%	**100**	**7.36**	**2.02**	**0.10**	**85.12**	**2.05**	**2.03**	**0.26**	**0.01**	**1.06**

Source: Ministry of Agriculture and Land Reclamation, Matrouh governorate, Directorate of Agriculture, Agricultural Affairs, Statistics Management.

Table 5. Actual survey of cultivated winter vegetables in Matrouh governorate, season 2019/2020. (Unit: Fed).

Centre	Total area	tomato	Zucchini	potato	eggplant	artichoke	Beans	Green onion	cucumber	pepper	carrots	Peas	Paper vegetables
El-Hamam	12972	10250	935	1370		242						175	
******* Young Graduates	2018.18			94		1832.18	1					91	
Al-alamein	235	200			10				5	20			
El-Dabaa													
El-Negaila													
Brain /Salloum	450							450					
Matrouh	16.12							3					13.12
Siwa	12.49	16	8	14	5		2		3		1.12		
Total	15741.18	10466	943	1478	15	2074.18	3	453	8	20	1.12	266	13.12
%	100.00	66.49	5.99	9.39	0.10	13.18	0.02	2.88	0.05	0.13	0.01	1.69	0.08

Source: Ministry of Agriculture and Land Reclamation, Matrouh governorate, Directorate of Agriculture, Agricultural Affairs, Statistics Management.

Table 6. Actual survey of cultivated of summer crops in Matrouh governorate season 2019. (Unit: Fed).

Centre	Total area	Bean	Alfalfa	onion	garlic	Sugar beet
El-Hamam	682	587	95			
Beet Villages	11877	10976	891	6	1	3
Siwa	3500			3500 Intercropped		
Al-alamein	140	40			100	
Total	16199	11603	986	3506	101	3
%	100	71.63	6.09	21.64	0.62	0.02

Source: Ministry of Agriculture and Land Reclamation, Matrouh governorate, Directorate of Agriculture, Agricultural Affairs, Statistics Management.

Table 7. Actual Survey of summer vegetables in Matrouh governorate in season 2019. (Unit: Fed)

Centre	watermelon	Zucchini	Mallow	potato	eggplant	cucumber	Cantaloupe	tomato	pepper	cantaloupe	watermelon	Beans	cabbage	artichoke	Paper vegetables
El-Hamam	1805	1082		1220	220	300	615	10322	150		75	10			
Graduate Youth Villages	2034	116		17	331	1	588	5982	937				13	776	
Al-alamein	1500	50			40	50		1000	40						
El-Dabaa	20														
Matrouh	271					10		50		87					19
El-Negaila	150									50					
Barani	450						350	40							
Siwa	15	15	40		5	6		20	2						
Total	6245	1263	40	1237	596	367	1553	17414	1129	137	75	10	13	776	19

Source: Ministry of Agriculture and Land Reclamation, Matrouh governorate, Directorate of Agriculture, Agricultural Affairs, Statistics Management.

Table 8. Statement of The actual Survey of medicinal and aromatic plants summer and perennial season 2020.

Centre	genre	Area fed - karat		classification	Reviews
El-Hamam	mint	3		municipal	Irrigation from the El-Hamam canal
Al-alamein	-	-	-	-	-
El-Dabaa	-	-	-	-	-
Matrouh	mint	4	4	municipal	Rain irrigation
El-Negaila	-	-		-	-
Barani	mint	60		municipal	-
Siwa	mint	84		municipal	Irrigation on wells
	Roselle	89		municipal	Irrigation on wells
	Licorice	9	-	municipal	Irrigation on wells
	Basil	5	-	municipal	Irrigation on wells
Total		254	4	-	-

Source: Matrouh governorate, Directorate of Agriculture, Horticulture Management, 2020.

Table 9. Production of red and white meat and honey bees on 1/1/2020.

series	Center /City/District	Production of red meat (1,000 tons/year)	Production of white meat (1,000 tons/year)	Production of honey bees (kg/year)
1	El-Hamam	0.363	1575	0
2	Al-alamein	0.19	1247	0
3	El-Dabaa	0.052	14287	0
4	Marsa Matrouh	1443	18562	0
5	El-Negaila	0.004	4162	0
6	Barani	0.008	7125	0
7	Salloum	0.005	0.9	0
8	Siwa	0.053	0	0
Total province		1947	4785	0

Source: Ministry of Agriculture and Land Reclamation, Matrouh governorate, Directorate of Veterinary Medicine, Statistical Directory, 2020.

Table 10. Survey Total of fruit gardens for 2019/2020.

Centre	fig		olive		Palm		almond		grapes		Citrus		Guava		pomegranate		banana	
	fed	karat	fed	karat	fed	karat	fed	karat	fed	karat	fed	karat	fed	karat	fed	karat	fed	karat
El-Hamam	10140	-	1314	-	59	-	-	-	2644	-	1173	-	1895	-	382	-	-	-
Al-alamein	3997	-	2359	-	954	-	-	-	365	-	986	-	978	-	450	-	-	-
El-Dabaa	7009	16	4432	21	30	-	12	8	39	14	2	-	8	7	33	12	-	-
Matrouh	27429	-	5491	-	134	-	667	-	396	-	-	-	-	-	6	-	-	-
El-Negaila	2455	-	2400	-	8	2	21	-	45	-	-	-	-	-	-	-	-	-
Barani	9270	-	5065	-	39	8	25	-	2360	-	-	-	-	-	-	-	-	-
Siwa	30	-	18443	-	9160	9	-	-	124	12	120	21	47	12	351	-	13	12
Total	60330	16	39504	21	10384	19	725	8	5973	2	2281	21	2928	19	1222	12	13	12

Source: Matrouh governorate, Directorate of Agriculture, Information Centre.

Table 10. Follow

Centre	apricot		pear		apple		peach		plum		Mango		carob		Fig fork		kaki	
	fed	karat	fed	karat	fed	karat	fed	karat	fed	karat	fed	karat	fed	karat	fed	karat	fed	karat
El-Hamam	12	-	1450	-	4443	-	1496	-	58	-	29	-	-	-	-	-	18	-
Al-alamein	-	-	200	-	1960	-	1620	-	40	-	-	-	-	-	-	-	-	-
El-Dabaa	1	-	2	16	8	4	1	9	-	-	-	-	-	4	3	7	-	-
Matrouh	-	-	-	-	-	-	6	15	-	-	-	-	-	-	-	-	-	-
El-Negaila	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barani	-	-	-	-	-	-	-	-	-	-	-	-	8	-	-	-	-	-
Siwa	18	-	49	-	36	-	7	-	5	12	16	-	-	-	14	-	-	-
Total	31	-	1701	16	6447	4	3131	-	103	12	45	-	8	4	17	7	18	-

Source: Matrouh governorate, Directorate of Agriculture, Information Centre.

Table 11. Numbers of dispersed date palms in the northwest coast 2020.

Centre	Number of masculine palms	Number of feminine palms	Number of small palms	Total number of scattered palms
El-Hamam	33	176	-	209
Al-alamein	647	3497	299	4443
El-Dabaa	21	109	-	130
Matrouh	127	682	57	866
El-Negaila	6	23	-	29
Barani	20	98	-	118
Total	854	4585	356	5795

Source: Matrouh governorate, Directorate of Agriculture, Horticulture Management.

Table 12. Numbers of date palms collected in Siwa 2020

genre	Total area		Number of masculine palms	Number of feminine palms	Number of small palms	Total number of palms
	fed	karat				
Palm Collected	9165	9	74475	441494	291238	807207

- **There's no scattered palm siwa.**

Source: Matrouh governorate, Directorate of Agriculture, Horticulture Management.

Table 13. General Survey of livestock in Matrouh governorate in 2020.

Centre	Fatten calves			Females			Sheep	goat	Camel	Riding animals
	cows		buffalo	cows		buffalo				
	local	Imported		local	Imported					
Matrouh	30			383			69982	7773	470	470
El-Dabaa	76			382			48531	7604	2232	380
Al-alamein	160			517			7695	2220	445	246
El-Hamam	4848		742	9788	297	1866	52100	15300	100	1507
El-Negaila	235			308			41917	6445	2541	368
Barani and Salloum	4			80			75126	9487	1968	468
Siwa	72			272		14	2178	615		37
Total	5425		742	11730	297	1880	297529	49444	7739	3476
Animal unite	3797.5		742	8211	267.3	1880	59505.8	791104	7739	24332

Source: Matrouh governorate, Directorate of Agriculture, Management of Animal Production.

Table 14. Farms, massacres and veterinary units on first January 2020.

series	Center /City/District	Number of poultry farms (farm)	Number of poultry massacres (massacres)	Total poultry slaughter capacity (1,000 tons\ year)	Number of livestock massacres (massacres)	Total livestock massacres capacity (1,000 tons/year)	Number of veterinaryunits (unit)
1	El-Hamam	21	0	There is no	1	1.116	5
2	Al-alamein	24	0	There is no	1	0.472	1
3	El-Dabaa	280	0	There is no	1	1.116	2
4	Matrouh	440	one massacre and doesn't work	There is no	2	5.919	3
5	El-Negaila	91	0	There is no	1	0.471	2
6	Barani	180	0	There is no	1	0.529	1
7	Salloum	22	0	There is no	1	0.529	1
8	Siwa	0	0	There is no	1	1.116	1
Total province		1058	0	There is no	9	11.268	16

Source: Ministry of Agriculture and Land Reclamation, Matrouh governorate, Directorate of Veterinary Medicine, Statistical Directory,2020.

Part 4

Results

preface:

This part includes identifying the study area to be the cornerstone according to which breeders will be dealt with and the extent of the importance of natural pastures in the lives of breeders in terms of providing animal food. It also includes some previous pastoral measurements to shed light on the previous situation of natural pastures. This part also includes the results of the analysis for SWOT, PESTEL and the financial analysis, in addition to the most important information obtained from the questionnaire.

A- Study areas and villages

These are the visited areas and villages, most of whose residents work in agriculture and animal production activities and related activities such as grazing, fodder trade and others (For which published evidence was found, according to the information note of Matrouh governorate in 2020, the statistical yearbook of Matrouh governorate in 2020).

A-1- The villages belonging to the city of Marsa Matrouh:

- **Awlad Marei village:** It is one of the villages belonging to the city of Matrouh, located about 40 km west of the Matrouh city. It is inhabited by families from the Sorehat tribe, one of Awlad Kharouf tribes. It has a number of 123 families, with a total population of about 536 people, and the average per capita expenditure is 9585 pounds annually. The number of the poor is about 298 individuals, representing 55.6% of the total population of the village.

- **Al-Qasr Village:** It is one of the villages belonging to the center of Matrouh, located about 7 km west of Matrouh city. It is inhabited by two main tribes, namely Alshibat tribe, which is a tribe affiliated with Ali Al-Ahmar tribe, and some families from Qawasim tribe and follow the Al-Jumaiat tribe.

- **Wadi Al-Raml Village:** It is one of the villages belonging to the center of Matrouh, located about 8 km west of Matrouh city, and inhabited by families from Al-Ashibat tribe, Ali Al-Ahmar tribe.

- **Al-Saqifa village:** It is one of the small appurtenances that follow the city of Matrouh . It is located about 7 km east of the city. It is inhabited by families from three sub-tribes belonging to Sanqar tribe, namely Al-Obaidi tribe, the Maghawra tribe, and the Ajarmah tribe.

- Halazin village: It is one of the villages belonging to the Matrouh Center and is about 45 km away from it in the west direction. It is inhabited by families from several different tribes, namely Al-Houta tribe, Al-Shawaer tribe, Al-Quraydat tribe, and these three tribes belong to the Sanqar tribe, while Awlademera tribe belongs to the Awlad Kharouf tribe, and with the number of 150 families, with a total population of about 769 people, and the average per capita expenditure of 7895 pounds annually. The number of the poor reached about 514 individuals, representing 66.9% of the total population of the village. It is one of the poorest villages in Matrouh governorate, which was recently included in the second phase. From the initiative of Haih Karima.

A-2- The villages belonging to the Barani Center:

- **Al-Khor area:** It is one of the dependencies of the city of Barani. It is located in the southwest of the center of Barani, as it is about 60 km away from the city of Barani and about 190 km from the city of Matrouh. It is inhabited by families from the Sankar tribe.

- **Abu Mazhoud village:** It is one of the villages belonging to city of Barani, about 35 km south of the Barani center. It is inhabited by families from the Al-Jarara tribe, which is one of the Sanqar tribes. It has 106 families, with a total population of about 647 people, and the average per capita expenditure is 7542 pounds annually, and the number of the poor reached about 471 individuals, representing 72.7% of the total population of the village. It is one of the poorest villages in Matrouh governorate, which was included in the first phase of the Dignified Life Initiative.

- **Shammas village:** It is one of the villages belonging to city of Barani, about 90 km away from the center of Matrouh. It is inhabited by families from the Al-Sharasat tribe and the Sanqer tribe, and it has a number of 619 families, with a total population of about 3559 people, and the average per capita expenditure is 9948 pounds annually. The number of the poor is about 2087 individuals, representing 58.6% of the total population of the village

B- Evaluation of some important range measurements in the rangelands of the North-western Coast of Egypt:

The results of studies and research (Table 15) that were conducted in the Northwest Coast region showed the following results:

B-1. The average plant density (plant / m^2) was recorded (3.54 plant / m^2) in the autumn season, which reflects the dry season, while it was recorded (12.32 plant / m^2) during the spring season, which reflects the wet season.

B-2 . The average vegetation coverage as a percentage in the autumn season was recorded (19.09), while it was recorded (26.26) in the spring season.

B-3. The results (Table 15) showed that the dry rangelands productivity during the fall and spring seasons, which was recorded (243.75 kg per feddan in the autumn season, while it was recorded (395.16 kg per feddan) during the spring season.

Table 15. Average plant density (plant /m^2), vegetation coverage (as a percentage) and dry rangelands productivity (kg. /fed.), for natural pastures, affected by the growing seasons on the North-western Coast of Egypt.

