جائزة خليفة الدولية لنخيل التمر والابتكار الزراعي
KHALIFA INTERNATIONAL AWARD FOR DATE PALM AND AGRICULTURAL INNOVATION

AEC
Egyptian Agricultural Export Council

Egypt's Climatic map of the most important date palm Cultivars

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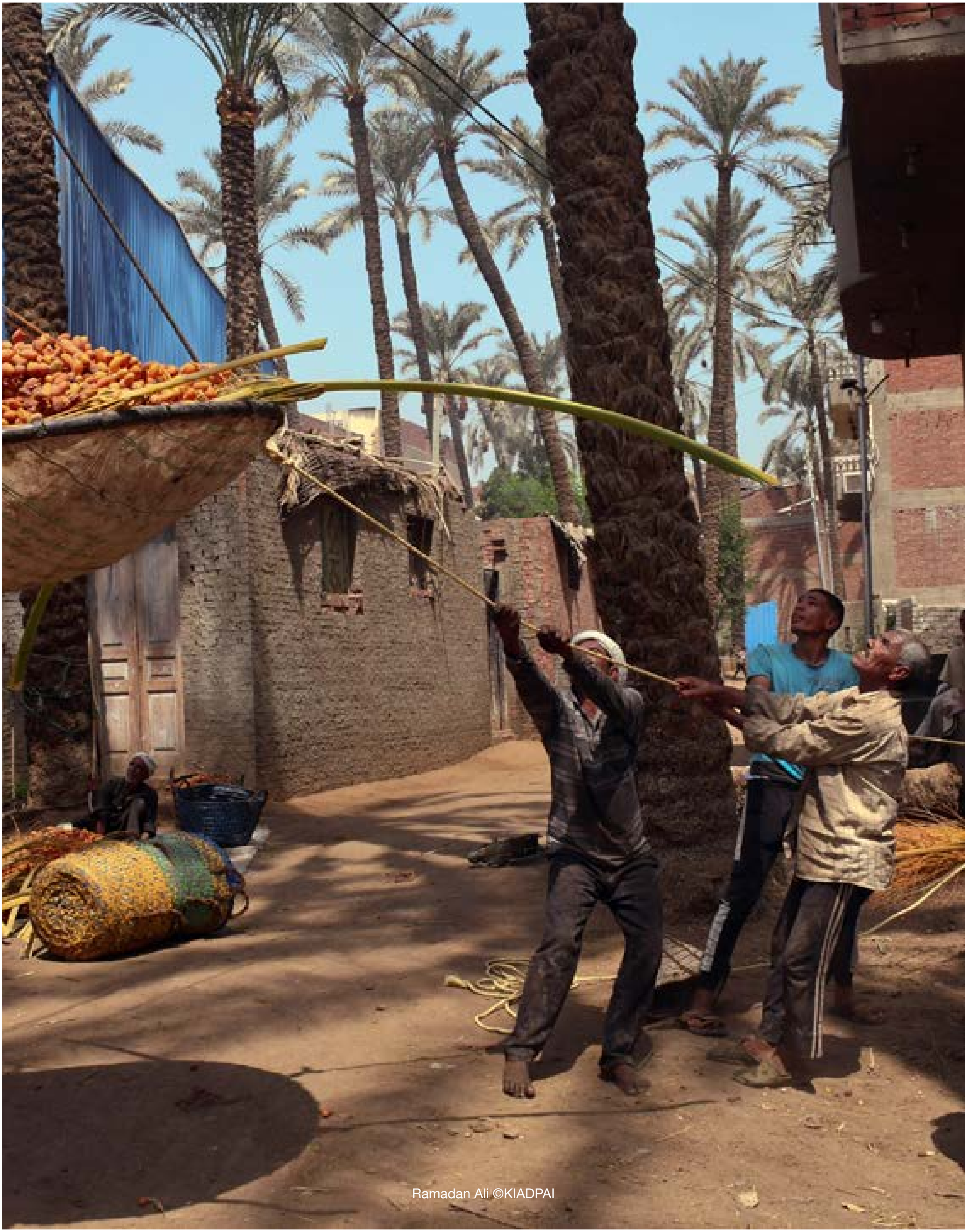
Dedication

To all date palm lovers in:

- Egypt,
- Arab world, and
- other date producing countries...



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Egypt's Climatic map
of the most important date palm cultivars

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Agricultural Export Council in the Arab Republic of Egypt, and the Khalifa International Award for Date Palm and Agricultural Innovation in the United Arab Emirates.

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International Book Classification Number:

NMC Printing Permit: MC-03-01-1001181

ISBN (Printed Book): 978-9948-806-54-7

ISBN (E-Book): 978-9948-806-55-4

© Design and Direction by:

Media Center Khalifa International Award for Date Palm and Agricultural Innovation.

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http://www.AEC-Date-Palm-Comittee.com

Or visit the website of the Agricultural Export Council

https://www.aecegypt.com

Or visit the website of the Khalifa International Award for Date Palm and Agricultural Innovation

www.kiaai.ae

REQUIRED CITATION:

El-Sharabasy, S.F; Rizk, R; and El-Shirbeny, M. (2022). Egypt's Climatic map of the most important date palm cultivars. Agricultural Export Council in the Arab Republic of Egypt, and the Khalifa International Award for Date Palm and Agricultural Innovation.

The English version of the book was launched during the 27th International Conference of the States Parties to the United Nations Framework Convention on Climate Change (COP27), held in Sharm El-Sheikh, Arab Republic of Egypt, 06-18 November 2022.

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TERMS, SYMBOLS AND ACRONYMS

Blunt: having converging straight edges that form an angle of more than 90°.

Climate change: means a change in the climate that is directly or indirectly attributable to human activity that leads to a change in the composition of the global atmosphere, which is observed, in addition to the natural variability of the climate, over similar time periods.

Cylindrical: Rod-like and two to three times as long as wide.

Early harvest: is the collecting of ripe fruits from date palm at early time of season.

Emarginate: Shape is with a shallow notch at the apex.

Fadden: Agricultural area units equal to 4,200.83 square meters or 0.42 hectares.

Falcate: curved like.

Intermediate harvest: is the collecting of ripe fruits from date palm in the middle of season.

Late harvest: is the collecting of ripe fruits from date palm at late time of season.

Obovate: Having a length about 1.5 times the width, and widest above the centre.

Obtuse: having converging rounded edges that form an angle of more than 90°.

Optimum heat limits: The heat needs that the plant achieves the highest level of growth, flowering and fruiting. These heat **limits vary.** There are lower and upper limits, and they differ according to the stage of growth and the cultivar.

Ovate: egg-shaped, with wider portion at base, ovate in all sections through long-axis.

Retuse: having a blunt (obtuse) and slightly notched apex.

Ton: one ton equal 100 kilogram.

Truncate: Cut off squarely; having an abruptly transverse end.

During the preparation of the climatic map of the most important varieties of date grown in the Arab Republic of Egypt, many individuals cooperated with the work teams, and the process included contributions from farm owners, engineers and individuals working in the field of date palm cultivation. Therefore, the work team extends its sincere thanks to all the collaborators, especially:

- Dr. Ahmed Ragab Mohamed, Mandisha farm, Bahariya Oasis, Giza.
- Dr. Hafez Khalil Hassan, Aswan farm, Aswan.
- Dr. Khader Mahmoud Muhammad Ali, Beer Sheikh Ali Farm, Kharga, New Valley.
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Preface

Encouraging Arab investments in date palm cultivation and maximizing its added value

H. E. El Sayyed El Qaseir
Minister of Agriculture and Land reclamation
ARAB REPUBLIC OF EGYPT

The date crop in Egypt is considered a strategic crop, as Egypt currently occupies the first place at the global level in terms of production by 18% of the global production of dates, and the first at the Arab level by about 24% of the Arab production of dates. Statistics confirm the existence of a continuous increase in the number of dates. Total and fruitful palm trees in all date-producing governorates of Egypt. (The most important of which are: New Valley, Aswan, Giza, Sharkia, Buhaira, Damietta, Matrouh, North Sinai) to reach approximately 15 million fruit trees producing more than 1.7 million tons of dates with a high average productivity exceeding (115) kg per palm, starting from The ministry has sought to develop the infrastructure for this sector and encourage investment in order to achieve added value for the production, marketing and export of Egyptian dates at the national, regional and international levels. Where the Ministry of Agriculture attaches great importance to the date sector, as it is one of the promising sectors to achieve economic growth, increase exports, create new job opportunities, and achieve community and sustainable development.

His Excellency Abdel-Fattah El-Sisi, President of the Arabic Republic of Egypt, directed the implementation of the largest date farm in the world in Toshka - Aswan Governorate, 181 km from Lake Nasser, where the soil is rich and free of pollutants, which makes it ideal, as 23 thousand acres were cultivated out of the total area specified by 62%. The implementation of this giant project comes within the framework of signing a joint protocol between the Ministry of Agriculture and the National Service Agency, to grow more than 50 of the most important varieties of palm trees that fall within the famous types of Arab dates in the world, to be cultivated in Aswan Governorate, among these varieties are {Al-Barhi – Al-Majhoul – Al-Saqai - Al-Shishi - Al-Numeishi - Al-Khalas - Al-Sukari - Ajwa Al-Madina - Al-Anbara ... and others}

The Arab Republic of Egypt is characterized by the variability of climatic conditions and their variation in temperature and atmospheric humidity, which are essential factors in determining the optimal locations for each variety of date and date palms in terms of suitability for geographical and climatic regions to achieve the highest productivity in quantity and quality. Different thermal units required for each variety, as well as for each stage of fruit growth to obtain a production that conforms to the quality specifications in its home country or higher than it, as large numbers of local varieties of dates and dates are grown in Egypt, which are spread throughout Egypt, such as {Zaghloul – Samany – Amhat – Sewi (Saedi) – Gondeila - Bartamouda – Sakkouti ... etc.}.

As a result of the current climate changes that occurred in the world and the weather phenomena associated with them, and the changes that occurred with the emergence of droughts and hurricanes resulting from global warming. The importance of climatic studies and their basic role appeared when setting an agricultural policy, especially with its impact on the quality of the palm crop, the quantity, and the relationship of maturity and condition of the fruits to the climate and the vegetative and fruiting growth of the palm.

Therefore, studying the climatic needs of varieties and linking them with future data and expectations regarding climate changes and their development in order to control and define areas for expansion in palm cultivation and the extent to which the areas are suitable for the different varieties targeted for expansion in order to provide the necessary information for investors and palm growers to achieve maximum crop production with optimal use of available resources where there is currently what is known as the belt It is the most suitable for a good and distinct crop. It is located between latitudes 16 - 27° north of the equator, while palm trees are generally grown between latitudes 10 - 40° north of the equator.

The book contains 26 varieties of the most important varieties of dates and dates cultivated in the Arab Republic of Egypt, which differ in their needs of thermal units and relative humidity from one region to another depending on each variety. Excellent and good quality grade. As for the studied cultivars, they belong to three groups according to the following: the wet cultivars group, the semi-dry/half moist cultivars group and the dry cultivars group.

The Ministry of Agriculture is very keen to support scientific research to develop the date palm cultivation and date production sector and push the investment wheel to enhance the competitiveness of Egyptian dates at the national, regional and international levels.

We take the opportunity to address the brothers in the sisterly United Arab Emirates and the General Secretariat of the Khalifa International Award for Date Palm and Agricultural Innovation with great thanks and appreciation for the continuous support for the development and development of the infrastructure for the palm cultivation sector and date production in the Arab Republic of Egypt and the date-producing countries, by organizing a series of Festivals, exhibitions, international conferences, and distinguished scientific publications that contributed to uniting the efforts of all concerned parties, improving reputation, increasing demand, and enhancing the competitiveness of Arab dates in international markets.

Encouraging Arab investments in date palm cultivation and maximizing its added value

ENG. AHMED SAMIR SALEH
MINISTER OF TRADE AND INDUSTRY
ARAB REPUBLIC OF EGYPT

The Arab Republic of Egypt is the largest date producer in the world, with a productivity of more than 1.7 million tons, which represents approximately 18% of the volume of global production, and 24% of the volume of Arab production. Therefore, Egypt pays great attention to the date cultivation sector within the framework of efforts aimed at developing the promising industrial and export sectors with the great competitive advantage, as the date palm cultivation sector in Egypt represents one of the most promising sectors to achieve sustainable industrial and community development, create job opportunities, improve producers' income, contribute to achieving food security and increase exports.

Within the framework of the date cultivation development strategy in the Arab Republic of Egypt prepared by the Ministry of Trade and Industry in cooperation with all concerned national and international organizations, and with the follow up of Khalifa International Award for Date Palm and Agricultural Innovation, United Arab Emirates. The Egyptian Ministry of Trade and Industry is implementing an integrated program to develop the date palm cultivation throughout the supply management and value chains of this sector, with a focus on transferring and applying modern technologies and good practices in all stages of the value chain to maintain high quality and maximize added value, as well as expanding the production of export items of high market value that would increase exports by providing technical support services and the necessary studies to assist in establishing modern factories, rehabilitating existing factories, obtaining international quality certificates, developing products, linking industry to sources of scientific research, raising the efficiency of human resources, participating in international exhibitions, inviting importers from the most promising countries in local fairs and festivals, and preparing studies to promising markets, as well on export incentives.

Egypt is considered among one of the best countries in the world for planting different date varieties due to the country's wide area and the availability of suitable climatic conditions for the production of wet, semi-dry and dry dates, whether they are early, medium or late ripening, and also for the availability of production elements from arable lands, technical expertise, human cadres and trained workers at an appropriate cost, in addition to Egypt's unique geographical location, and its free trade agreements that link Egypt with the European Union, the Mediterranean Basin, Arab countries, Africa, the Maghreb, Turkey and South America, which increases international competitiveness, in addition to the availability of a large growing local market, due to the annual increase in the population and also the increasing awareness of the consumption of dates throughout the year because of their high nutritional and health value, and the expansion of date use and their factories in general.

Egypt is currently constructing the largest date production project in the region on an area of 38,000 acres that includes 2.3 million date palm trees of Egyptian and Arab varieties of high marketing value, including the establishment of refrigerated and frozen storage facilities, sorting and packaging stations, and various production lines to achieve maximum benefit and work to maximize the added value.

In light of the ongoing expansion to establish many specialized investment farms that apply international quality systems in all parts of the value chain, and in light of the climatic changes that the world is facing, it is important to develop a geographic-climatic map for the cultivation of various varieties of date palms in Egypt, and to determine the best areas for cultivation of each category in terms of weather conditions such as heat, humidity, rain and wind and the extent of the impact of those weather factors, environmental conditions and soil and water on the quality on the production of these varieties with high quality according to their thermal needs as a start for developing an investment map on a scientific basis for date palm cultivation and date production in Egypt in areas suitable for future expansion.

The Ministry of Trade and Industry in the Arab Republic of Egypt calls for the integration of Arab efforts, the exchange of technical expertise, the encouragement of joint Arab investments in the field of date palm cultivation, the maximization of added value, and the removal of obstacles, as Arab countries produce more than 78% of the global production volume, and contributes to more than 60 % of the global trade in dates, as it is under study to establish joint logistic areas specialized in storing, packaging, manufacturing and exporting of dates, as well as joint entities to export Arab dates.

In conclusion, I am pleased to extend my sincere thanks and appreciation to the United Arab Emirates and Khalifa International Award for Date Palm and Agricultural Innovation, for the continuous support to serve this blessed tree in all parts of the Arab world, and to develop this promising sector by organizing festivals, conferences, competitions, scientific seminars and scientific publications, to shed light on this important sector, unify the efforts of all concerned parties, and extend the bonds of cooperation to larger areas by supporting the rehabilitation of the largest number of date factories, the establishment of refrigerated and frozen storage areas, and working on building ongoing fruitful cooperations.

Investment Map

Prof.Dr. Abdelouahhab Zaid
Secretary General of the Khalifa International Award for Date Palm and Agricultural Innovation

The Near East and North Africa region is considered the original home of date palm, whereas people's spiritual connection with the palm tree is deeply rooted, and the tree as such is an integral part of the local culture in this region. It is the majestic tree which bears the weather's harsh conditions throughout the year. Its dates are the healthy food that includes all the nutritious ingredients for human body. We are all aware of the importance of date palm and its fruits and the economic, social, heritage importance it represents, this is not to mention the necessity of exploiting dates and by-products in successful investment projects.

A look at the Arab world production of dates which exceeds 70% of the average of the world production and at the number of planted palm trees which constitute 80% of the total number of palm trees in the world would reveal the importance of the Arab serious work and the thoughtful future vision to maintain and invest in the date palm sector.

In spite of the success of some investments in the date palm sector, yet the focus in these investments and the suggestion of the investment strategic plans at the Arab level are still below the desired level because the traditional methods in producing and marketing are the most prevailing whereas the advanced technologies in food production are still very limited. Moreover, the Arab region is still lacking the strategy of effective production and promotion of dates and their products.

In its turn, the General Secretariat of Khalifa International Award for Date Palm and Agricultural Innovation, has sensed the importance of date palm trees and dates in its various research, marketing, manufacturing and productive aspects and the obstacles this sector faces that hinder its benefit in agricultural investments to support the economies of date growing countries.