Growth seasons	Autumn	Spring
Range measurements		
Plant density (plant /m^2)	3.54	12.32
Vegetation coverage (%)	19.09	26.26
Dry rangelands productivity (kg./fed.)	243.75	395.16

B-4. It is clear from the obtained results that the total dry rangelands productivity (the productivity of the autumn season + the productivity of the spring season) is estimated at (638.91 kg. / fed. / year), and since the area of rangelands in the North-western Coast of Egypt is about (4 million feddans), the total dry forage productivity of this area is estimated at about 2 million, 555 thousand and 640 tons of dry fodder.

B-4-1. The price of a ton of alfalfa hay (the finest types of hay) is about 3 thousand Egyptian pounds. The monetary value of the dry productivity of rangelands on the North-western Coast of Egypt can be calculated at about 7.7 million Egyptian pounds.

B-4-2. The animal unit (a large cow weighing 455 kg) needs 290 kg of good hay/month, i.e. 3480 kg of good hay/year, and accordingly, the carrying capacity (grazing capacity) can be calculated (the number of animal units or its equivalent of other animal species/unit area/ the year).

C- SWOT and PESTEL analysis

C-1- SWOT Analysis:

This analysis helps to know the strengths to build on and to identify weaknesses to address and helps to make the most of opportunities and identify threats and deal with them in an organized way to reduce their impact and is one of the most important strategic planning tools. Analysis of questionnaires, interviews, discussion panels and field observations as follows:

C-1-1-The internal environment:

C-1-1-A- STRENGTHS:

1- The expansion of the area of natural pastures, reaching about 11 million Feddan in 2019, according to the statistics of the Arab Organization for Agricultural Development.
2- The uniqueness of the Egyptian grazing areas with the presence of many grazing plants that are not found in other grazing areas
3- The experience of breeders in different grazing areas.

4- The state’s continuous support for pastoral communities through development programs and projects that fall under the strategies of combating desertification and sustainable agricultural development, such as rainwater harvesting projects, the construction of dams and ground reservoirs, the establishment of water analysis units and the establishment of pastoral units in Matrouh governorate, and this is for the stability of pastoral communities. and rural areas and increase the rates of achieving food security.
5- The activity of raising and grazing animals is a major source of income for pastoral societies, so it is necessary to develop and improve pastures and manage them in a sustainable manner.
6- The importance and diversity of livestock in the governorate (animals found in the pasture: sheep - goats - camels).
7- Increasing the volume of demand for red meat at remunerative prices for livestock, especially on holidays and occasions, and thus positively affect the income of the breeder.
8- The presence of a large local market for livestock capable of absorbing the entire volume of production, whether within the scope of Matrouh governorate, or outside the borders of Matrouh governorate, by trading with livestock markets in the different governorates.
9- Great and continuous support from all sides for animal and agricultural production within the strategy to combat desertification and sustainable agricultural development to achieve food security.
10- Practice other activities besides grazing activity such as (hunting for some birds such as quail and migratory birds for domestic consumption and sale and there are some hunting for high-priced species such as Falcons, in addition to the activity of searching for tubers of cama or tervas and harvesting them for sale, in addition to ecotourism, camping, and other activities).
11- The existence of some institutions that are concerned with resources and the pastoral community, such as the Center for sustainable development of

Matrouh resources and its subsequent support centers spread at the level of the governorate centers, in addition to the Applied Research Center with Pasture Research Unit .the center is now working towards the germination of some plant varieties for cultivation in the pastoral units to be worked in the next phase in addition to the Directorate of Agriculture, the Directorate of Veterinary Medicine and the College of desert agriculture in Fouka.

12- The existence of regional and international organizations and bodies that are able to provide technical support and ensure training between different agencies and institutions

13- The state provides research and technical cadres that help the pastoral community in the sustainable development of the pastures and provide them with all services

C-1-1-B- WEAKNESSES:

1. Practice of open grazing between members of one tribe and one family, which complicates the process of development and sustainable management of pastoral resources.
2. Expansion of degraded pasture lands in scattered areas in the sprawling Matrouh governorate, where the area of the governorate extends from 61 km west of Alexandria governorate to the Egyptian-Libyan border with a length of 450 km along the Mediterranean coast, and extends south into the desert at a depth of 400 km south of Siwa Oasis, with a total area of 166.563 A thousand km2, or about 16% of the area of Egypt. This requires a lot of work and effort, as well as great institutional, human and material capabilities so that the concerned authorities can achieve sustainable management and development of pastoral resources.
3. Lack of accurate maps related to the pastoral sector, especially those related to the productivity of pastures, exploitation systems, the population's lifestyle, and the lack of data and statistics.
4. Lack of maps of degraded pasture areas in Matrouh governorate.

5. Bad exploitation of the pastures, the high rate of population growth and the consequent increase in the nutritional requirements of the population, and the increase in the number of livestock, which eventually leads to the practice of grazing with a large pastoral load that exceeds the capacity of the grazing areas.
6. Lack of accurate data on the traditional grazing paths used by the different herds of livestock and the grazing seasons in the pastoral areas.
7. Prevailing belief among breeders is that the size of the grazing herd owned by the breeder is a measure of wealth, which increases pressure on the natural pastures and disrupts the ecological balance of the pasture.
8. Lack of accurate data on the numbers and types of pastoral livestock, as well as the absence of accurate data on breeders who practice grazing.
9. Lack of rain harvesting wells, which may contribute to the sustainability of pastures.
10. Lack of benefit from the secondary products of the traditional pastoral sector in Matrouh governorate, such as (wool products, animal hair, leather and milk) and this is due to reasons including: (weak impact of agricultural manufacturing for traditional animal products and its inability to sufficiently increase the added value of traditional animal production - poor use of organic fertilizer due to its low value and high transportation costs - the use of milk to breastfeed the small herd).
11. Low efficiency of pastoral animal production due to the lack of appropriate grazing and breeding and production systems.
12. Bad marketing path and the control of middlemen in livestock markets.
13. Lack of a system to identify pastoral products and their sources of production.
14. High prices of fodder, especially since dependence on it represents a large percentage, especially after the decrease in rains in recent years and the scarcity of pastures.
15. There are no cows in the pasture due to the low area of the pastures and they need a large proportion of feed.

16. Lack of success of the pastoral units that were created (250 pastoral units distributed over Marsa Matrouh, Ras Al-Hikma, Al-Nujaila, Barani) due to several reasons, including (lack of interest and follow-up from the authorities entrusted with attention and follow-up to educators and pastoral units - the lack of sufficient wells to harvest rain For the sustainability of these units - the lack of serious participation of the local community in the management of these units).
17. Not valuing many ecosystem services, due to lack of awareness of their value.
18. High average age of a large segment of breeders, and the reluctance of their children to practice the profession of grazing and raising livestock.
19. Migration of many young people from pastoral societies to live in cities and coastal areas, in search of a better education opportunity or in search of a better job opportunity.
20. Lack of laws and legislation to protect natural pastures.
21. Failure of the pastoral units that he worked before.
22. Weakness of the administrative apparatus of government institutions in managing pastoral resources.
23. Lack of technical and research personnel based on the management, development and development of natural pastures.
24. Lack of coordination between institutions and bodies related to natural pastures.
25. Weak funding for pasture protection, conservation and development programs compared to the expansion of pastoral areas.
26. Weak participation of the local population in Matrouh governorate in pastoral development projects because they did not participate in the preparation and implementation of projects for natural pastures, especially those related to the protection, maintenance and rehabilitation of pasture lands and their sustainable management.
27. Weakness in regulating and educating pasture-users and pastoral communities.

28. Weakness of the legal system related to pastoral resources, which guarantees their sustainable management.
29. The lack of effective application of laws and regulations in order to prevent wrong practices and deter violators, especially with regard to overgrazing and urban and agricultural expansion at the expense of pastures.
30. The absence of a strategy and a national action plan for the development of the grazing sector in the medium and long term.
31. The absence of a policy to support feed and medicine for breeders.
32. Low environmental awareness among communities due to the lack of an integrated program to raise awareness of the importance of pastures in all their environmental, economic and social aspects.
33. Insufficient counselling and awareness programs.
34. Lack of interest in specialized research and awareness in the fields of pastures and related studies.
35. The high average age of most breeders and the weak participation of their children in grazing.

C-1-2- The external environment:

C-1-2-C- OPPORTUNITIES:

1. Diversity of environments and climate in the natural pastures in Egypt between the climate of the Mediterranean region the Red Sea coast region.
2. Diversity of natural pasture production from many grazing plants, including annual and seasonal herbs and shrubs
3. Availability of demand for animal products encourages the continuation of activity and the preservation of natural pastures
4. Positive role that natural pastures play in combating desertification and climatic changes and preserving biological diversity
5. Positive role of improving pastures in reducing sand and dust storms and sand encroachment, which cause huge material losses and affect human and animal health.

6. Availability of large financial resources within the framework of implementing the Paris Agreement to adapt and limit climate changes and preserve biological diversity at the regional and international levels.

C-1-2-D- THREATS:

Pastoral resources and communities are exposed to several threats, the most important of which are:

1. Decrease in rainfall, especially in recent years, which negatively affected the reduction of the area of pastures and the greater dependence on fodder.
2. Exposure of the grazing areas to the phenomenon of climatic changes, as drought periods extend and recur, which helps to deteriorate the condition of the pastures and exacerbate the phenomenon of desertification and the consequent decrease in the biodiversity of endemic plant species with good fodder value in terms of quantity and quality.
3. Low rainfall, frequent droughts and unfavourable environmental conditions constitute an obstacle to the development of pastoral resources and communities.
4. Economic crises and lack of external support directed to rangeland development projects.
5. In the case of establishing pastoral units, the tribal customs do not allow any other tribes from outside the region to graze in the vicinity of their areas.

C-2- PESTEL ANALASYIS:

C-2-1- Political Factors (P):

1. The Arab Republic of Egypt enjoys a state of political stability, which encourages the enactment of legislation and the development of programs and mechanisms for the maintenance, development and management of natural pastures.
2. The Arab Republic of Egypt enjoys good regional and international relations, which encourages coordination at the regional and international levels for the development of natural pastures

3. The Arab Republic of Egypt signed the Framework Convention on Adaptation to Climate Changes and Limiting its Effects in Paris in 2015.
4. The Arab Republic of Egypt launched in December 2019 the updated strategy for sustainable agricultural development in Egypt 2030. The strategy in the environmental field aims to reduce the potential effects of climate change on Egyptian agriculture and the sustainable use of natural agricultural and pastoral resources.
5. The state should review its plans for horizontal agricultural expansion and urbanization in areas considered natural pastures.

C-2-2- Economic Factors (E)

1. Natural pastures provide food for most animal herds (sheep, goats, camels) for a period ranging between 4- 6 months per year.
2. Providing job opportunities for the residents of pastoral communities, whether in the activity of grazing animal herds or the trade of live animals and their products such as meat, milk, wool, animal hair, leather and organic fertilizers.
3. Providing a good source of income for the residents of pastoral communities, whether in the activity of grazing animal herds or selling live animals and their products such as meat, milk, wool, animal hair, leather and organic fertilizers.
4. Availability of a necessary commodity with high quality specifications such as red meat at reasonable prices at the local level.
5. The breeder purchases animal feed, whether green or concentrated, for supplementary feeding during the summer and autumn, as well as during periods of drought, for a period ranging between 4-6 months per year.
6. The activity of hunting and trading migratory birds spreads during the period from August to December of each year.
7. Breeders roam the natural pastures during the winter and spring season to search for and sell truffle tubers.

8. Pastures provide a good source of income in case of interest in the activity of eco-tourism trips.
9. It is preferable to establish a number of pastoral units in each of the pastoral societies so that the area of the pastoral unit is commensurate with the number of animals in the grazing herd in order to fill part of the fodder gap and develop livestock in the governorate.
10. The area of one pastoral unit shall not be less than 25-50 acres in each pastoral gathering in order to provide a pastoral load commensurate with the number of animals within the grazing herds.

C-2-3- Social Factors: Social Factors (S)

1. Matrouh governorate, as a desert governorate, prevails as a tribal and family system, which leads to the necessity of coordination with the tribal elders and the Matrouh Tribal Council when developing any system for the maintenance and development of natural pastures, both in terms of determining the areas of pastures in each region, as well as regulating grazing periods and repeating them in the same region , as well as when establishing pastoral units that aim to fill part of the feed gap in the governorate.
2. For the success of the process of maintaining and developing natural pastures and pastoral communities, it is preferable to assign a member of the pastoral community (a pastoral community sheikh) to be responsible for following up on the implementation of the instructions and instructions of the grazing process within the pastoral community residing in it, as well as coordinating with the sheikhs of the villages and neighboring pastoral communities to ensure one of the reasons for the success of the process Sustainable management of natural pastures.
3. Most of the pastoral societies lack basic services such as health units, schools and means of communication, which leads to a lack of awareness towards environmental and sustainable development issues.

4. The belief prevails among the residents of pastoral societies that the large size of the family is one of the main reasons for increasing social influence within the pastoral community, which puts increasing pressure on pastoral resources and leads to their rapid deterioration.
5. There is currently a tendency among most of the youth of the pastoral communities in Matrouh governorate to migrate, whether internal to urban cities in the governorate or external migration to the Arab Gulf states or Europe to search for a good job opportunity.

C-2-4-Technological Factors:

1. The natural pastures in Matrouh governorate are rich with many types of grazing plants, whether seasonal, annual or shrubs such as (acacia, picking, alfalfa tree, .. etc.).
2. Most of the breeders in Matrouh governorate practice the open grazing system, because the possession of land is on the commons, which leads to the rapid deterioration of the condition of the natural pasture.
3. Due to the fact that most of the breeders follow the method of overgrazing on the one hand and the increase in the number of animals within the grazing herd on the other hand, which constitutes an obstacle to the maintenance and development of natural pastures.
4. It is preferable for each pastoral unit to include a number of plant species, whether seasonal, annual, and forage shrubs.
5. 7- Expanding the construction of dams and rainwater harvesting tanks in pastoral communities that suffer from an acute shortage of water resources to help meet the needs of the population of the pastoral community of water and irrigate the pastoral units.