Although there are some successes achieved here and there in the Arab region, nevertheless we are all aware of the problems this sector faces which need the cooperation of all concerned scientists and researchers in order to study its problems and solve them and also to develop the dates production and manufacturing channels.

The emergence of international economic obstacles and the liberation of international trade within the framework of the World Trade Organization (WTO) would lead to the opening of international markets before Arab dates and their derivatives, which will increase the degree of competition, a fact which necessitates the raising of the marketing and productive efficiency, decreasing production cost and increasing the quality of products and adherence to international standards. All this requires the increase of the exerted efforts by the public and private sectors in the various stages of date palm production and marketing.

Hence the importance of the Award's General Secretariat role to support the production of the "Climatic map of the most important commercial dates varieties in the Arab Republic of Egypt" book, to be a witness to the importance of investing in this sector and a guide to the new investor in choosing the best commercial varieties, and the best agricultural areas for growing this or that variety. With the aim of maximizing the benefit and increasing the yield in order to achieve an added value to the quality of Egyptian dates in the local and international markets.

A promising vision for the future of the dates sector in Egypt

Mr. Abdul Hamid El Demerdash

Chairman of the Agricultural Export Council

Since time immemorial, date palm trees have occupied a distinguished position in Egyptian agriculture. Egypt ranks first in the world in the production of dates, with its huge wealth of palms ranging between 13-15 million fruitful palm trees, but it occupies a lagging position in the field of dates international exports. There are several challenges facing the date export sector in Egypt, and we count on benefiting from the great interest that the dates sector is currently receiving from all concerned authorities in the country, especially the political leadership, and the development efforts that the country is currently undertaking to advance this sector and the boom it is witnessing The sector is currently in the date palm plantations within the framework of the 5 million palm trees project under the auspices of His Excellency the President of the Republic, to produce dates for export purposes. This national project aims at producing high-value dates as one of the most important productive and export sectors promising to achieve sustainable economic and community development, reflecting the increase in global demand Dates and the high nutritional benefits of such fruits.

Since the date palm cultivations spread in all parts of the Arab Republic of Egypt from its southernmost point in Aswan to Rasheed on the Mediterranean coast in the north, and the multiplicity of varieties that are grown in the Governorates of the Republic in addition to a number of new varieties that are recently introduced into Egypt, which must be It is cultivated according to the appropriate environmental and climatic conditions to produce high-quality fruits and achieve maximum production with an optimal use of available resources. Since the climatic conditions with their various elements are the most important natural factors affecting agricultural crops, including date palm plantations and their impact on the flowering process, pollination process, fruit set, speed of growth and early maturity in addition to its impact on the fruits quality.

Since the Agricultural Export Council is one of the national arms to support and develop the agricultural export sector, of which dates are one of the most important pillars, and in light of what we have seen from the possibility of raising the economic value of Egyptian exports if more efforts are made in order to raise the exports of Egyptian dates, and based on the role of the Council to support the success of these efforts for the development of the Egyptian dates sector, the Council took the initiative to establish a committee for date palms and adopted a strategy to revive the culture of exporting dates at all stages of supply and supply chains, and began the thought of reorganizing investments in the date palm and dates sector in Egypt. There is a need to design a categorical map of the cultivable dates varieties in Egypt and the appropriate geographical places for them, as well as suitable places for the future expansion of the cultivation of date palm new varieties, which are compatible with the effects of climatic changes and ends with the full investment map for the production and export of dates as a step aimed at rationalizing and maximizing the cultivation of date palm in Egypt.

In light of the new partnership between Khalifa International Award for Date Palm and Agricultural Innovation from the United Arab Emirates, and the Agricultural Crops Export Council, which began preparing this book, “The Climate Map for the Most Important Date Varieties in the Arab Republic of Egypt,” which is an investment map for those wishing to invest in this sector in the best way that they can to achieve the maximum benefit and economic feasibility.

Where the book aims to lay the practical and methodological foundations to enhance investment opportunities in the Egyptian date palm sector, by clarifying the vision about the geographical distribution of palm production areas and the most appropriate areas in which the cultivation of the various most important types of export dates takes into account the type Soil, climatic fluctuations and environmental factors that help reach the highest possible results, taking into account the study and improvement of the supply chain and then maximizing the investment return, which ultimately aims to achieve what the Council aims to achieve to maximize Egyptian date exports and access to various export outlets and global markets.

At the end, I would like to extend my sincere thanks to all those who contributed to the production of this book because of its great importance to serve the date palm sector in Egypt in the coming years, as well as the export of dates.

A tree with roots in history

Mr. Ali Abu Al-Saba

Director General of the International Center for Agricultural Research in the Dry Areas (ICARDA)

Date palm trees, a promising sector in the Arab Republic of Egypt, which represents the first producer of dates in the world, according to the statistics of the Food and Agriculture Organization, where production reached 1.69 million tons annually, coming from 15 million palm trees.

The date palm is a tree that goes down in history and has enabled over the years to provide food for the inhabitants of dry and desert areas. It is a bi-dwelling tree. The male bears male flowers, and the female bears female flowers. The farmers realized from ancient times to the possibility of its propagation through the shoots produced by the palm throughout its life, which range from between 4 and 40 seedlings, and this vegetative propagation was the secret behind the existence of the currently recognized varieties, which differ from one country to another and from one oasis to another. This propagation with offshoots enabled the stabilization of genetic traits and thus obtaining varieties such as Al-Barhi, Mejhoul, Deglet Al-Nour and Al-Sukari...On the other hand, the farmers dealt with the stallions in a different way, as the stallions were multiplied mostly by seed, and as a result the existing stallions are a genetic mixture, each stallion is different from the other.

There are two important factors that determine the presence of a suitable variety in the appropriate area, which are the thermal needs of the variety and its compatibility with the climatic conditions of the region, and the second factor concerns the relative humidity in the air and its suitability with the needs of the fruits of the variety to reach the required quality. This book, the first of its kind in this field, is distinguished by identifying the varieties that can be cultivated in each region. It also responds to the urgent need to map the varieties in each palm producing country.

The urgent need now appears to develop a map of the varieties, especially in light of the millions of palms produced by tissue culture techniques, which are introduced to the countries of palm production (including the Arab Republic of Egypt) without knowing the areas where the fruits are good, and also when we know that the palm is produced after four years of planting and can be This is a big loss just because there is no such map of items by regions.

From here comes the importance of this precedent represented by this book, which we are sure will be useful and fruitful for the expansion of the varieties, especially the commercial ones, supplied through the techniques of propagation by tissue culture, which have a great return in the global markets, through which it is possible to make a big leap in the export of dates, especially of the varieties Like Mejhoul and Barhi and others.

Mitigating the negative effects of climate change

Dr. Nasr El Din El Obeid

Director General of the Arab Center for Studies of Arid Zones and Dry Lands “ACSAD”

In the beginning, I am pleased and honoured to extend a sincere greeting from the heart and conscience, full of love, respect and pride to the United Arab Emirates, its loyal and proud people, a wise and rational leadership, and a history full of many achievements and great gifts witnessed by this country, under the leadership of H.H. Sheikh Mohammed bin Zayed Al Nahyan, President of the United Arab Emirates, “May God protect him”, where Khalifa International Award for Date Palm and Agricultural Innovation, is one of the honors of this country, serving as the executive arm of development of the date palm cultivation and date production sector at the national, regional and international levels, where we have found a large collection of works and achievements at the regional level that we are proud of and cherish such as the series of International Date Palm conferences, the series of Arab date festivals, and the series of development projects in a number of Arab countries, which It has actively contributed to the development of this sector and the achievement of Arab food security, in addition to the series of strategic studies, and the series of scientific publications that enriched the Arab Scientific Library in this field, the latest of which was this important book “The Climate Map of the Most Important Dates Varieties in the Arab Republic of Egypt”, issued by the General Secretariat of Khalifa International Award for Date Palm and Agricultural Innovation, the Egyptian Ministry of Agriculture and the Export Council for Agricultural Crops in the Arab Republic of Egypt, as we are honored to participate in a brief word in this book, which will help investors and decision makers to choose the right cultivation place, time and environmental conditions for each variety of dates in the Arab Republic of Egypt. We also highly appreciate the interest of His Excellency President Abdel Fattah al-Sisi, President of the Arab Republic of Egypt, in planting 5 million date palms in the Toshka project, which will enhance the high position occupied by Egypt in the production of dates globally, these and other projects at the Arab level contribute effectively to the absorption of greenhouse gases and reduce the negative effects of climate changes.

On this occasion, we are honored to present some of the contributions of the Arab Center for the Studies of Arid Zones and Arid Lands (ACSAD), in the development of date palm cultivation and production in the Arab region, believing in the importance of this blessed tree for Arab food security, and its role in mitigating the negative effects of climate changes in the Arab region, which gives the palm tree greater importance and role in stabilizing Arab food security, and encourages the expansion of its cultivation to increase green spaces in the Arab region. ACSAD’s efforts have borne fruit on the establishment of the Palm Research and Development Network in the Arab States during the period (1994-2002), which issued more than 33 different studies on palms and contributed to the study of the agricultural systems of the palm cultivation areas and the assessment of the economic and social repercussions of the technical obstacles facing the palm sector in the Arab countries. It is worth mentioning that the Arab Center Organization “ACSAD” puts in your hands all its capabilities and expertise to expand the cultivation of palms and date production in the Arab countries to contribute to the achievement of the Sustainable Development Goals, and keep pace with global trends to adapt to climate change and mitigate its negative effects, and is deeply proud of the partnerships that ACSAD has with the General Secretariat of the Award and with regional and international organizations and high-level coordination with them in this regard.

A promising sector to support food security and promote development

Dr. Reda Shibli

Executive Secretary of the AARINENA Association

I am pleased to thank Khalifa International Award for Date Palm and Agricultural Innovation for its valuable efforts and many achievements in the field of date palm, especially in publishing the “Climate Map for the Most Important Date Varieties in the Arab Republic of Egypt”, book which will be of great importance, in which a lot of efforts have been made in order to develop an investment framework New for the future of the cultivation and industry of dates in the Arab Republic of Egypt, which will serve as a very important reference for every expert, investor and researcher in the field of date palm cultivation and production and processing of dates.

The production of Arab countries represents about 7.3 million tons of various types of dates, representing 75% of the global production of dates, which is estimated at more than 8.6 million tons. Arab countries export more than 65% of the quantity of dates marketed internationally. Recent years have also witnessed a significant expansion in palm cultivation and date production throughout the Arab world, especially the Hashemite Kingdom of Jordan, the Kingdom of Morocco and the Arab Republic of Egypt. This was accompanied by an increase in the global demand for Arab dates as a result of the increased reputation and spread as a result of a series of date festivals organized by the General Secretariat of Khalifa International Award for Date Palm and Agricultural Innovation, in a number of Arab countries over the past decade. This requires work to restructure this sector and support it with scientific research and qualitative initiatives in order to maximize the added value of Arab dates in general, hence the importance of this book (the climate map of the most important varieties of dates grown in the Arab Republic of Egypt).

On the other hand, the date palm in the Arab Republic of Egypt is considered a strategic crop, as Egypt is currently ranked first in the world in terms of production quantity (by 17.7% of global production of dates), and first at the Arab level (by up to 23% of Arab production for dates), although it is not the first in the Arab world in the number of fruitful palms, and statistics confirm a continuous increase in the number of total and fruitful palms in all the Governorates of Egypt that produce dates (the most important of which are: New Valley, Aswan, Giza, Sharkia, Beheira, Damietta, Matrouh, North Sinai) to reach to approximately 15 million date palm trees producing about 1.6 million tons of dates with an average productivity of more than 105 kg per tree, with the increase in the areas occupied by date palm trees as a result of new investments in palm and date projects, the most important of which is the national project to establish the largest date palm farm in the world on an area of 40,000 feddans in Toshka, which includes more than 2.5 million new palm trees. The Arab Republic of Egypt pays great attention to the dates sector as it is one of the most promising sectors to achieve economic growth, increase exports, and create new job opportunities, and to achieve community development.

Towards high quality Date Palm production

Eng. Khaled El-Haggan

Chairman, Date Palm Committee at AEC

Two elements are necessary for the production of high-quality Date Palm fruits: 1- Climate suitability to the selected Date cultivar, and 2- the suitable good agriculture practices to the cultivar and the farm environment. In other words, the climate plays a major role in the production of high-quality Date Fruits, and consequently, the selection of where to plant which cultivar becomes a major decision for new investors. In addition, understanding the impact of climate on the production of existing planted cultivars would help in adopting different/better agriculture practices to obtain the desired high quality Date fruits.

From a different observation, the random sporadic horizontal expansion of Date Palm plantation in Egypt has led to fragmented, incomplete, un-integrated, and incompetent components of the Date Palm supply chain. Both facts above have led to the necessary requirements for a scientific, well though of, justified, and integrated Date Palm supply chain investment map. This became an important target for the Date Palm Committee at the Agricultural Export Council to fulfill and deliver to all Date Palm stakeholders in Egypt.

Two years ago, when the Date Palm Committee (DPC) at the Egyptian Agriculture Export Council (AEC) was created, I was honored to be selected to chair it. A new strategy was born to achieve the Date Palm ambitious goals that suit Egypt, as the largest producer of Date Palm in the world. One of the important axes of this strategy is the development of a Nationwide Date Palm Investment Map that guides all new investment in the integrated Date Palm Supply Chain to obtain the highest Date fruit quality, increase export, highest possible return on investment, best operation, and best integration of all components of supply chain. The base of this Investment map is the climatic map of the Date Palm cultivars in Egypt. This climatic map is now produced and will be presented in this book and in the new Date Palm Committee website very soon. A dream came true.

An excellent team was selected to develop this map based on scientific measures and accurate climatic data for 26 Date Palm Cultivars. The selected team is best in class, each in his professional capacity and scientific accomplishments. Many surprises came up with the progress made with the map: new areas were found suitable for specific cultivars, better plantation classifications for these varieties, and most important what quality of Dates fruits can be obtained based on climatic data only. In other words, a real breakthrough in what to plant where? And for which Date Palm quality?

Khalifa Award for Date Palm and agricultural innovations was supporting from day one to the importance of this Date Palm Cultivars climatic map. Their contribution to the success of this map and to the creation of this document is instrumental for tis success. Khalifa award professional team has spent excellent efforts and time to produce this climatic map in its best offer to the Date Palm stakeholders.

A great thank you to the Development and editing Team, to Khalifa Award's management and staff, and to the Date- Palm Committee at AEC for producing this important Date Palm Cultivars climatic map, both in excellent scientific content and professional presentation. Their contribution will always be remembered in the success of producing high quality Date Palm fruit in Egypt.


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Chapter 1

Introduction

1.1 An overview of using date palm by ancient Egyptian

The relationship between the ancient Egyptians and all the elements of the environment was based on the rational use and preservation of natural resources as well as the optimum utilization of natural resources.

The scenes on the ancient Egyptian tombs and temples, as well as the texts written on the papyrus, confirm that the ancient Egyptians respected and appreciated all natural resources such as, the Nile, agricultural land, plants and animals.

The ancient Egyptian practices related to natural environmental resources are emphasizing the sustainability that assesses the building of the ancient Egyptian civilization that astonished the world until now.

Date palm (Phoenix dactylifera L.) has grown in Egypt since Date palm (Phoenix dactylifera L.) has grown in Egypt since the early times of the ancient Egyptians. "Palm" tree is considered one of the oldest planted in Egypt. Large quantities of dates were found in the tombs of the pharaohs, which they left on the walls of their tombs and temples.

The date palm has several hierographic names, including «Bono» or «Fono», «Benret» and «Benri». Dates were also mentioned in the inscriptions of the tomb of «Nefer Maat» in Meidum from the Fourth Dynasty as «Benert», which means sweetness, an ancient name unique to the ancient Egyptian language. It was also called «Ammt», and perhaps the same word for dates called «Amhat» (Nazir, 1968).

The word "balah" is one of the common words in the Egyptian dialect, and its roots go back to the ancient Coptic language with the word "balhul" which means dates. As for the name "balah" in the Arabic language, it is the plural of "balaha". It is the fruit of the date palm before it ripens, as long as it is green and round.

Ancient Egyptians used dates as food items, and they extracted from soaked dates a kind of wine, and it was used in mummification because it contained alcohol. They used leaves, trunks, and fronds for the production of mats and baskets, and also the nucleus was used in medical prescriptions, and necklaces and ornaments were made of the same dates for the blessing of women and girls. Sandals were made from their fronds.

Palm fronds are one of the most important plants distinguished for New Year's Eve. The green palm fronds symbolized the beginning of the year because it expresses the renewed life as it comes out from the heart of the tree. The ancient Egyptians used to seek blessings from it and make ornamental braids that hang on the doors of houses and carry them as well to be placed in Cemeteries. Dry dates are distributed as charity for the souls of their dead people. This custom remains until now, especially in Upper Egypt, as they used to make different types of amulets and pendants from fronds that people carry to renew life in the new year.