C-2-5-Environmental factors (E)

1. The rainy season recedes only during the winter season, and the dry season extends to the rest of the seasons.

2. The extension of the dry season helps to spread the phenomenon of sand encroachment, sand storms and soil erosion, which negatively affects the state of natural pastures as well as the health of humans and animals.
3. It became clear that the phenomenon of climatic changes is the main reason for the recurrence and extension of drought periods from year to year, which affects the state of natural pastures and the plant species they contain.
4. The extension of the effects of the phenomenon of climate change in this environment constitutes a major obstacle to the efforts being made to preserve, maintain and manage the pastoral resources in a sustainable manner.
5. The deterioration of the state of the natural pastures leads to the loss of biological diversity and the elimination of plant and animal species that were rich in these natural pastures.
6. Increasing the awareness of the population of pastoral communities towards environmental issues leads to assistance in the maintenance of natural pastures and the ease of their development and sustainable management.

C-2-6- Legal Factors:

1. The state must enact special legislation for natural pastures, as they are one of the natural resources in the country, which must be preserved, developed and managed in a sustainable manner.
2. In the event that the state desires to carry out projects of horizontal agricultural expansion and urban and population development, it must avoid areas of natural pastures and enact binding legislation to do so.
3. The state shall enact special legislation for the establishment of local administrations whose competences include determining the areas of natural pastures in each region, as well as determining the plant species present in each pastoral grouping, and following up on raising the awareness of breeders on the appropriate methods of grazing and determining the dates of grazing and the timing of its recurrence in the same area, as well as setting

mechanisms for the maintenance and development of natural pastures., which contributes to its sustainable management.

D- Breeders and Official questionnaires:

In many studies and scientific research, the use of samples is considered the basis, because of its many advantages, which is a shortening of time, effort and costs.in addition, the use of sampling method helps to quickly obtain data, summarize, classify and analyze it. the importance of using the sample in this study increases due to the multiplicity and spread of the area of natural grasslands in most border governorates in the Arab Republic of Egypt, so it was necessary to take a sample so that it is accurately representative of the community and then generalize the results to the study community as a whole.

Matrouh governorate was chosen as it is located in the Northwest Coast region, which has a natural pasture area of about 4 million feddans of natural pasture area in the Arab Republic of Egypt of about 11 million Feddans, and has large numbers of cattle and sheep heads and many animals' production projects.

D-1- Breeders questionnaire:

The questionnaire included a set of questions in various fields related to natural pastures, and opinions were surveyed through a questionnaire containing that set of topics, which included a number of questions for 40 grazing practitioners, and the results were as follows:

D-1-1- Database of elements associated with natural pastures:

Centers: The administrative division of Matrouh province comprises about 8 centers (Hammam, Al-Alamein, Dabaa, Morsi Matrouh, Najila, Sidi Barani, Salloum, Siwa), and the sample included three centers: Morsi Matrouh, Sidi Barani, And Najla, Tables (16, 17).

Sample villages: The sample included 11 villages spread over the three centers: Hallazin, Ouled Merhi, Al-Qasr, Ouled al-Abs, Al-Abas, Al-Htaawah,

Wadi al-Sheqoq in the center and city of Morsi Matrouh, Abu Mazhoud villages, Shammas village, al-Khor in Sidi Barani center, and the Al-mathani albharia in the Center of Najila city, Table (18).

Table 16. Administrative division of the centers, cities and villages of Matrouh Governorate.

No.	Center	City	village local units
1	Hammam	Hammam	6
2	Al-Alamein	Al-Alamein	2
3	Dabaa	Dabaa	13
4	Morsi Matrouh	Morsi Matrouh	18
5	Najila	Najila	2
6	Sidi Barani	Sidi Barani	8
7	Salloum	Salloum	2
8	Siwa	Siwa	5
Total			56

Source: Matrouh Governorate, Information and Decision Support Center, Information Note, January 2021.

Table 17. Centers and cities of the study sample in Matrouh Governorate.

No.	Center	City	village local units
1	Morsi Matrouh	Morsi Matrouh	18
2	Sidi Barani	Sidi Barani	8
3	Najila	Najila	2

Source: Matrouh Governorate, Information and Decision Support Center, Information Note, January 2021.

Source: Matrouh Governorate, Information and Decision Support Center, Information Note, January 2021.

Table 18. Villages of the study sample in Matrouh Governorate.

No.	Center	Village
1	Morsi Matrouh	Hallazin, Ouled Merhi, Al-Qasr, Ouled al-Abs, Al-Abas, Al-Htaawah, Wadi al-Sheqoq
2	Sidi Barani	Abu Mazhoud, Shammas, al-Khor
3	Najila	Al-mathani albharia

Source: Questionnaire.

D-1-1-1- Personal data on the grazing practitioner:

Age group of grazing practitioners: The number of grazing practitioners under the age of 30 was 11 Person, and the number of grazing practitioners was 18 Person for the Age group of 30 to under 50, while the number 11 of grazing practitioner aged for age group of 50 years and over, Table (19).

Table 19. Age group of the study sample of educators in Matrouh Governorate 2021.

Age group	Number of breeders	%
under 30 years old	11	27.5

From 30 years to less than 50 years	18	45
From 50 years and over	11	27.5
Total	40	100

Source: Questionnaire.

Basic profession: It was found that there are 10 breeders of their basic profession grazing practitioner, and 7 breeders of their basic profession grazing practitioner with farming, and those who are grazing as a basic profession amounted to 12 of the grazing practitioners, and 11 breeders grazing practitioner addition of in other work, Table (20).

Table 20. Basic occupation of the study sample of educators in Matrouh Governorate 2021.

Occupation	Number of breeders	%
Their primary occupation is jam	10	25.0
Their main occupation is a breeder, in addition to the agricultural profession	7	17.5
Their main occupation is herding	12	30.0
Their profession is shepherding, in addition to other work	11	27.5
Total	40	100.0

Source: Questionnaire.

Years of grazing practice (experience): It turns out that there are 16 grazing practitioners with experience under 20 years, and that 13 breeders have 20: 40 years of grazing experience, while 11 breeders have experience over 40 years, Table (21).

Table 21. Years of grazing practice (experience) for the study sample of breeders in Matrouh Governorate 2021.

Category	Years of herding practice	%
With less than 20 years of experience	16	40.0
From their experience from 20 years to less than 40 years	13	32.5
From their experience of 40 years or more	11	27.5
Total	40	100.0

Source: Questionnaire.

Educational Status: The number of breeders who are not Able to read and write is about 10, and the number of breeders who are Able to read and write is about 21, and the number of educators with an average qualification is about 9, Table (22).

Table 22. Educational status of the study sample of educators in Matrouh Governorate 2021.

Educational Status	Number of breeders	%
Mom	10	25.6

Reads and writes	21	53.8
Middle Certification	8	20.5
Qualification above average	0	0.0
bachelors degree	0	0.0
Total	39	100.0

Source: Questionnaire.

D-1-1-2- Data on the characteristics of the grazing area and the types of pastoral plants:

Plants in the region at present: al-qatf, acacia, tshash, ajram, ararr, sheeh, awraq El-shieh, azm, eqheahwan, baatran, Ashbet El-Arnab, El-temear, searhaet El-kabsh, al-zabih, El-rabi, brceim shujairy, haozan, El-bahwaar, dajis, abo-aterin, as well as natural pastoral plants that It grows on the rain such as: El-sheeier, Al-shalttam, hadal, matnaan, Al-khobza, al-kzhah, Shaara, aashbet shajjara, Krisha, suret Kabsh al_kamh, serhat al-kabsh, Arboud, bselh Howahi, Lsls, Al-Ba'atran, Al-Tahrija, Al-Nafal, Giza, nwar, Jahwan, aashbet al-zabih, El-bazoun and these Plants are less in size and value year after year and are present in the region at the moment due to the cold weather and their exploitation in firewood for heating and high gas prices, and the unorganized grazing and Heavy grazing

Plants that existed in the region in the past (which may still exist today): Abu Atrin, Acacia, Eqheahwan, bason, El-temear, Gel, , al-zabih, Shaltam, Shih, Ajram, Al-qatf, al-kzhah, Al-qatf, basela el-tiour, basela elaalaf, bselh Howahi, Jahwan, Giza, hatab surt kabsh, Huzan, Dajis, Daqis, zbah, Arboud, ashb zabih, oshbet El-Arnab, Kriisha, Lsls, Nafel, Noar, Al- baatran.

Type of grazing practiced in the area: open grazing is generally practised in the area, Table (23).

Table 23. Type of grazing practiced in the region for the study sample of breeders in Matrouh Governorate 2021.

grazing type	Number of breeders
open grazing	40
periodic grazing	0

Source: Questionnaire.

Adequate pastures during the dry season: The sample showed insufficient pastures during the dry season, and feed was used during that period, Table (24).

Table 24. Adequacy of pastures in the dry season for the study sample of breeders in Matrouh Governorate 2021.

Number of who answered "yes"	Number of who answered "no"	Total
1	39	40
2.5	97.5	100.0

Source: Questionnaire.

Current state of pastures in the area: Sample members have found that the state of pastures in the area is currently moderate to poor by 12 to 28 grazing practitioners, Table (25).

Table 25. Status of pastures in the region at the present time for the study sample of breeders in Matrouh Governorate 2021.

Excellent	good	average	bad	Total
0	0	12	28	40
0.0	0.0	30.0	70.0	100.0

Source: Questionnaire.

The state of the pastures in the area in the past: Sample members saw the state of pastures in the area in the past as excellent to good to medium by 4 to 33 to 3 grazing practitioners, Table (26).

Table 26. Previous pasture state of the pastures in the region for the study sample of breeders in Matrouh Governorate 2021.

Excellent	good	average	bad	Total
4	33	3	0	40
10.0	82.5	7.5	0.0	100.0

Source: Questionnaire.

Best grazing seasons: Spring season turns out to be about one to two months of winter in case the winter season is the best grazing season, Table (27).

Table 27. Best grazing seasons for the study sample of breeders in Matrouh Governorate 2021.

Autumn	Winter	Spring	Summer
0	4	40	0

Source: Questionnaire.

Length of grazing season: The grazing season has been shown to extend throughout the spring, which is the best grazing season, and about 1:1.5 months for autumn and winter depending on the state of the rains, Table (28).

Table 28. Length of the grazing season for the study sample of breeders in Matrouh Governorate 2021.

Autumn	Winter	Spring	Summer
1: 1.5 months	1: 1.5 months	3 months	0

Source: Questionnaire.

The extent of reliance on natural pasture only: the sample combined that they did not rely solely on natural pastures, Table (29).

Table 29. Extent of dependence on natural pasture only for the study sample of breeders in Matrouh Governorate 2021.

Number of who answered "yes"	Number of who answered "no"	Total
1	39	40
2.5	97.5	100.0

Source: Questionnaire.

Filling the lack of feed: The undernutrition of sheep and animals is being filled from purchase from the market, agricultural waste, wood, rain barley cultivation and fig tree leaves, and the association provides subsidized feed of only about 5 tons, Table (30).

Table 30. Filling the shortage of fodder for the study sample of breeders in Matrouh Governorate 2021.

Number of breeders buying from the market	Number of breeders answered agricultural wast	Other	Total
40	10	3	53
75.5	18.9	5.7	100.0

Source: Questionnaire.

Types and prices of feed: The sample members found that the most important feed used to meet the lack of feed during the drought is a mixture of feed and grains ranging in price from 5,000 pounds to 6,400 pounds per ton, and the second most important type of gain feed ranges from 2,700 pounds to 6,200 pounds per ton, as well as feed a mixture of earnings, corn, wheat, bean peel and barley hay ranging from about 500 pounds\ton.

Types of plants preferred by animals in the area: sheep and goats are found to prefer Acacia - Persem Shajiri - Eqheahwan - Al-qatf - Nafel - Al-zabih - Shaltam - pruning shajar alzaytun - pruning shajar allawz waraq altiyn - Ajram khutba (tshashi) - aldhabah - alkhabiz- mawadu alnafl - Acacia Nafel - Acacia - Dabih - sirat kabsh - earbud - alshiyh - aleazma,, as for the preference of camels for plants in the spectral region - alhalaab - aldhabaah - alkhabiz- mawadu alnafl - 'akasya - aldubayhi- alshiltam - alqatfa- alqalifatu- - and most plants and camels eat most herbs with small amounts of Feed compared to sheep and goats.

Unpalatability plants for animals in the area: the most important of these plants have been found to be the al'athla, shajarat almasisi, alhanzali, alhulw (toxic), 'abuetran, alshiyhi, alharimali, alhinzali, albuzumu, alsakran, qasis, almishmami, alghasul, alsirkhit, alhirmal, almasisi, aleitrin, alqatf, salty and any type of plant with Unpalatability bitterness for animals in the region.

D-1-1-3- Data on the grazing herds in the area:

The types of animals that were grazing in the area at the present time: sheep and goats, as well as a few camels.

Types of animals that were grazing in the area in the past: sheep, goats and camels, in addition to some animals that have become extinct, such as the wild deer.

The tenure situation of the herding herd of the grazing: ranging from 10:500 head of sheep, ranged between 12:150 head of goats, and ranged between 10:100 head of camels, Table (31).

Table 31. Possessive position of the study sample of educators in Matrouh Governorate 2021.

Sheeps			Goats			Camels		
Category	Number of breeders	%	Category	Number of breeders	%	Category	Number of breeders	%
less than 50 heads	6	16.7	less than 20 heads	5	16.1	less than 50 heads	5	55.6
from 50 heads to less than 100 heads	11	30.6	from 20 heads to less than 30 heads	7	22.6	from 50 heads or more	4	44.4
from 100 heads to less than 150 heads	12	33.3	from 30 heads to less than 40 heads	11	35.5			
from 150 heads or more	7	19.4	from 40 heads or more	8	25.8			
Total	36	100.0	Total	31	100.0	Total	9	100.0

Source: Questionnaire.

Daily grazing wage: ranging from 67 pounds to 160 pounds per day in this grazing season in addition to 300 pounds of communication cards other than 300 pounds eaten per month grazing season or during the four months for grazing.

D-1-2- Factors affecting natural pastures:

D-1-2-1- Data on climate change and its impact on the grazing area:

Previous natural disasters: It turns out that the number of sample members reached about 27 members of the sample who answered "yes" natural disasters occurred in the region previously, where the number of sample members about 11 members of the sample who answered "no" that there were no accidents or natural disasters in the region previously, Table (32).

Table 32. Previous natural disasters for the study sample of educators in Matrouh Governorate 2021.

Number of who answered "yes"	Number of who answered "no"			Total
27	11			38
71.1	28.9			100.0
Seoul	dryness	fire	other (remember)	
19	8	0	0	27
70.4	29.6	0.0	0.0	100.0

Source: Questionnaire.

The impact of these disasters on the nature of the region: these disasters affected the nature of the area where animal mortality, soil erosion, soil driftage, the deterioration of the grazing situation by a number of 10,10,15,12 grazing practitioner, in addition to only one Breeder of the sample members answered there are diseases of animals and we want the support of the state of veterinary care and medicines, Table (33).

Table 33. Impact of these disasters on the nature of the region for the study sample of educators in Matrouh Governorate 2021.

Animal mortality	Soil erosion	Soil erosion	Deterioration of grazing conditions	Other (remember)	Total
10	10	15	12	1	47
21.3	21.3	31.9	25.5	2.1	100.0

Source: Questionnaire.

Climate change: 38 grazing practitioners replied to climate changes such as temperature change, rain, floods, and storms, Table (34).

Table 34. Climate change in the study sample area of educators in Matrouh Governorate 2021.

Number of who answered "yes"	Number of who answered "no"
38	0

Source: Questionnaire.

Type of climate change: About 36 breeders replied to a lack of rainfall, 23 grazing practitioners with high temperatures, and 2 grazing practitioner with torrential rains and storms, Table (35).

Table 35. Type of climate change in the study sample area of educators in Matrouh Governorate 2021.

Decreased rainfall	high temperatures	torrents and storms	Other	Total
36	23	2	0	61
59.0	37.7	3.3	0.0	100.0

Source: Questionnaire.

Impact of climate change on the grazing area: 32 replied that there is an impact on the grazing area from climate change, Table (36).

Table 36. Effect of climate changes on the grazing area for the study sample of breeders in Matrouh Governorate 2021.

Number of who answered "yes"	Number of who answered "no"	Total
32	3	35
91.4	8.6	100.0

Source: Questionnaire.

Average financial value of the impact of these climate changes: The answers for most of the sample were that the effect was that the purchase of feed for herd feed was valued at feed, as well as the value of dead animals, the lack of firewood collected, and the death of newborn animals, ranging from 40,000 to 165,000 pounds, according to the value of the purchased feed and the dead animals.

D-1-2-2- Impact of urban or agricultural expansion on natural grazing areas:

Agricultural expansion in the grazing area: It was found that about 19 of the sample members who answered "yes" there was an agricultural expansion in the grazing area, where about 21 of the sample members answered "no" as there was no agricultural expansion in the grazing area, Table (37).

Table 37. Agricultural expansion in the grazing area for the study sample of breeders in Matrouh Governorate 2021.

Number of who answered "yes"	Number of who answered "no"	Total
19	21	40
47.5	52.5	100.0

Source: Questionnaire.

Urban encroachment on grazing areas by construction or roads: About 9 of the sample members who answered "yes" answered that there had been an urban expansion in the grazing area, and about 31 of the sample

members who answered "no" replied that there was no urban expansion in the grazing area, Table (38).

Table 38. Urban encroachment on grazing areas by building or roads for the study sample of educators in Matrouh Governorate 2021.

Number of who answered "yes"	Number of who answered "no"	Total
9	31	40
22.5	77.5	100.0

Source: Questionnaire.

Areas where agriculture has been expanded: The answers were as follows: Wadi Al-Sheqoq, Al-Seqifa, Al-Abbes Center, Awlad Al-Abass and Al-Qasr in Matrouh Center, south and east of Hallazin village, 45 km west of Matrouh, Abu-mzhod, Sidi-Barani center, west of Matrouh, and in this village, 3 nature reserves were made to protect plants, in addition to reclaiming and cultivating some areas to grow barley to feed sheep and animals, and some have responded that agricultural expansion in the grazing area is carried out through local breeders. By planting the barley crop on the rain in order to feed sheep, camels and animals, and it was the Breeder that expanded the agricultural on the pastures so that it would not be dispossessed and not the state.

Value of damage: Through a survey of sample members on the value of damage caused in areas where agriculture has been expanded, most of the sample members answered "I don't know or can't estimate the value of this damage," while others of the sample members, estimated at 81,000 pounds, answered the value of buying feed for three months during which the grazing was supposed to take place in natural pastures, and some answered that the herd and herders had suffered a grazing effort in the Remote grazing areas.

Areas where urbanization was expanded: The answers were as follows: Wadi Al- Sheqoq and Htaawah , north and east of El- Kilo 4 in the area of Al-Seqifa 10 kg north of Morsi Matrouh, south and east of the village of Al-Hallazin west of Matrouh 45 kilometers away, Abumzhoud center Sidi Barani west of Matrouh 120 km and in this village a desalination plant was operated seven years ago and does not work and has not been utilized.

Value of damage: Through a with a question of the sample members on the value of the damage caused in the areas where the agriculture was expanded, the sample members answered as follows, estimated at 81,000 pounds the value of buying feed for three months during which the natural pastures were supposed to be grazed, estimated the value of feed to compensate for the lack and lack of pasture, long walks south and west of grazing, and some answered the movement of herders and herd to remote areas in order to graze.

D-1-2-3- Impact of ecotourism activity on natural pastures:

Practice of ecotourism in the region: As for a with a question of the sample members about whether ecotourism is practiced in the area where it is grazing, a number of sample members answered that about 14 members of the sample who replied that ecotourism is practiced in the region, while about 25 surveyors of the sample responded that ecotourism is not practiced in the region, Table (39).

Table 39. Practice of eco-tourism in the region for the study sample of educators in Matrouh Governorate 2021.

Number of who answered "yes"	Number of who answered "no"	Total
14	25	39
35.9	64.1	100.0

Source: Questionnaire.

Benefits from ecotourism: Six sample members responded with benefits from ecotourism, while some 33 sample members replied that there were no benefits from ecotourism, Table (40).

Table 40. Benefits from practicing eco-tourism activity for the study sample of educators in Matrouh Governorate 2021.

Number of who answered "yes"	Number of who answered "no"	Total
6	33	39
15.4	84.6	100.0

Source: Questionnaire.

Impact of ecotourism on the grazing area: 3 sample members answered "yes", while 30 answered "no", Table (41).

Table 41. Benefits from practicing eco-tourism activity for the study sample of educators in Matrouh Governorate 2021.

Number of who answered "yes"	Number of who answered "no"	Total
3	30	33

9.1	90.9	100.0

Source: Questionnaire.

The causes of the impact: terrorizing animals as a result of the presence of strangers in the grazing area, in addition to causing inconvenience to the herd and the carabi.

Average financial value of ecotourism practice: The estimate of the average financial value of ecotourism practice is limited to: by visits, the total season is not fixed 5 nights 250 pounds per day for a total of 1,250 pounds per season, summer parties only for a limited period of about 300 pounds per day and the journey period of 3-5 days.

Hunting activity in the grazing area: As for a asking of the sample members whether Hunting activity is carried out in the grazing area, some 26 of the sample members who responded "yes" answered that Hunting activity was carried out in the area where I graze, while about 12 surveyors answered "no" and Hunting activity was not carried out in the area where I graze, Table (42).

Table 42. Practice of hunting activity in the grazing area for the study sample of breeders in Matrouh Governorate 2021.

Number of who answered "yes"	Number of who answered "no"	Total
26	12	38
68.4	31.6	100.0

Source: Questionnaire.

Average financial value of Hunting activity: By asking the sample members about the average financial value of Hunting activity, the sample members replied: As a non-permanent activity, quails, birds, yams, moons and wheat are hunted and for domestic consumption because of their low numbers and modest value, hunting Falcon breeding and sale ranges from only 2000-5000 pounds, quail and some birds in the migration season for birds from September to October and be for domestic consumption only, the value of a pair of quail 65 pounds the value of birds per 5 pounds and the value of The lunar pair is about 130 pounds, the value of a bird - a 5 pound dish, a bou jamed - wine - bahnoush 5 pounds, a lunar pair of 25 pounds, a quail pair of

100 pounds, ewes pair 70 pounds, falconry in the range of 50-100 thousand pounds per year, according to the opinion of breeders.

D-1-2-4- Impact of natural pastures on the balance of the ecosystem:

Positive impact of natural pastures on the surrounding environment:

By asking sample members if you see a positive impact of natural pastures on your surrounding environment, about 36 sample members responded "yes" and there is a positive impact of natural pastures on the surrounding environment, Table (43).

Table 43. Positive effect of the presence of natural pastures on the surrounding environment for the study sample of breeders in Matrouh Governorate 2021.

Number of who answered "yes"	Number of who answered "no"
36	0

Source: Questionnaire.

Migratory bird activity in the natural grazing area: As for a asking of the sample members and their questions about the activity of migratory birds in the natural grazing area, a number of approximately 28 sample members who answered "yes" answered that there was activity of migratory birds in the natural grazing area, while about 7 surveyors answered "no" there is no activity of migratory birds in the natural grazing area, Table (44).

Table 44. Positive effect of the presence of natural pastures on the surrounding environment for the study sample of breeders in Matrouh Governorate 2021.

Number of who answered "yes"	Number of who answered "no"	Total
28	7	35
80.0	20.0	100.0

Source: Questionnaire.

Poor use of pastures leads to the degradation of the natural plant in the region: as for a asking of sample members about whether it was noted that poor use of pastures led to the degradation of the natural plant in the area, about 18 sample members who answered "yes" observed that natural plant degradation as a result of poor use of pastures in the area, while about 20 sample members answered "no" and did not notice any plant degradation, Table (45).

Table 45. Bad use of pastures leads to the deterioration of the natural vegetation in the area for the study sample of breeders in Matrouh Governorate 2021.

Number of who answered "yes"	Number of who answered "no"	Total
18	20	38

47.4	52.6	100.0

Source: Questionnaire.

The degradation of the natural plant in the region leads to a deterioration in soil and climate: through asking of sample members did you notice that the degradation of the natural plant in the region leads to a deterioration in soil and climate, a number of sample members about 19 answered "yes", while a number of about 17 sample members answered "no" to about 17 sample members, Table (46).

Table 46. Deterioration of the natural vegetation in the area leads to a deterioration in the soil and climate for the study sample of breeders in Matrouh Governorate 2021.

Number of who answered "yes"	Number of who answered "no"	Total
19	17	36
52.8	47.2	100.0

Source: Questionnaire.

Manifestations of degradation: The response of the sample members is limited to: "The disappearance of plants, low level of silt, soil erosion, movement of sand, lack of varieties and numbers of plants in grazing areas, lack of plant density in grazing areas , severe shortage of varieties and density of plants in pastures due to scarcity of rain and overgrazing, high pastoral density, large numbers of animals, disproportionate numbers of pasture plants and sheep, lack of plant varieties in pasture, disappearance of plants from pastures, dry grazing areas, high temperature, deterioration of grass "Plants, lack of rain, water, sand transport, soil erosion, sand transportation and movement, disappearance of previously existing plants, declining areas of barley cultivation, which affected livestock, strong winds, increased finishing activity due to high gas prices, erosion of vegetation, lack of grazing activity."

Costs of returning pastures (pasture restoration) as they were before the deterioration: the answer of the sample members was as follows: (I do not have sufficient knowledge of the costs but can repeat the experience of establishing pastoral units and the construction of reservoirs and dams to harvest rainwater, the cost of establishing pastoral units so that a number of 2 to 3 units for grazing in each area to reduce the cost of feed, the cost of constructing a tank capacity of 1500 m3 about 30 thousand pounds, the cost of

planting a pastoral unit an area of 15 Feddan about 4500 pounds other than the cost of irrigation wells, value Providing natural gas so that we do not resort to firewood, the value of providing feed support to reduce overgrazing, identifying grazing areas, organizing grazing periods and establishing pastoral units.

D-1-3- Benefits of using natural pastures:

D-1-3-1- Amount and value of benefits from the use of natural pastures in grazing.

Herd number: The results of the questionnaire indicated that the average herd number was about 134.5 sheep, goats and camels, detailed numbers in the financial analysis.

Length of herd breeding: Sample members answer that the herd breeding period ranges from about four months to a year for sheep and goats, and about one to two years for camels.

Price per animal when sold: The sample found that the price of one animal when sold ranges from 1300 pounds to 6000 pounds per head of sheep and goats depending on the age and weight of the animal when sold, the prices of selling sheep: from the age of 3 to 4 months about From 1600 pounds to 1750 pounds and age from 5 to 6 months ranging from 1800 pounds to about 2000 pounds and age 9 - 10 months ranging from 2200 pounds to 2500 pounds and age A year starting from 3000 pounds to about 4000 pounds by weight, while the sale prices of goats from the age of 5 - 6 months about 1750 pounds to about 1900 pounds and the age of 9 - 10 months about 2000 pounds to about 2 400 pounds and a general age ranges from about 2800 pounds to about 3000 pounds and the age of 16 months is about from 3000 pounds to about 3300 pounds while the age of 18 months ranges from about 3300 pounds to about 3500 pounds This is worth one animal, from about 10,000 pounds to about 20,000 geha per head of camels depending on the age and weight of the camel or camel when sold.