Tomb of peshedu (son of Menna and Huy), peshedu drinking from a Canal. «https://assets.pinterest.com/ext/embed html?id=545568942358279737»


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1.2

Challenges of climate change

Climate change, according to the definition of the Intergovernmental Panel on Climate Change (IPCC), is the difference, whether in the average state of the climate, variation, or in its persistence for a long period, which is usually decades or more. It includes increases in temperature (global warming), sea level rise, changes in rainfall patterns, and an increase in the frequency of extreme weather events.

Climate change can be attributed to natural internal processes or external influences such as changes in solar cycles and volcanic revolutions, as well as continuous anthropogenic changes in the composition of the atmosphere or land use.

It should be noted that the United Nations Framework Convention on Climate Change (UNFCCC), in the first article, defines climate change as It is "a change in the climate that is directly or indirectly attributable to human activity that leads to a change in the composition of the atmosphere, which is added to the natural variability of the climate, over similar periods.

Thus, the Convention distinguishes between climate changes that are attributable to human activities that modify the composition of the atmosphere and the climate variability caused by natural causes.

The Intergovernmental Panel on Climate Change (IPCC) has asserted in its Fourth Assessment Report that the world is undoubtedly warming where temperatures increased by 0.3-0.6°C during the 19th century while the increase was between 0.2°C and 0.3°C during the past 40 years (IPCC, 2017).

In addition, the IPCC predicts that, for the southern and eastern Mediterranean, warming over the 21st century will be larger than global annual mean warming – between 2.2-5.1°C according to a realistic emissions scenario (Scenario A1B). In the same period of time, annual precipitation rates are likely to decrease 10% by 2020 and 20% by 2050. The report also provides a comprehensive analysis of how climate change is affecting natural and human systems. The concern is increasing about the likely implications of climate change on poverty, economic growth, ecosystem services, livelihood opportunities, and overall human development.

Climate change is a challenge that requires comprehensive and multi-sectorial action, including in the agricultural and food systems, Such measures should be fully taken into account in relation to international goals and agreements, such as the Sustainable Development goals for 2030 and its internationally agreed goals related to sustainable development, the Rio Declaration on Environment and Development, and the Paris Agreement.

As mentioned in the latest reports issued by the Intergovernmental Panel on Climate Change, Agricultural and food systems must become more resilient to the current and future impacts of change climate, by learning from good practices in order to advance transformative adaptation policies, plans and measures.

In order to adapt to climate change and mitigate its effects as well as achieve resilience in agricultural and food systems against climate change, in parallel with the pursuit of sustainable development goals, especially the eradication of hunger and malnutrition.

There is an urgent need to address climate change, as the number of people facing hunger will reach between 720 and 811 million in 2020 (FAO Report 2021) and the already tangible impacts of climate change and extreme weather events affect food security, nutrition and poverty.

Current analyzes indicate that hunger and all forms of malnutrition will not be eradicated by 2030 unless measures are taken to accelerate progress, particularly in order to sustainably increase agricultural productivity and incomes., Addressing inequality in access to safe and nutritious foods for healthy eating patterns, meanwhile accelerating climate action

Given that the sustainable development of the date's sector in Egypt faces many challenges. The most important of which are climatic changes, which negatively affect the productivity of dates and their quality if they do not take the necessary measures to limit their impact within the framework of the relevant sustainable development goals. This includes approaches of agro-ecology, sustainable agricultural production and value chain development.

In line with the measures of adaptation and mitigation of the effects of climate change, the idea of preparing a «Egypt's Climatic map of the most important date palm cultivars» arose to help provide support for managing climate risks by providing more accurate information on the impacts.

The expected climate at the local level and the availability of the least expensive, comprehensive and accessible climate risk management measures, easily, including early warning mechanisms. It also includes modeling the cultivation and production of dates in Egypt to support the sustainable cultivation of dates in Egypt to reach high-quality production with global competitiveness.

The aim of the Climatic map of the most important cultivars of dates palm cultivated in Egypt is to provide guidance, recommendations and plans on how to be resilient against climate change impact and at national, sub-national and local levels. Expand the cultivation of suitable date palm cultivars at the appropriate geographical and climatic areas targeting high-quality of dates products.

Chapter 2

Egypt's
Dates
production

2

Egypt's Dates production

The date palm is cultivated in Egypt over a geographical extension of about 1500 km of wide range of environmental and climatic factors, which affect the distribution of date palm cultivars.

Soft date cultivars (52,7%) spread in the northern regions and semi-dry cultivars (12,6%) in the regions of middle Egypt and Oases, while the dry cultivars (1,2%) were in Upper Egypt, especially Aswan. New cultivars have been introduced in Egypt in recent years (Abdullah, 2018).

The dates crop in Egypt is considered a strategic crop in the past, present, and future. Egypt currently ranks firstly of the world in the production of date by an amount of 1,710,603 tons in 2020, according to the estimation of the Economic Affairs Sector of the Ministry of Agriculture and Land Reclamation, Arab Republic of Egypt (Figure 2-1, Table 2-1).

The average production of dates for the last 5 years reaches 1,544,090 tons, and the average production of the last 10 years reaches 1,524,228 tons (Figure 2-2, Table 2-2).

Date palm cultivated 134,126 feddan during 2020, and the average cultivation reaches 111,355 feddan during the period 2016-2020.

The number of fruitful date palm varied according to the governorate. Giza governorate ranked firstly by the number of fruitful female date palm reaching 2,057,477 palm trees, or 13.84%, followed by the New Valley Governorate, in the second order, with 1,719,706 palm trees, or 11.57%. Then Sharqiya Governorate came in third order with 1,358,511 palm trees, with a rate of 9.14% (Table 2-1, Economic Affairs

The top 10 Dates Producing Countries in the World (2020)

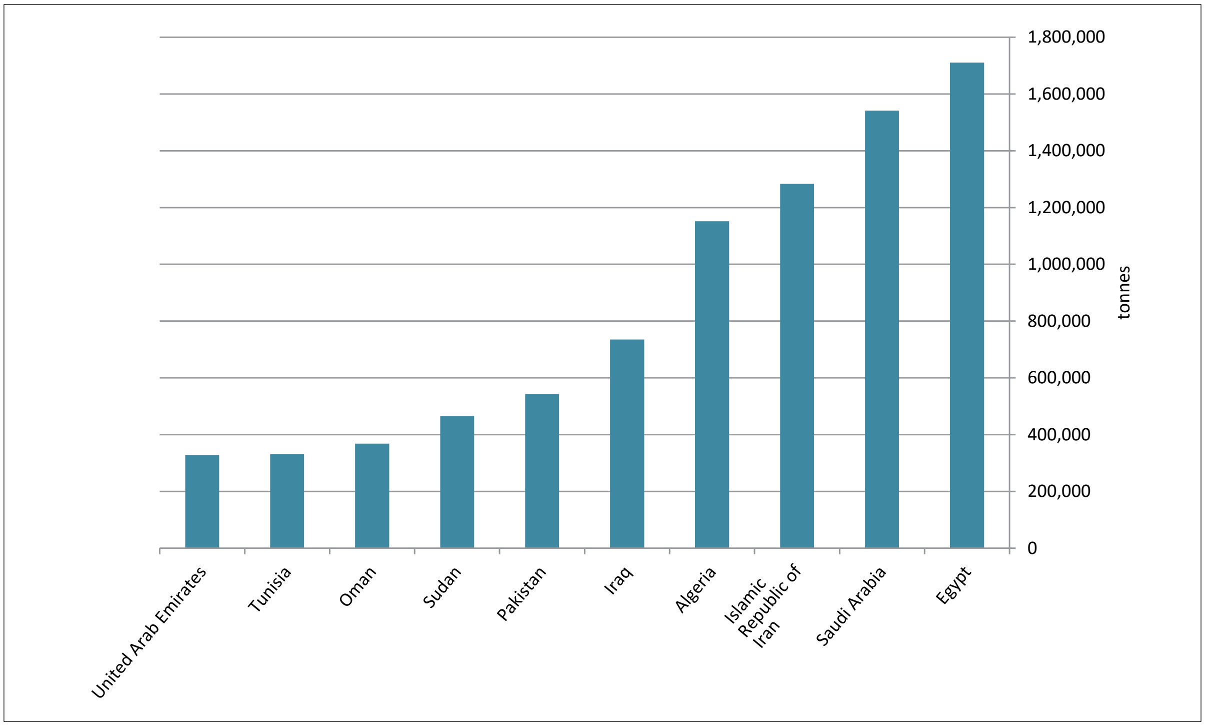


Figure 2-1: The top 10 Dates Producing Countries in the World (2020)
Source: United Nations Food and Agriculture Organization database

Dates production of Egypt

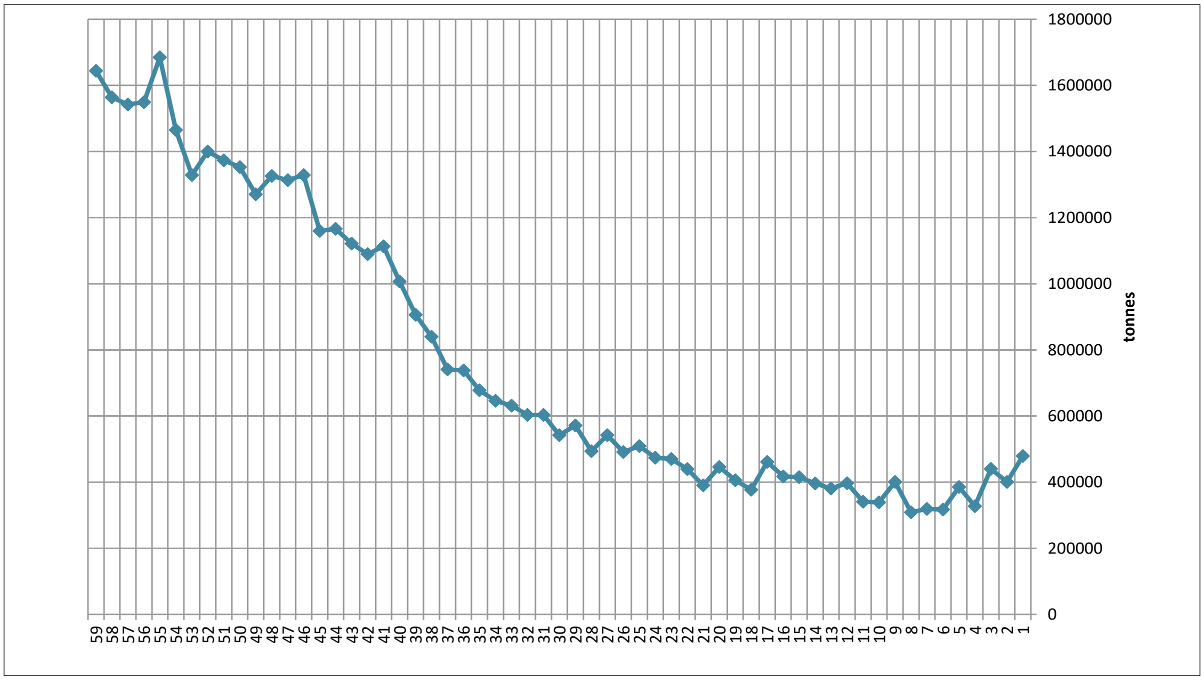


Figure 2-2: Dates production of Egypt
Source: United Nations Food and Agriculture Organization database

The date palm area in Egypt

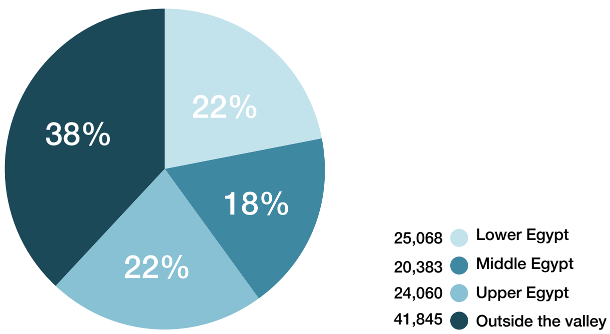


Figure 2- 3: Date palm cultivation of the Egyptian geographical regions.

Source : Statistics of the Economic Affairs Sector, Ministry of Agriculture and Land Reclamation

Fruitful date palm in Egypt

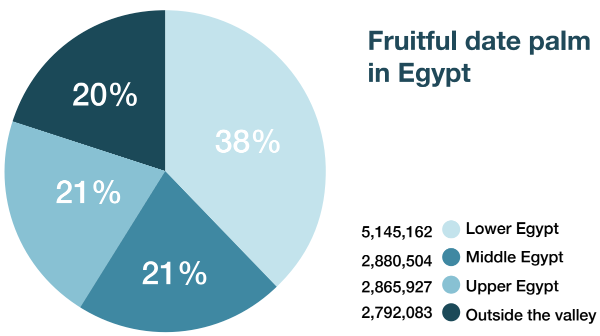


Figure 2- 4 : The number of fruitful date palm of the Egyptian geographical regions.

Source: Statistics of the Economic Affairs Sector, Ministry of Agriculture and Land Reclamation

Date palm production in Egypt

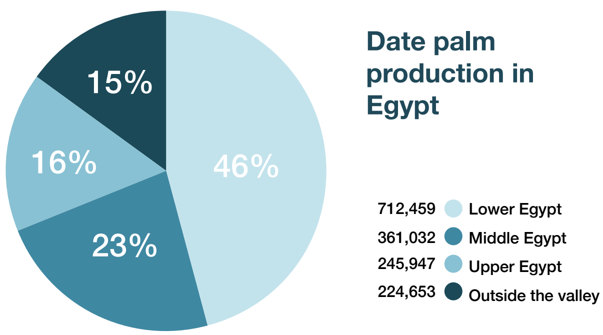


Figure 2- 5: Date palm production of the Egyptian geographical regions.

Source : Statistics of the Economic Affairs Sector, Ministry of Agriculture and Land Reclamation

Sector Statistics, Ministry of Agriculture and Land Reclamation, 2020).

Giza ranked first among the Egyptian governorates in the production of dates in Egypt with total production of 284,044 tons. Port Said governorate came in last with total production of 1,053 tons. The average productivity is estimated at 113 kg per palm. (Statistics of the Economic Affairs Sector, Ministry of Agriculture and Land Reclamation, 2020, Table 2-1& 2-2).

Table 2-1: Total Area, Yield and Production for Palm Dates, average 5 years

Governorates	Production (Ton)	Yield (K.g.\Palm)	F. Palm (Palm)	Area (Fed.)
Alexandria	8,021	101.619	78,932	402
Behera	114,685	108.948	1,052,661	5,619
Gharbia	6,269	117.520	53,344	374
Kafr-El Sheikh	61,973	136.902	452,681	5,110
Dakahlia	27,996	126.399	221,489	785
Damietta	109,961	119.544	919,840	15
Sharkia	224,019	164.900	1,358,511	443
Ismailia	110,928	164.976	672,390	1,205
Port Said	1,053	94.060	11,195	-
Suez	10,509	150.892	69,646	144
Menoufia	6,923	127.221	54,417	89
Qalyoubia	22,688	127.777	177,559	409
Cairo	4,654	66.595	69,885	773
Lower Egypt	709,679	136.673	5,192,550	15,368
Giza	284,044	138.055	2,057,477	36,176
Beni Suef	34,418	100.617	342,068	47
Fayoum	110,988	123.857	896,096	1,239
Menia	39,126	131.827	296,799	548
Middle Egypt	468,576	130.434	3,592,440	38,010
Assuit	38,521	83.426	461,739	400
Suhag	37,472	94.000	398,640	753
Qena	28,841	75.032	384,385	1,368
Luxor	16,060	71.004	226,185	865
Aswan	109,683	89.789	1,221,561	24,340
Upper Egypt	230,577	85.636	2,692,510	27,726
Inside the valley	1,408,832	122.747	11,477,500	81,104
New Valley	150,155	87.314	1,719,706	28,258
Matruh	26,559	54.000	491,829	10,426
Red Sea	-	0.000	47,106	134
North Sinai	19,267	74.843	257,431	6,981
South Sinai	5,896	76.997	76,574	-
Noubaria	99,894	125.545	795,685	7,223
Outside the valley	301,771	89.062	3,388,331	53,022
Total	1,710,603	115.069	14,865,831	134,126

Source : Economic Affairs Sector .