Amount of milk per day: As for the amount of milk production per day, the vast majority of the sample members explained that it is used to breastfeed the lambs young, and some answered that sheep are not benefited from milk, but only to breastfeed the young, goats 1 liter per day for 3 months the price of liter ranges from about 5 - 6 pounds, while camels 1 kg per day for 8 months.

Length of milking period: Field indicators of the study sample members showed that the length of milking period is about three to four months for goats and sheep to feed lambs only and during the spring season from March to May, and for the period of camel milking is about a year.

What is the price of milk: By surveying the sample members the approximate price of coffee was the answer as follows. The Milk for the home and feeding the young herd only, milk for raising the herd as breastfeeding, and some stated that it is about 5.5 pounds per liter, and for home consumption only, and milk is not sold, and the sold is not in custom at the region.

Amount of wool and lint per year: The vast majority of the sample members replied that the wool is Worthlessly, the sheep comes from about 3 to about 4 kg wool per year, the sheep of about 3 kg wool per year and the ram about 6 kg wool per year at a price of 1.5 pounds per kilo, ranging from about 450 kilos per year for approximately 100 heads to about 750 kg per year, the ram 6 kg wool/year - sheep 3 kg wool/year Priced at EGP 1.5-2 depending on quality.

Wool and lint price: Through a survey of the sample members on the price of wool and lint, the answer was as follows. Wool and lint are a small and modest price and marketed is difficult, the cost of mowing one sheep wool is 10 pounds when the resulting wool is sold for about 15 pounds and therefore there is no use of wool and lint, and the price of a 45 kg wool quintal ranges from about 80 pounds to about 90 pounds.

Quantity of manure per year: As for the survey of the sample members' opinion on the amount of manure per year, the answer was as follows. Worthless. Grazing takes place in the desert without benefiting from the

manure. The quantity ranges from approximately 130 bag per year for about 100 sheep, and about 70 bag per year for about 50 sheep.

The price of manure: Through a survey of the respondents' opinion about the price of the dung, the answer was as follows. The price of a bag of dung is about 3 pounds.

D-1-3-2- Amount and value of benefits from the use of natural pastures in ecotourism activity:

Acting as a guide in ecotourism as safari or otherwise: By asking whether you have previously worked as a guide in ecotourism as a safari or otherwise, a number of the sample members answered 8 who answered "yes", while a number answered from the sample to about 32 members who answered "No", Table (47).

Table 47. Playing the role of a guide in ecotourism as a safari or other for the study sample of educators in Matrouh Governorate 2021.

Number of who answered "yes"	Number of who answered "no"	Total
8	32	40
20.0	80.0	100.0

Source: Questionnaire.

The value of the wage (for those who did so) in this activity: a number of sample members answered whether he acted as a guide in ecotourism as safari or otherwise and the answer was as follows, few and without pay, about 250 pounds for a period of about 5 days a year, while others answered about 300 pounds a day but this activity is not permanent and is done for a specified number of days during the spring season only, and others answered about 1000 pounds a day Pounds to about 200 pounds per day as a guide but limited days.

Impact of ecotourism on the income of the educator: by asking the sample members about whether ecotourism affects your income as a breeder, the number of sample members was about 4 members of the sample who answered "yes", while the answer was "no" to the number of sample members amounted to about 34 members of the sample. It terrorizes animals but has no negative or economic positive impact, occupying the grazing area and

disturbing the herd and the breeder and thus negatively affecting my income as a breeder, Table (48).

Table 48. Impact of ecotourism on the income of the breeder for the study sample of breeders in Matrouh Governorate 2021.

Number of who answered "yes"	Number of who answered "no"	Total
4	34	38
10.5	89.5	100.0

Source: Questionnaire.

D-1-3-3- Amount and value of the benefits of using natural pastures for Hunting.

Hunting in pastures: By asking the sample members whether you are Hunting in the pastures, the answer was as follows, the number of sample members was about 21 members of the sample who answered "yes", while the number of "no" sample members answered about 15 members of the sample, Table (49).

Table 49. Hunting in the pastures for the study sample of breeders in Matrouh Governorate 2021.

Number of who answered "yes"	Number of who answered "no"	Total
21	15	36
58.3	41.7	100.0

Source: Questionnaire.

Species caught: By asking the sample members what species they are hunting, the sample members answered the following: alseman, birds asafir, yamam, alqamary, albhnowsh, zages, disba, bogamied, khemrh, Albahoush, alnaag, and ornamental birds.

Hunting value: These were the answers of the sample members of the sample, for domestic consumption only, a bird aghas and zages of about 5 pounds, Bo Jamed, Khemara and Al-Hnoush about 5 pounds, alqamary about 25 pounds a alseman of about 100 pounds, a pair of alnaag about 70 pounds, and the value of a pair of birds Decorations range from about 5 pounds to about 6 pounds, about 200 pounds in the whole season, as follows: "40 pounds per day for 5 days in the total season, equal to the value of about 200 pounds per year", Table (50).

Table 50. Value of hunting in pastures for the study sample of breeders in Matrouh Governorate 2021.

bird name	The approximate value of a pair of birds in Egyptian pounds
bird aghas and zages	5

Bo Jamed, Khemara and Al-Hnoush	5
alqamary	25
alseman	100
a pair of alnaag	70
a pair of birds decorations	6 : 5

Source: Questionnaire.

D-1-3-4- Amount and value of benefits from the use of natural pastures to balance the ecosystem:

Other activities such as migratory birds or any other things: By asking the sample members whether there are other activities such as migratory birds or any other things, a number of about 24 of the sample members who answered “yes” answered with “no” a number of It was about 12 of the sample members, Table (51).

Table 51. Other activities such as migratory birds or any other things for the study sample of breeders in Matrouh Governorate 2021.

Number of who answered "yes"	Number of who answered "no"	Total
24	12	36
66.7	33.3	100.0

Source: Questionnaire.

Value of benefiting from it: the answers of the sample members were as follows, Alsaman hunting for domestic consumption, and others answered that he sells about 10 saqour a year worth about 2 to 5 thousand pounds in addition, eating birds, hunting migratory birds: from August to November value (Asfra - Agahas - Desba 5 pounds) (Bo Jamed - Khamra - Bahnoush 5 pounds) (Kamary pair 25 pounds) (Alsaman pair 100 pounds) (Alnaag pair 70 pounds), while others answered the value of benefit for domestic consumption to diminish its value.

D-1-3-5- Amount and value of benefits from the use of natural pastures in other utilitarian activities.

Other activities during grazing: By asking the sample members whether there were other activities during grazing, about 16 sample members responded "yes", while about 18 sample members answered "no." , Table (52).

Table 52. Other activities during grazing for the study sample of breeders in Matrouh Governorate 2021.

Number of who answered "yes"	Number of who answered "no"	Total
16	18	34
47.1	52.9	100.0

Source: Questionnaire.

Value of benefiting from it: As for the value of benefiting from the other utilitarian activities carried out by the breeder during grazing in the natural pastures or any other things, the respondents' answers from the sample members were as follows, hunting for home consumption, and others answered that he shear sheep's wool and get paid on the head Each one is about 10 pounds, and firewood is collected during the fall and winter season to save the value of gas cylinders, which is estimated at about 750 pounds.

D-1-4- Problems and solutions for natural pastures from the point of view of grazing practitioner:

Problems: High prices of medicines, corn and feed, problems of water shortage from July to November, otherwise rain falls and storage for the rest of the year, help digging wells in each area and establishing water storage tanks to help drink animals throughout the year, establishing a number of 2 Pastoral units in each village, the spread of animal diseases, needs activity - harvest - well - reservoir - secret in the valley - taqwa - pesticides - feed - distributed to people barley (carmioch plant) but the Breeder is not convinced by the idea of pastoral units.

Ways to be used to restore pastures to their previous status: the answer was: work wells and dams for harvesting rain to maintain pastures, fortify the herd, support the prices of feed and medicines for animals, support the state and work pastoral units, organize grazing in each area through a council of elders and mayors, identify grazing areas in each area, establish ground reservoirs to store rainwater to help drink animals, establish pastoral units with 3-4 pastoral units in each village at least the area of pastoral unit From about 15 Feddan to about 50 Feddan per area, growing salinity-tolerant plants that are suitable as feed crops, breeding pastoral plants and not ignoring pastures, establishing desalination plants, creating nature reserves to preserve Plant, cultivation of sustainable plant varieties throughout the year, good tillage of pastures when scattering barley, establishment of a subsidized feed plant, provision of gas so that breeders do not take plants as wood, cultivation of pastoral plants in marginal areas that are not suitable for growing barley,

increase Plant density in the grazing yard, the establishment of workshops and seminars for breeders to organize grazing to maintain the state of the pasture, support breeders with barley grains for cultivation because barley is a major feed crop in the region and the remnants of barley cultivation are fed animals during the months of May, June and July, not dumping garbage in the pasture, encouraging the transfer of types of feed from the delta to an offer such as bean adoption, peanuts, the provision of seeds of plants resistant to drought and thirst.

D-2- Official Questionnaire:

The questionnaire contains a range of questions in various areas related to natural pastures, and their opinion was surveyed through a questionnaire form containing that set of axes, which included a number of questions for 6 members of the sample as officials (included: the director of the rangeland research unit, the pasture specialist, the director of the animal production research unit at the Applied Research Center, an agricultural engineer, a plant production specialist, and the director of the support center at the Center for Sustainable Development in Matrouh Resources) and was The results are as follows:

D-2-1- Pastoral units as one of the means of expanding grazing services:

Establishing pastoral units in this area: Through a questionnaire and a survey of sample officials on whether pastoral units were established in the study area, the answers of the entire sample or the approximately 6 "yes" officials indicated that pastoral units had been established in this area, Table (53).

Table 53. Establishment of pastoral units in this area for the study sample of officials in Matrouh Governorate 2021.

Number of who answered "yes"	Number of who answered "no"
6	0

Source: Questionnaire.

Pastoral units have been established in three centres: Matrouh Center and about 40 pastoral units have been established, with an approximate area of

about 25 Feddan per pastoral unit, approximately 40% feed value, and a Sidi-Brani centre and the number of pastoral units. It has about 30 pastoral units with an approximate area of about 25 Feddan per pastoral unit with a feed value of about 40%, and the Salloum Center and the establishment of a number of about 10 pastoral units with an approximate area of unit The pastoral one amounted to about 25 Feddan with an approximate feed value of about 40%. These pastoral units have closed the feed gap, which currently stands at about 20 percent. It is planned to establish pastoral units in the coming period, and is expected to be in the area of Barani, Najla and Matrouh about 2 pastoral units with an approximate area representing about 60 Feddan per pastoral unit, with an approximate feed value of about 30%: approximately 40% for those areas, in addition to Ras al-Hikma in Matrouh, which is numbered in the range of 14 pastoral units in each center with an area of 9 Feddan per unit.

Plant varieties recommended for cultivation according to grazing animals: acacia-al-qatf, halab-persim shagiri, panicum, Shouka plants, owssaj- AAkwl, with an approximate feed value of about 40%.

D-2-2- Role of those responsible for the process of sustainable development of pastures in the study area.

Directorate of Agriculture's improvement and development of pastures in the region: the answers of the sample or the 4-year-old "yes" officials indicated that the Directorate of Agriculture is improving and developing pastures in the region, while only one of the sample members replied "no" that the Directorate of Agriculture did not work to improve and develop pastures in the region.

Improvement, development and cost: protection of these pastures, the provision of qualified scientific staff to work in the fields of agricultural development and the overloading of their expertise and skills, the provision of technical and guidance support through training courses and extension fields and awareness of the dangers of overgrazing, the provision of shelters and planting pastoral shrubs, and financially the cost of such improvement and

development in partnership with some entities or organizations, both at the local and international levels.

Problems and constraints facing pastoral communities, solutions and proposals: Field results were illustrated through the questionnaire and the executive opinion poll on the problems and constraints facing pastoral communities:

- The absence of an institutional and legislative frameworks to regulate grazing and to advancement pastures, pastoral communities and pastoralists.
- Lack of water and lack of rainfall in pastoral areas, leading to overgrazing, with high feed prices.
- Encroachment on pastoral areas and land through agricultural or tourism activities.
- Weakness and modesty of pastoral plant cover, the nature of the soil and its drift as a result of wind activity and the failure to stabilize the pastoral total.
- The lack of regulation of grazing by the pasture, and the absence of veterinary supervision in light of the emergence of some diseases, especially a new disease on animals.

Solutions and proposals for the problems and constraints facing pastoral communities: solutions and proposals from the executive point of view of the problems and constraints facing pastoral communities that can be introduced to re-develop and promote those communities in the following points.

- Enact legislation on grazing, pastoral communities, pastoralists and pastures.
- Enable grazing practitioner to own their land.
- The establishment of water collection wells, through the combined irrigation, the Sustainable Development Centre for Matrouh Resources and the Reconstruction Authority, to drill rainwater harvesting wells, contributing to the cultivation of additional feed to fill the feed gap.

- Training and educating grazing practitioner in regulating grazing properly.
- The state's trend towards supporting grazing practitioner.
- Attention to veterinary care and the work of mobile and stable veterinary units and convoys in pastoral communities.
- Stop agricultural and urban encroachment on pastures, expand the intensification and protection of pastures.
- Make overlapping crops between legumes to raise the value of the pastoral product, regulate grazing and determine optimal pastoral density to stop overgrazing.
- Establishing reserves to define grazing areas and punish those who infringe on them while removing and making sure that there are no encroachments again.