Table 2-2: Total Area, Yield and Production for Palm Dates, average 5 years

Governorates	Production (Ton)	Yield (K.g.\ Palm)	F. Palm (Palm)	Area (Fed.)
Alexandria	7,044	89.17	78,989	421
Behera	180,846	150.72	1,199,894	14,962
Gharbia	5,333	106.11	50,255	294
Kafr-El Sheikh	50,433	126.64	398,229	5,169
Dakahlia	23,543	102.67	229,300	639
Damietta	87,393	105.99	824,509	14
Sharkia	208,705	171.21	1,219,025	262
Ismailia	96,516	149.12	647,223	1,361
Port Said	888	85.83	10,344	-
Suez	6,916	84.03	82,307	500
Menoufia	18,299	110.97	164,895	73
Qalyoubia	24,422	120.26	203,069	570
Cairo	2,123	57.19	37,124	805
Lower Egypt	712,459	138.47	5,145,162	25,068
Giza	206,451	131.26	1,572,820	18,593
Beni Suef	27,820	93.15	298,664	59
Fayoum	83,519	123.22	677,827	1,161
Menia	43,243	130.57	331,194	570
Middle Egypt	361,032	125.34	2,880,504	20,383
Assuit	41,694	90.41	461,169	391
Suhag	38,171	92.48	412,766	776
Qena	18,756	61.29	305,988	915
Luxor	11,797	62.66	188,269	500
Aswan	135,530	90.49	1,497,736	21,479
Upper Egypt	245,947	85.82	2,865,927	24,060
Inside the valley	1,319,438	121.14	10,891,593	69,511
New Valley	105,607	80.28	1,315,542	18,738
Matruh	38,318	91.44	419,054	7,825
Red Sea	3,450	51.27	67,292	137
North Sinai	22,550	68.62	328,636	9,345
South Sinai	3,598	40.00	89,957	-
Noubaria	51,130	89.45	571,602	5,800
Outside the valley	224,653	80.46	2,792,083	41,845
Total	1,544,090	112.84	13,683,675	111,355

Source : Economic Affairs Sector .

Giza Governorate ranked in terms of production with 15.21% of the total production of dates in Egypt, followed by the Sharkia Governorate with 13.75% of the value of the total production of Egyptian dates (table 2-2).

Regarding the geographical areas, Lower Egypt comes first in terms of production with a rate of 44.01%, followed by Middle Egypt with 26.44%, then a region outside the valley with 15.84%, and finally Upper Egypt with 13.71% of total dates production of Egypt (Statistics of the Economic Affairs Sector, Ministry of Agriculture and Land Reclamation, (Table 2-3-Figure 2-3, 2- 4& 2-5).

Table 2-3: Total Area, Yield and Production for Varieties of Palm Dates, Average (2016-2020)

Governorates	Production		F. Palm		Area	
	%	Ton	%	Palm	%	Fed
Lower Egypt	46.14	712,459	37.60	5,145,162	22.51	25,068
Middle Egypt	23.38	361,032	21.05	2,880,504	18.30	20,383
Upper Egypt	15.93	245,947	20.94	2,865,927	21.61	24,060
Outside the valley	14.55	224,653	20.40	2,792,083	37.58	41,845
Total	100.00	1,544,090	100.00	13,683,675	100.00	111,355

Source : Economic Affairs Sector .

According to the average production of dates for five years (2016-2020), Meghal (unknown) cultivars ranked firstly in dates production value of 27.28%, followed by Hayani cultivars with 21.83% of the value of the production of Egyptian date. While the production of Sewi cultivar was ranked third, with a production value of 20.00% of the total production (Figure 2-6).

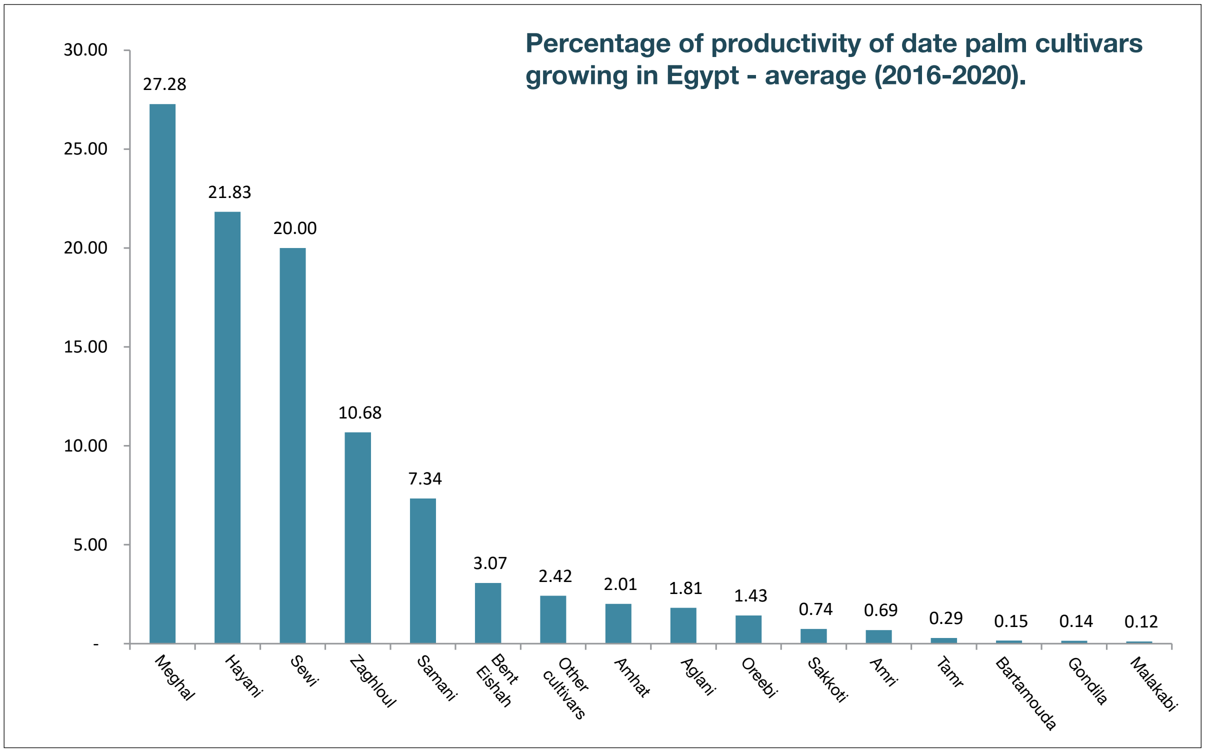


Figure 2-6 : Dates production percentages of cultivars growing in Egypt
Source: United Nations Food and Agriculture Organization database

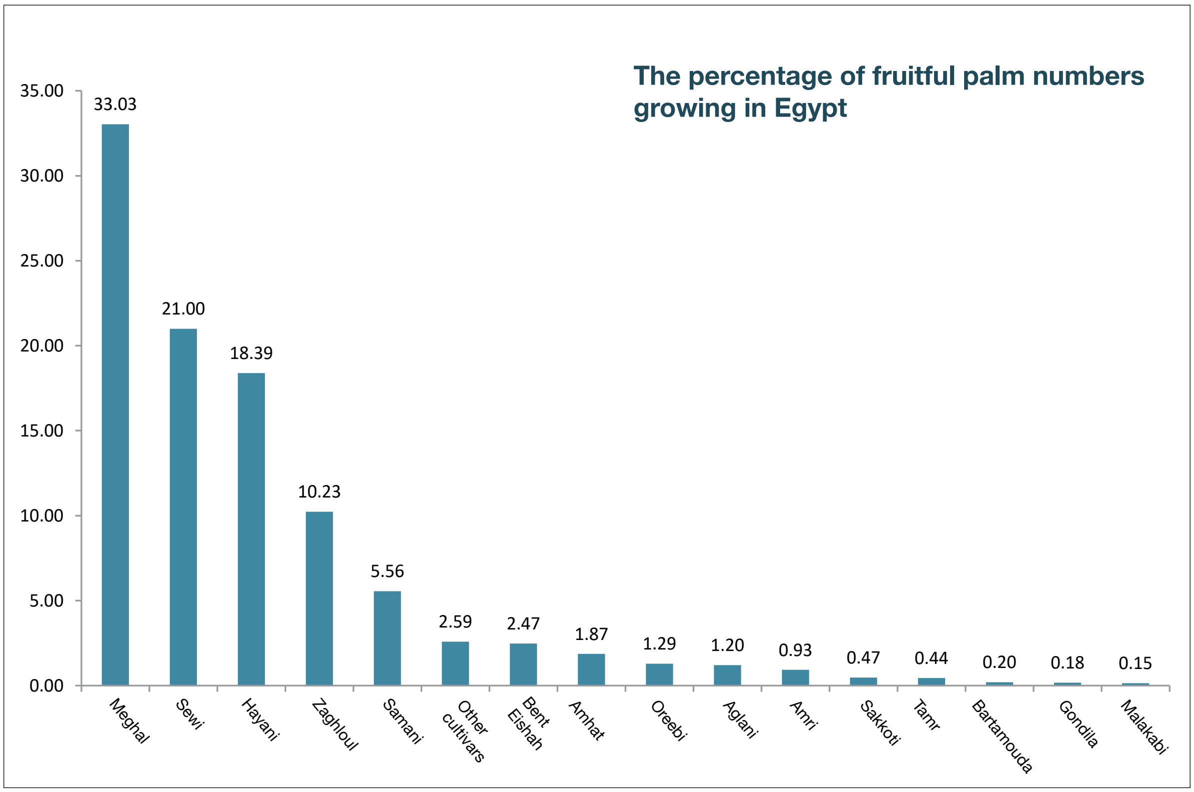


Figure 2- 7: Fruitful date palm cultivars growing in Egypt
Source: United Nations Food and Agriculture Organization database

Regarding to the number of fruitful date palm in Egypt, the Meghal (unknown) cultivars topped the percentage by approximately 33.03%, followed by the Sewi cultivar with a rate of 21.00%, and then the Hayani cultivar with a rate of 18.39% (Figure 2-7).