E- Financial Analysis

For the purpose of estimating the economic value of natural pastures, two hypotheses were putted: the first is presence of natural pastures and extent of their use, both in providing part of fodder in addition to making use of firewood and hunting. and ecotourism, and other in the absence of natural pastures, and comparison will be made regardless of other costs such as veterinary care or barn costs and other variables, which are often fixed in presence and absence of pastures, so it is not necessary to include them in the financial analysis. Table (54) shows the cost and revenue items for raising a herd of animals, which consists of 153 sheep, 48 goats, 56 camels for an average of the sample (51.4 animal unit) collected, without the presence of natural pastures, in addition to the presence of these pastures, to arrive at the financial value of using Natural pastures, where the total costs amounted to about 790.7 thousand pounds without the use of natural pastures, while the costs amounted to about 748.4 thousand pounds with the use of natural pastures. The revenue amounted to about 1383.3 thousand pounds without using natural pastures, compared to about 1386.5 thousand pounds, and a net revenue of about 592.6 thousand pounds without using natural pastures,

compared to about 638.1 thousand pounds, and an annual difference of about 45.5 thousand pounds, and 3.79 thousand pounds monthly.

Tables (55, 56) show the financial flows of raising a herd of animals without using natural pastures, and with the use of natural pastures during a period of 10 years. Table (57) shows indicators of financial analysis, which shows that the difference in the net present value amounted to about 363.9 thousand pounds, 18.2 thousand pounds annually, while the difference in the ratio of benefits to costs was about 10%, and the difference in the internal rate of return was about 4.2%.

Table 54. Averages of some variables and costs and revenues for raising a herd of animals without and with the use of natural pastures.

Items			without natural pastures	with natural pastures
Costs				
flock	sheep	No. (An. Unit)	153.4 (30.68)	153.4 (30.68)
	goat	No. (An. Unit)	48.3 (9.66)	48.3 (9.66)
	camels	No. (An. Unit)	56.3 (56.3)	56.3 (56.3)
The period of raising	sheep and goats	month	10.8	10.8
	camels	month	26.0	26.0
The price is the beginning of raising	sheep and goats	pound	1750.0	1750.0
	camels	pound	4500.0	4500.0
The value is the beginning	sheep and goats	pound	352987.2	352987.2
	camels	pound	253125.0	253125.0
Feed	quantity	ton	41.3	27.5
	Price	EGP/ton	4429.0	4429.0
	Value	EGP/ton	182747.6	121831.8
Shearing costs		pound	1841.0	1841.0
Sponsorship costs		pound		14080.0
The cost of restoring pastures	year	pound		4500.0
Total costs		pound	790700.9	748365.0
revenue				
flock	sheep	No. (An. Unit)	153.4 (30.68)	153.4 (30.68)
	goat	No. (An. Unit)	48.3 (9.66)	48.3 (9.66)
	camels	No. (An. Unit)	56.3 (56.3)	56.3 (56.3)
The price is the end of breeding	sheep and goats	pound	3500.0	3500.0
	camels	pound	12000.0	12000.0
The value is the end of raising	sheep and goats	pound	705974.5	705974.5
	camels	pound	675000.0	675000.0
Milk	quantity	Liter/per/day	0.9	0.9
	Price	EGP/Liter	5.7	5.7
	Value	pound	760.7	760.7
Wool	quantity	kg/per/year	3.7	3.7
	Price	EGP/kg	2.1	2.1
	Value	pound	1192.0	1192.0
Sabla	quantity	bag	128	128
	Value	pound	382.5	382.5
Ecotourism	year	pound		775.0
Hunting	year	pound		2182.5
value of firewood	year	pound		200.0
total revenue		pound	1383309.7	1386467.2
net revenue		pound	592608.8	638102.2
The annual difference		pound	45493.4	
The monthly difference		pound	3791.1	

Source: Questionnaire.

Table 55. Averages of some variables and financial flows of raising a herd of animals without using natural pastures.

Year			1	2	3	4	5	6	7	8	9	10
Outflows												
flock	sheep	number	153.4	153.4	153.4	153.4	153.4	153.4	153.4	153.4	153.4	153.4
	goat	number	48.3	48.3	48.3	48.3	48.3	48.3	48.3	48.3	48.3	48.3
	camels	number	56.3	0.0	56.3	0.0	56.3	0.0	56.3	0.0	56.3	0.0
The period of raising	sheep and goats	month	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8
	camels	month	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0
The price is the Beginning of raising	sheep and goats	pound	1750.0	1750.0	1750.0	1750.0	1750.0	1750.0	1750.0	1750.0	1750.0	1750.0
	camels	pound	4500.0	0.0	4500.0	0.0	4500.0	0.0	4500.0	0.0	4500.0	0.0
The value is the beginning	sheep and goats	pound	352987.2	352987.2	352987.2	352987.2	352987.2	352987.2	352987.2	352987.2	352987.2	352987.2
	camels	pound	253125.0	0.0	253125.0	0.0	253125.0	0.0	253125.0	0.0	253125.0	0.0
Feed	quantity	ton	41.3	41.3	41.3	41.3	41.3	41.3	41.3	41.3	41.3	41.3
	Price	EGP/ton	4429.0	4429.0	4429.0	4429.0	4429.0	4429.0	4429.0	4429.0	4429.0	4429.0
	Value	EGP/ton	182747.6	182747.6	182747.6	182747.6	182747.6	182747.6	182747.6	182747.6	182747.6	182747.6
Shearing	pound	pound	1841.0	1841.0	1841.0	1841.0	1841.0	1841.0	1841.0	1841.0	1841.0	1841.0
Total outflows		pound	790700.9	537575.9	790700.9	537575.9	790700.9	537575.9	790700.9	537575.9	790700.9	537575.9
Inflows												
flock	sheep	number		153.4	153.4	153.4	153.4	153.4	153.4	153.4	153.4	153.4
	goat	number		48.3	48.3	48.3	48.3	48.3	48.3	48.3	48.3	48.3
	camels	number		56.3	0.0	56.3	0.0	56.3	0.0	56.3	0.0	56.3
The price is the end of breeding	sheep and goats	pound		3500.0	3500.0	3500.0	3500.0	3500.0	3500.0	3500.0	3500.0	3500.0
	camels	pound		12000.0	0.0	12000.0	0.0	12000.0	0.0	12000.0	0.0	12000.0
The value is the end of raising	sheep and goats	pound		705974.5	705974.5	705974.5	705974.5	705974.5	705974.5	705974.5	705974.5	705974.5
	camels	pound		675000	0.0	675000.0	0.0	675000.0	0.0	675000.0	0.0	675000.0
Milk	quantity	Litter/per/day		0.88	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
	Price	EGP/Litter		5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7
	Value	pound		760.7	760.7	760.7	760.7	760.7	760.7	760.7	760.7	760.7
Wool	quantity	kg/per/year		3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
	Price	EGP/kg		2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1

Year			1	2	3	4	5	6	7	8	9	10
	Value	pound		1192.0	1192.0	1192.0	1192.0	1192.0	1192.0	1192.0	1192.0	1192.0
Sabla	quantity	kg		4121.875	4121.9	4121.9	4121.9	4121.9	4121.9	4121.9	4121.9	4121.9
	Value	pound		382.5	382.5	382.5	382.5	382.5	382.5	382.5	382.5	382.5
Total inflow		pound	0.0	1383309.7	708309.7	1383309.7	708309.7	1383309.7	708309.7	1383309.7	708309.7	1383309.7
net flows		pound	-790700.9	845733.8	-82391.2	845733.8	-82391.2	845733.8	-82391.2	845733.8	-82391.2	845733.8

Source: Questionnaire.

Table 56. Averages of some variables and financial flows of raising a herd of animals with the use of natural pastures.

Year			1	2	3	4	5	6	7	8	9	10
Outflows												
flock	sheep	number	153.4	153.4	153.4	153.4	153.4	153.4	153.4	153.4	153.4	153.4
	goat	number	48.3	48.3	48.3	48.3	48.3	48.3	48.3	48.3	48.3	48.3
	camels	number	56.3	0.0	56.3	0.0	56.3	0.0	56.3	0.0	56.3	0.0
The period of raising	sheep and goats	month	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8
	camels	month	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0
The price is the beginning of raising	sheep and goats	pound	1750.0	1750.0	1750.0	1750.0	1750.0	1750.0	1750.0	1750.0	1750.0	1750.0
	camels	pound	4500.0	0.0	4500.0	0.0	4500.0	0.0	4500.0	0.0	4500.0	0.0
The value is the beginning	sheep and goats	pound	352987.2	352987.2	352987.2	352987.2	352987.2	352987.2	352987.2	352987.2	352987.2	352987.2
	camels	pound	253125.0	0.0	253125.0	0.0	253125.0	0.0	253125.0	0.0	253125.0	0.0
Feed	quantity	ton	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5
	Price	EGP/ton	4429.0	4429.0	4429.0	4429.0	4429.0	4429.0	4429.0	4429.0	4429.0	4429.0
	Value	EGP/ton	121831.8	121831.8	121831.8	121831.8	121831.8	121831.8	121831.8	121831.8	121831.8	121831.8
Shearing	pound	pound	1841.0	1841.0	1841.0	1841.0	1841.0	1841.0	1841.0	1841.0	1841.0	1841.0
Sponsorship costs	year	pound	14080.0	14080.0	14080.0	14080.0	14080.0	14080.0	14080.0	14080.0	14080.0	14080.0
The cost of restoring pastures	year	pound	4500	4500.0	4500.0	4500.0	4500.0	4500.0	4500.0	4500.0	4500.0	4500.0
Total outflows		pound	748365.0	495240.0	748365.0	495240.0	748365.0	495240.0	748365.0	495240.0	748365.0	495240.0
Inflow												
flock	sheep	number		153.4	153.4	153.4	153.4	153.4	153.4	153.4	153.4	153.4
	goat	number		48.3	48.3	48.3	48.3	48.3	48.3	48.3	48.3	48.3

Year			1	2	3	4	5	6	7	8	9	10
	camels	number		56.3	0.0	56.3	0.0	56.3	0.0	56.3	0.0	56.3
The price is the end of breeding	sheep and goats	pound		3500.0	3500.0	3500.0	3500.0	3500.0	3500.0	3500.0	3500.0	3500.0
	camels	pound		12000.0	0.0	12000.0	0.0	12000.0	0.0	12000.0	0.0	12000.0
The value is the end of raising	sheep and goats	pound		705974.5	705974.5	705974.5	705974.5	705974.5	705974.5	705974.5	705974.5	705974.5
	camels	pound		675000	0.0	675000.0	0.0	675000.0	0.0	675000.0	0.0	675000.0
Milk	quantity	Litter/per/day		0.88	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
	Price	EGP/Litter		5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7
	Value	pound		760.7	760.7	760.7	760.7	760.7	760.7	760.7	760.7	760.7
Wool	quantity	kg/per/year		3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
	Price	EGP/kg		2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
	Value	pound		1192.0	1192.0	1192.0	1192.0	1192.0	1192.0	1192.0	1192.0	1192.0
Sabla	quantity	kg		4121.875	4121.9	4121.9	4121.9	4121.9	4121.9	4121.9	4121.9	4121.9
	Value	pound		382.5	382.5	382.5	382.5	382.5	382.5	382.5	382.5	382.5
Ecotourism	year	pound		775	775.0	775.0	775.0	775.0	775.0	775.0	775.0	775.0
Hunting	year	pound		2182.5	2182.5	2182.5	2182.5	2182.5	2182.5	2182.5	2182.5	2182.5
value of firewood	year	pound		200	200.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0
Total inflow		pound	0.0	1386467.2	711467.2	1386467.2	711467.2	1386467.2	711467.2	1386467.2	711467.2	1386467.2
net flows		pound	-790700.9	845733.8	-36897.8	891227.2	-36897.8	891227.2	-36897.8	891227.2	-36897.8	891227.2

Source: Questionnaire.

Table 57. Financial analysis indicators for raising a herd of animals without using natural pastures.

Indicator	NPV Thousand pounds	NPV annual Thousand pounds	B/C	IRR
without pasture	**3108.4**	**155.4**	**1.47**	**61.6%**
With pasture	**3472.4**	**173.6**	**1.57**	**65.9%**
difference	**363.9**	**18.2**	**0.10**	**4.2%**

Source: Questionnaire.

Summary

Natural rangelands are considered an essential source of elements for preserving livestock in the world, but what the planet has witnessed in terms of severe climatic changes, water scarcity, rain scarcity, desertification and overgrazing all led to the deterioration of rangelands and weak vegetation cover, which negatively affected animal production.

The rangelands in the Arab Republic of Egypt are considered despite the deterioration they suffer from due to several factors, including the environment, such as the low rates of the amount of rain falling on the rangelands, as well as climate change, drought and salinity, in addition to following some bad human and administrative behaviours such as overgrazing and cutting wood and other factors that led to the deterioration rangelands in Egypt, however, are considered one of the most important natural renewable fodder resources because they provide the bulk of the low-cost fodder resources for livestock, in addition to their importance in soil maintenance and water conservation in addition to their role in supporting wildlife and maintaining ecological balance and other benefits that are difficult to financially estimate.

The people of Matrouh also suffer from a lack of rangelands and dryness due to the lack of rain and their damage to the purchase of fodder at a very high price, which led to the sale of some sheep to buy fodder, to feed the rest of the herd and raising the cost of selling one head and raising the price of meat, other than its impact on the quality of sheep, because it is not the same as the quality of natural rangelands.

Within the framework of the implementation of the HERD project, which aims to promote the rehabilitation and sustainable management of rangelands, in order to provide ecosystem services and protect biodiversity in Egypt and Jordan, and stimulate expansion at the regional and international level. So, This study is part of the UNEP-GEF funded project “Healthy Ecosystems for Rangeland Development (HERD): sustainable rangeland management strategies and practices” the output 1.2.2 cost-benefit analysis of

sustainable rangeland management policies and practices using economic methodologies.

UNEP is conducting the Economics of Ecosystems and Biodiversity for Agriculture and Food (TEEBAgriFood) study, which seeks to bring together scientists, economists, policymakers, business leaders, and farmers organizations in order to undertake a comprehensive economic evaluation of agricultural systems, practices, products, or policy scenarios against a comprehensive range of impacts and dependencies across the value chain. The study will seek collaboration options with the TEEBAgriFood initiative.

The study depends on the information obtained from the governmental agencies, economic statistical and social studies related to the scope of the study and in line with its objectives. In addition, it depended mainly on the information gathered, with the help of stakeholders' questionnaire, which was in harmony with the study objective, from studied samples and communities. It depends on personal meetings with various stakeholders. Several meetings with researchers' staff, traders, herders are of quite gain in drawing the outlines of the study and planning the final policy options.

It has depended on Breeders (Herders) questionnaire it included four axes: sample database of elements associated with natural pastures, factors affecting the natural pastures, benefits obtained from the use of natural pastures and problems and solutions for natural pastures from the point of view of breeders. And it has depended on officials questionnaire it included two axes: pastoral units as one of the means of expanding the pastoral services and the role of the authorities responsible for the process of sustainable development of the pastures in the study area. In addition to Rapid Rural Appraisal.

The SWOT analysis has been used is an analytical method that helps in determining the points of weakness and strength, and in realizing the type of threats and the nature of the available and affecting opportunities in a particular organization or sector.

The PESTEL analysis was also used: a tool used to analyze and monitor the external marketing environmental factors that affect a particular

organization or sector, and the external factors that may change in the future, in order to exploit these changes as opportunities, or to find solutions to potential threats better than competitors.

Financial analysis measures such as Net Present Value (NPV), Cost Benefit Ratio (B/C), Internal Rate of Return (IRR) were also used.

The most important results were as follows:

The current situation:

Matrouh province is found to be characterized by a unique location and a promising future, located in the northwest corner of the Arab Republic of Egypt, the total area of the province is about 166563 km^2 representing about 16.6% of the area of Egypt. It turns out that Matrouh province is administratively divided into several centers, cities and villages, and the number of centers has about 8 administrative centers are the center and city of Hammam, Al-Alamein, Dabaa, Morsi MataroH, Najila, Sidi Barani, Salloum, Siwa.

Where the reins planted in the province reached about 354362 Feddan, while the crop area reached about 392717 Feddan, and the total area of vegetables amounted to about 43,719 Feddan (11.13%), and the area of field crops amounted to about 214129 Feddan (54.53%), and the area of fruit About 134869 Feddan (34.34%) during the period (2019/2020), with about 5,425 local fattening calves, while female cows accounted for about 11,730 local heads and about 297 About 297529 heads were imported, goats reached about 49,444 heads, about 7,739 were camels, and about 3,476 animals were in the country during the year 2020.

The data also indicated that the total output of red meat was about 1947 thousand tons/year, while the production of white meat reached about 4785 thousand tons/year, as of January 1, 2020. The total number of poultry farms was about 1,058, with about 9 livestock massacres and a total livestock massacre capacity of about 11.3 thousand tons/year of livestock, and about 16 veterinary units.

SWOT analysis:

The most important strengths, weaknesses, opportunities and threats were identified, which were extracted from the results of the analysis of questionnaires, interviews, discussion panels and field observations as follows: it shows the importance of pastoral resources in Matrouh governorate, the diversity of the plant species present in the pasture, the expansion of the area of pasture lands, the diversity of livestock and the importance of the potential in it, which would obtain many different pastoral products such as dairy, wool, lint and organic fertilizer in addition to the practice of the hunt activity , and then improving the food and environmental security situation in Egypt in general and Matrouh in particular, as well as improving the living conditions of the pastoral communities. This is due to its deterioration and the shrinkage of the area of pastures and consequently the decline in the standard of living of pastoral communities, in addition to a large percentage of dependence on fodder, as well as the increase in its prices. The lack of coordination between government institutions and the bodies responsible for grazing.

PESTEL analysis:

it turns out that Egypt enjoys political stability, which encourages the development and sustainability of pastures. From an economic point of view, pastures provide good job opportunities and a great source of income for pastoral communities. As for social factors, the tribal system prevails in those communities, and therefore coordination with the elders of those tribes must be made in any procedures related to pastures and taking into account their customs. And their traditions, as shown by the migration of most of the youth of those societies, and from the technical side, it is preferable to plant varieties of (Acacia, picking, and sapling alfalfa) in the grazing units to be worked, and the area of each unit is from 25-50 acres to provide a pastoral load commensurate with the numbers of animals, in addition to the necessity of expansion in the construction of dams and rainwater harvesting tanks to meet the needs of the population of the pastoral community of water and irrigation of pastoral units and about the environmental factors, it has been found that climatic changes have led to a rise in temperatures and a lack of rain recently,

in addition to the extension of the dry season, which helped the encroachment of sand, which led to soil erosion Therefore, it was necessary to develop a strategy to overcome these challenges and lay the foundations, laws and legislations to achieve management, development and sustainability of pastoral resources and communities in Matrouh and to consolidate and coordinate joint institutional work in this field.

Questionnaires:

The importance of using the sample in this study increases due to the multiplicity and spread of the area of natural pastures in most of the border governorates in the Arab Republic of Egypt, so it was necessary to take a sample so that it is accurately representative of the community and then generalize the results to the study community as a whole. The Matrouh governorate was chosen, as it is located in the Northwest Coast region, where the area of natural pastures is about 4 million feddans out of the area of natural pastures in the Arab Republic of Egypt ،which amounts to about 11 million feddans, and it has large numbers of cattle and sheep, as well as many production projects. animal .The questionnaire included a set of questions in various fields related to natural pastures, and their opinion was surveyed through a questionnaire containing a set of axes that included a number of questions for about 40 educators.

As for the sample areas, it reached about 3 centers and the sample included three centers :Morsi Matrouh, Sidi Barani, and Al-Najila .Which included 11 villages distributed among the three centers, which are as follows, Halazin, Awlad Merhi, Al Qasr, Awlad Al Abs, Saqifat Al Bahariya, Hattawa, Wadi Al Shoukuk in the center and city of Marsa Matrouh, and the villages of Abu Mazhoud, Shammas village, Al Khor in the Sidi Barani center, and Mathani Al Bahariya in the Najila Center. **And that the age group of educators** : the number of the first group under the age of 30 was about ،11 and the second group was from the age of 30 to under 50 years of age, and it amounted to about 18, while it reached about 11 educators of 50 years of age and over. And there are 10 breeders whose main profession is pastoralism, and

about 7 breeders whose main profession is a agriculture and breeder with , and about 12 of the respondents who work in grazing as a basic profession, and those who carry out the task of grazing in addition to the other work of 11 .

The plants present in the area at the present time: al-qatf, acacia, tshash, ajram, ararr, sheeh, awraq El-shieh, azm, eqheahwan, baatran, Ashbet El-Arnab, El-temear, searhaet El-kabsh, al-zabih, El-rabi, brceim shujairy, haozan, El-bahwaar, dajis, abo-aterin, as well as natural pastoral plants that It grows on the rain such as: El-sheeier, Al-shalttam, hadal, matnaan, Al-khobza, al-kzhah, Shaara, aashbet shajjara, Krisha, suret Kabsh al_kamh, serhat al-kabsh, Arboud, bselh Howahi, Lsls, Al-Ba'atran, Al-Tahrija, Al-Nafal, Giza, nwar, Jahwan, aashbet al-zabih, El-bazoun. in the area In general, open grazing is practiced . It was also found that the pastures are insufficient during the dry season, and fodder is used during that period. And it turns out that the best seasons for grazing are spring and about one to two months from winter when it rains. The sample agreed that they do not depend on natural pastures only, and that sheep and animals are fed by purchasing fodder from the market and from agricultural residues, and that the Agricultural Society provides only about 5 tons of subsidized fodder. It was found that the most important fodder used on which they depend to compensate for the shortage of pastures during the drought period is a mixture of fodder and grains, whose price ranges from about 5000 pounds to about 6400 pounds per ton, and the second type of fodder in importance, the cothb in ranging in price from 2700 pounds to 6200 pounds per ton.

found that sheep and goats prefer acacia - tree clover - chrysanthemums - picking - shamrocks - dabeeh - Shaltam - pruning olive trees - pruning almond trees - fig leaves (palm) - Ajram - Hataba (chasing) - Aldbah - Baking - clover materials - Acacia - Al-Dabih - ram's navel - Arboud - Wormwood - Al-Azm, as for the preference of camels for the plants of the pleasant region - Al-Halab - Al-Dabbah - Al-Khabeez - clover materials - Acacia - Al-Dabieh - Shaltam - Al-Qatif - Al-Qalifa - and most plants and camels eat most Weeds with lower amounts of feed compared to sheep and goat. The value of the daily

wage for grazing ranged from about 67 pounds to 160 pounds per day in the grazing season .About 38 educators answered that there are changes in the climate such as change in temperature, rain, torrential rain and storms .And that there is an impact on the grazing area from climatic changes. **The average financial value of the impact** resulting from climatic changes is represented in the value of purchasing the fodder needed to feed the herd, and it ranges between about 40,000 to 165,000 pounds, and bears the value of the dead animals**.** And that the activity of hunting is not permanent and is for home consumption .And that there is a positive effect of the presence of natural pastures on the environment surrounding the breeders .

As for the **costs of restoring the pastures as they were before the deterioration** ،they do not have sufficient knowledge of the cost, but the experience of constructing **pasture** units and constructing reservoirs and dams to harvest rainwater can be repeated. Also, the cost of planting a 15-feddan pastoral unit is about 4500 pounds, excluding the cost of irrigation wells. **It was found that the period of raising the** herd ranged from about four months to a year for sheep and goats, and about one to two years for camels . **the price** of one animal when sold ranged from 1300 to 6000 pounds for a head of sheep and goats, depending on its age and weight, and from 10,000 pounds to about 20,000 pounds for a head of camels, according to age and weight .Where it became clear that milk is used to breastfeed young children, while some answered, it amounts to about 15 kilos of goat milk per day x 10 pounds .As for sheep, milk is not benefited from, but only for feeding young children, as it became clear from the respondents that wool and dung were not used. The method that can be used to restore the pastures to their previous condition :is to make wells and dams to harvest rain to maintain the pastures and support the prices of fodder and medicines for animals, organizing the grazing process in each region through a council of sheikhs and mayors of Matrouh, the state designating areas for grazing in each region ،establishing ground tanks to store rainwater To help the animals drink ،create at least 3-4 pastoral units in each

village. The area of the pastoral unit is not less than about 15 feddans to about 50 feddans for each area .

While the **officials' questionnaire** included a number of questions for 6 of the officials of the pastoral units and animal production in the Matrouh governorate, the study area ،pastoral units were established in this area in three centers: the Matrouh Center, the Barani Center ،and the Salloum Center. About 40, 30, and 10 pastoral units were established, respectively, with an area The approximation is about 25 feddans for one pasture unit, and the fodder value is approximately 40% .The percentage of filling the fodder gap of these pastoral units is currently about 20% .It is planned to establish pastoral units during the coming period, and it is expected that there will be about 2 pastoral units in the Barani ،Al-Najila and Matrouh area, with an area of approximately 60 feddans for one pastoral unit. These pastures provide qualified cadres to work in the fields of agricultural development and provide technical and extension support through holding training courses and extension fields and raising awareness of the dangers of overgrazing.

Problems and obstacles facing pastoral **societies** ،such as the absence of institutional and legislative frameworks necessary to regulate grazing and to promote pastures and pastoral communities, lack of water and lack of rain, and the absence of veterinary supervision .And that the solutions and proposals from the point of view of the executives that can be adopted for the restoration, development and advancement of those pastoral societies are represented in 1- Enacting legislations concerned with the field of grazing, pastoral societies ، pastoralists and pastures -2 .Establishing water harvesting wells, through the cooperation of irrigation officials, the Center for Sustainable Development of Matrouh Resources and the Construction Authority, to dig rainwater harvesting wells, which contributes to planting additional fodder to bridge the forage gap . Training and educating educators to organize grazing in the right way .The state's tendency to support educators .Establishing reserves, defining grazing areas and punishing those who infringe on them, while removing them and ensuring that there will not be any infringements again .

Financial analysis:

The difference in using natural pastures and not using them for the net annual revenue is about 45.5 thousand pounds, and the monthly is about 3.79 thousand pounds. The difference in the net present value amounted to about 363.9 thousand pounds, 18.2 thousand pounds annually, while the difference in the ratio of benefits to costs was about 10%, and the difference in the internal rate of return was about 4.2%.

Appendix

A- Questionnaire

A-1- Breeders Questionnaire:

governorate:	**Center:**	**the village:**
The data collector		

The first topic: a database of elements associated with natural pastures:

First: Personal data about the grazing practitioner:

1- Shepherd	
2- age	
3- Primary profession	
4- Number of years of experience in pastoral practice	
5- Education level	Illiterate ( ) read and write ( ) average ( ) above average ( ) College qualification ( )

Second: Data on the characteristics of the grazing area and the types of grazing plants:

6 -What types of plants are Currently in the area?	7- What types of plants were there in the area in the past?

8- What type of grazing is practiced in the area? Open ( ) periodic ( ) other ( )

9- Is the pasture sufficient in the dry season? Yes ( ) No ( )

10- What is the current state of the pastures in the region at the present time?

Excellent ( ) Good ( ) Average ( ) Bad ( )

11- What was the current state of the pastures in the area in the past?

Excellent ( ) Good ( ) Average ( ) Bad ( )

12- What are the best grazing seasons?

Autumn ( ) winter ( ) spring ( ) summer ( )

13- How long is the grazing season?

Autumn ( ) winter ( ) spring ( ) summer ( )

14- Do you rely on natural pasture only? Yes ( ) No ( )

15- If not, from where is the feed shortage filled?

Purchase from the market ( ) Agricultural Residues ( ) other ( )

16- If you depend on some feed, what is it?

Feed types	Estimate		
	Quantity	Price	Value

17- What types of plants do animals prefer in the area?

seasons / the animals	Autumn	Winter	Spring	Summer	Average value of savings in feed
Sheep					
goats					
The Camels					
cows					

18- Are there plants unpalatable to animals in the area?

Yes ( ) No ( )

19- If the answer is yes, what are the types of these plants?

A. ……
B. ……
C. ……

Third: Data on the grazing herds in the region:

20- What types of animals were grazing in the area at the present time?	21- What types of animals were grazing in the area in the past?

22- Ownership type of the grazing herd:

Types of grazing animals	Holding type		
	Own	Sharing	Another
sheep			
goat			
Camel			
cows			

23- If you are wage earner, what is the value of your daily wage?

24- What is the value of the daily wage for a pastoralist in the area?

The second axis: the factors affecting on the natural pastures:

First: Data of climatic changes and their impact on the grazing area:

25- Have there been any natural disasters in the area previously?

Yes ( ) No ( )

26- If the answer is yes, what is it?

Flood ( ) drought ( ) fire ( ) other (Mention)

27- What is the impact of these disasters on the state of nature in region?

Animal mortality - soil uncovering - soil erosion - deterioration of grazing state - other (Mention)

28- Is there a change in climate: temperature - rain - torrential rain and storms?
Yes ( ) No ( )

29- If the answer is yes, what is the type of change?

Decreased rain rates - high temperatures - torrential rains and storms - other

30- Have climatic changes affected on the grazing area?

Yes ( ) No ( )

31- If yes, what is the average financial value of the effect resulting from these changes?

Disasters	Average of financial value	Disasters	Average of financial value
Heavy rains and floods		fire	
Dryness		Other - Mention	

Second: The impact of urban or agricultural expansion on the natural grazing areas:

32- Has the agricultural expansion been done in the grazing area? Yes ( ) No ( )	33- Was the urban encroachment on the grazing areas by building or roads? Yes ( ) No ( )
34- What are the areas in which agricultural expansion has taken place?	35- What are the areas in which agricultural expansion has taken place**?**
36- Damage value	37- Damage value

Third: The impact of ecotourism activity on natural pastures:

38- Have ecotourism practiced done in the area in which you graze?

Yes ( ) No ( )

39- Are there benefits return for you from practicing ecotourism?

Yes ( ) No ( )

40- Does ecotourism have a positive or negative impact on the grazing area?
Yes ( ) No ( )

41- If the answer is yes, why?

42- Average financial value of ecotourism practice:

43- Is hunting activity practiced in the grazing area? Yes ( ) No ( )

44- Average financial value of hunting activity:

Fourth: The effect of natural pastures on the ecosystem balance:

45- Do you see a positive impact of the presence of natural pastures on the environment around you?

Yes ( ) No ( )

46- Is there an activity for migratory birds in the natural grazing area? Yes ( ) No ( )

47- Have you noticed that the bad use of pastures leads to the deterioration of the natural vegetation in the area?

Yes ( ) No ( )

48- Have you noticed that the deterioration of the natural vegetation in the area leads to a deterioration in the soil and climate?

Yes ( ) No ( )

49- If the answer is yes, what are the manifestations of deterioration?

A……

B……

C……

50- What is the cost in your estimation to restore the pastures as they were before the degradation?

The third topic: the benefits obtained from the use of natural pastures:

First: The quantity and value of the benefits from the use of natural pastures for grazing.

51- How many grazing herds?	52- How long is the period of raising a herd?	53- What is the price of one animal when it is sold?
54- How much milk per day?	55- How long is the milk period?	56- What is the price of milk?
57- How much wool and lint per year?	58- What is the price of wool and lint?	59- How much is the organic fertilizer per year?
60- What is the price of the organic fertilizer?		

Second: the quantity and value of benefits from the use of natural pastures in the activity of ecotourism

61- Have you previously played the role of a tour guide in eco-tourism, such as a safari or otherwise?

Yes ( ) No ( )

62- If yes, what is the value of your wages (or who did it) for this activity?

63- If yes, what is the value of your wages (or who did it) for this activity?

64- Does ecotourism affect your income as a breeder? Yes ( ) No ( )

Third: The quantity and value of the benefits from the use of natural pastures for hunting:

65- Do you hunting in the pastures? Yes ( ) No ( )

66- If yes, what species do you hunt?

67- Approximately what is the value of this hunting?

Fourth: Quantity and value of benefits from the use of natural pastures to balance the ecosystem.

68- Are there other activities such as migratory birds or any other things?

Yes ( ) No ( )

69- Approximately what is the value of benefiting from it?

Fifth: Quantity and value of benefits from the use of natural pastures in other beneficial activities.

70 - Are there other activities that you do while grazing?

Yes ( ) No ( )

71- Approximately what is the value of benefiting from it?

Fourth Axis: Problems and solutions for natural pastures from the point of view of breeders:

72- If the pastures are degraded, what is the method that can be used to restore the pastures to their previous state?

A. .....
B. .....
C. .....

A-2- Officials Questionnaire:

- Responsible Name: **- Position:**

- **The first topic: the pastoral units as one of the means of expanding the grazing services.**

1- Were pastoral units established in this area? Yes ( ) No ( )

2- If yes, what are the regions?

Area	Number of units	Approximate area	Approximate feed value

3- Has part or all of the fodder gap been filled? Yes ( ) No( )

4- If the answer is yes, what is the percentage of filling the fodder gap?

5- Is it planned to establish pastoral units during the coming period? Yes) (No ( )

6- If the answer is yes, what are the areas from your point of view?

Area	Number of units	Approximate area	Approximate feed value

7- What plant varieties do you recommend planting according to grazing animals?

Animals	Plant Varieties That Should Be Cultivated	Approximate Feed Value
Sheep		
Goats		
The Camels		
cows		

- **The second topic: the role of the authorities responsible for the process of sustainable development of the pastures in the study area**

8- Has the Directorate of Agriculture improved and developed the pastures in the region? Yes ( ) No( )

9- If the answer is yes:

N	The type of improvement or development	approximate cost of it
1		
2		
3		

10- What are the problems and obstacles facing pastoral societies, and what are the solutions and proposals from your point of view?

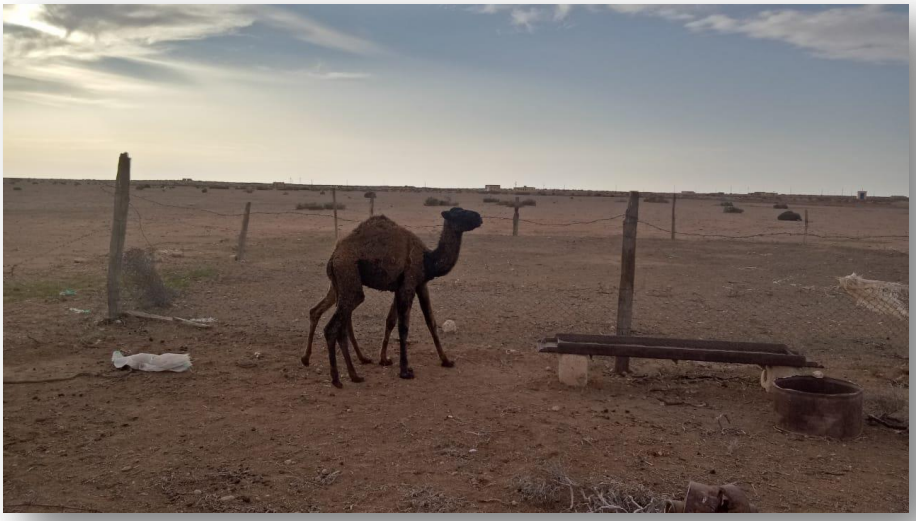
N	problems and obstacles	solutions and suggestions
1		
2		
3		
4		
5		

A-3- Discussion Form:

1. What are the benefits obtained in the case of selling some of the herd per year?
2. What are the benefits obtained in the case of selling the dairy production per year?
3. What are the benefits obtained in the case of selling wool and lint production per year?
4. What are the benefits obtained in the case of selling the organic fertilizer production per year?
5. What types of fodder do you buy? And their prices?
6. Do you rely on natural pasture only?
7. From where is the fodder shortage filled?
8. What are the benefits obtained from ecotourism?
9. What are the benefits obtained from hunting activity?
10. Is there an activity for migratory birds in the natural grazing area?
11. Was the agricultural expansion done at the expense of the pastures in the area?
12. Was the urban expansion at the expense of the pastures in the area?
13. What is the impact of natural disasters in the region?
14. What is the impact of climate change on the region?
15. What is the extent of the damage resulting from urban or agricultural encroachment?
16. Has the Directorate of Agriculture improved and developed the pastures in the area?
17. Do you want the country to pay more attention to the issue of ecotourism?
18. What is the extent of the family members' contribution to the herding profession?
19. What tribes are grazing in the area?
20. Do you want the state to enact laws to protect natural pastures from overgrazing?
21. Do you want the state to enact laws to protect natural pastures from agricultural encroachment on them?
22. Do you want the state to enact laws to protect natural pastures from urban encroachment?
23. What is area that should be established as pastoral units?
24. What are the plant varieties that should be planted in the pastoral units?

B- Photos

B-1- Pictures of some rangeland, plants and animals in Matrouh



B-2- Pictures of some plants in Matrouh:

El-Sakran herb عشبة السكران

Abu Mazhoud area

a poisonous tree that is not preferred by rangeland animals

Dendritic Clover البرسيم الشجيري

Among the preferred plants for rangeland animals, and therefore among the plants targeted for cultivation in pastoral units

Acacia shrub شجيرة الاكاسيا

Among the preferred plants for rangeland animals, and therefore among the plants targeted for cultivation in pastoral units

بانيكام banikam

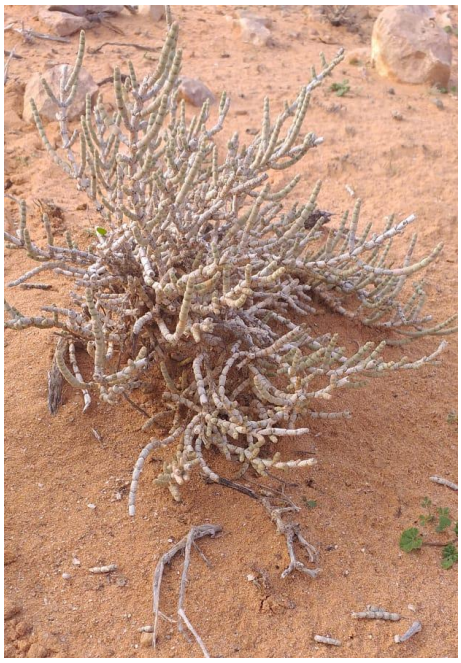
Among the preferred plants for rangeland animals, and therefore among the plants targeted for cultivation in pastoral units

الحلابEl-Halab

Australian El-Cuttfقطف استرالى

Among the preferred plants for rangeland animals, and therefore among the plants targeted for cultivation in pastoral units

Ajramعجرم



A picture of camels in the pasture grazing on the Ajram plant, about 30-40 km southwest of Abu Mazhoud

Tshash تشاش

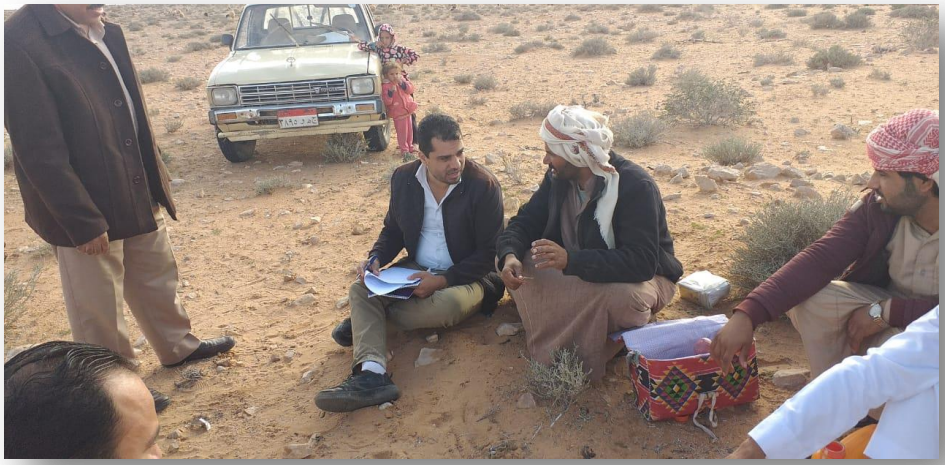
American El-Cuttfقطف امریکی

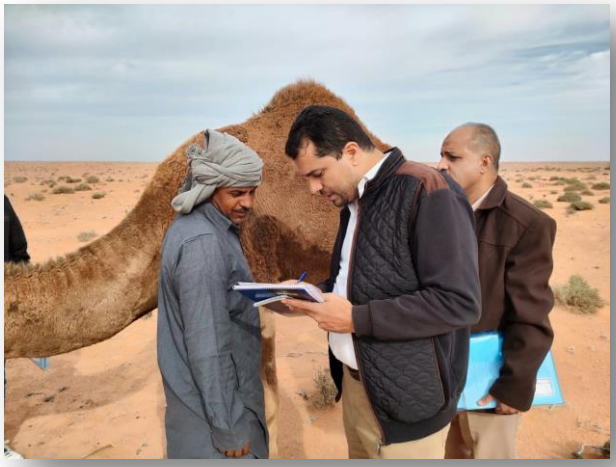
Among the preferred plants for rangeland animals, and therefore among the plants targeted for cultivation in pastoral units

B-3- Pictures of some Encounters in Matrouh


الوحدة المحلية
قرية أبو مزهود


الوحدة المحلية
لقرية أبو مزهود






الوحدة المحلية
لقرية أبو مزهود


وحدة بحوث المراعى
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وحدة بحوث المراعي
Range Management Research Unit


مركز البحوث التطبيقية
Applied Research Center


Decomax

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