While Sewi cultivar topped the cultivated area with 33.32%, followed by the Meghal (unknown) cultivars with 23.98.07% of the total date palm cultivated area in Egypt. While the Zaghloul ranked third, with an area ratio of 11.00% of the total area (Figure 2-8) (Table 2-4).

The value of production in 2020 amounted to about 324.243 million dollars, and an average of 333.8636 million dollars for the last 5 years, and an average of 378.9591 million dollars for the last 10 years (Figure 2-9).

The production has doubled twice since 1998 from 839,805 tons to 1,690,959 tons in 2020. The production has also tripled 3 times since 1987 from 542,000 tons by the year 2020. It has also quadrupled since 1975 from 415,100 tons by 2020. (Database of the United Nations, Food and Agriculture Organization).

Table 2-4: Total Area, Yield and Production for Varieties of Palm Dates, Average 5 y (2016-2020)

Cultivar	Production (Ton)	Yield (K. G.\Palm)	F. Palm (Palm)	Area (Fed.)
Zagloul	164,952	118	1,399,999	12,254
Amhat	31,089	121	255,475	2,182
Hyani	337,072	134	2,515,870	7,313
Bent Esha	47,349	140	337,981	1,729
Samany	113,277	148	760,287	6,812
Meghal	421,263	93	4,519,837	26,699
Sewi	308,852	108	2,873,311	37,105
Oraby	22,078	128	177,136	2,968
Amry	10,649	166	64,367	2
Aglany	27,897	170	164,326	20
Sacouty	11,434	90	127,726	1,090
Melkaby	1,794	88	20,482	257
Gandela	2,175	91	24,045	504
Bertamoda	2,350	86	27,527	966
Tmr	4,426	72	60,885	724
Others	37,436	106	354,423	10,733
Total	1,544,090	113	13,683,675	111,355

Source : Economic Affairs Sector .

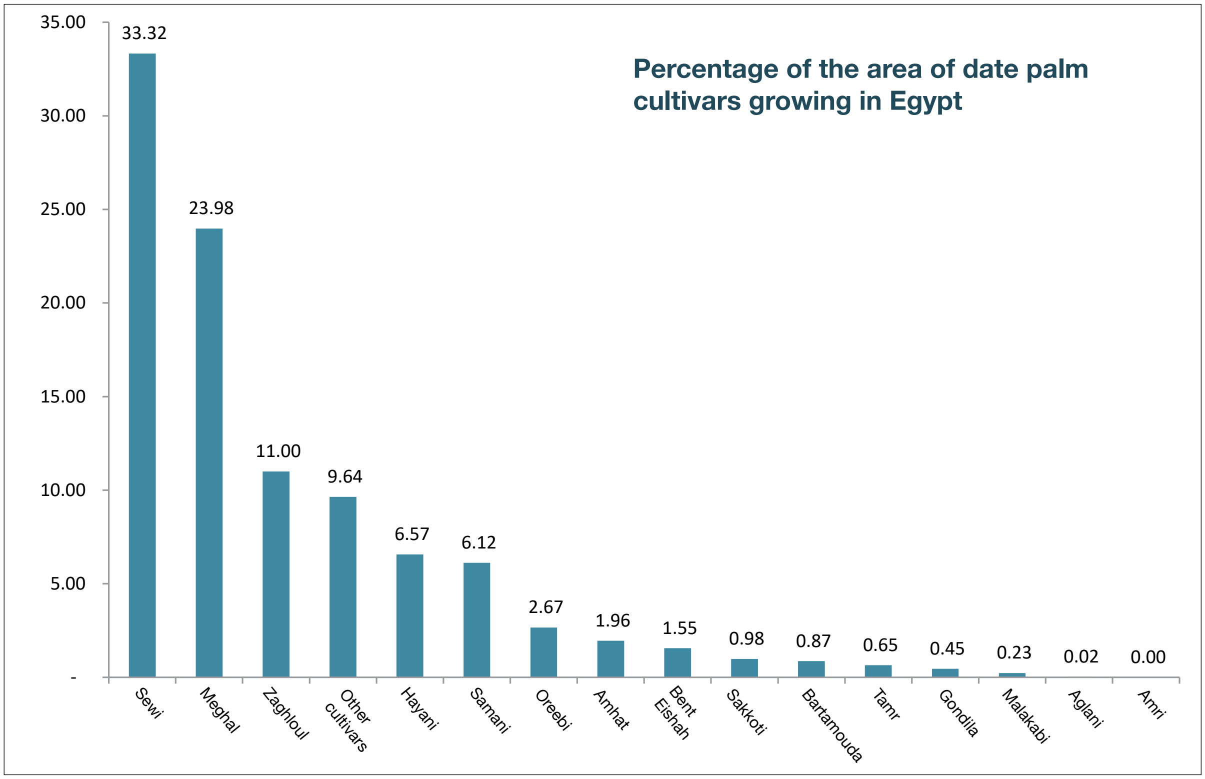


Figure 2- 8: Cultivated area percentage of cultivars growing in Egypt
Source: United Nations Food and Agriculture Organization database

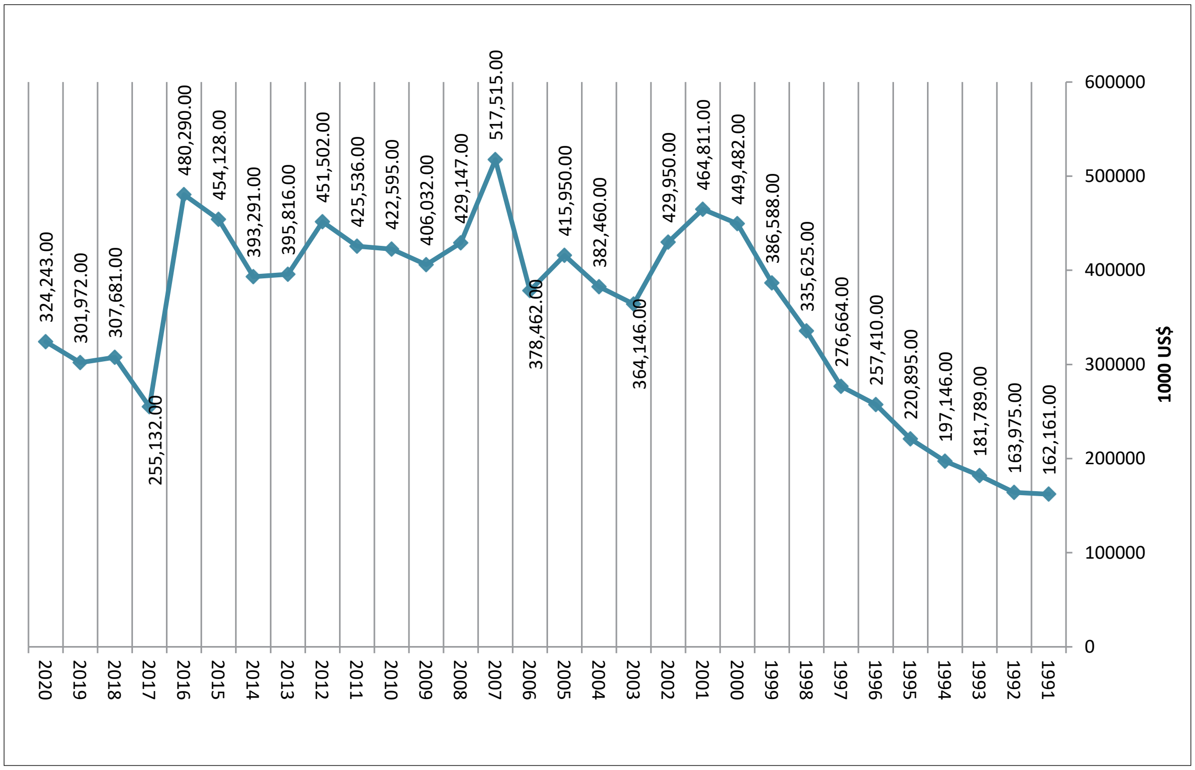
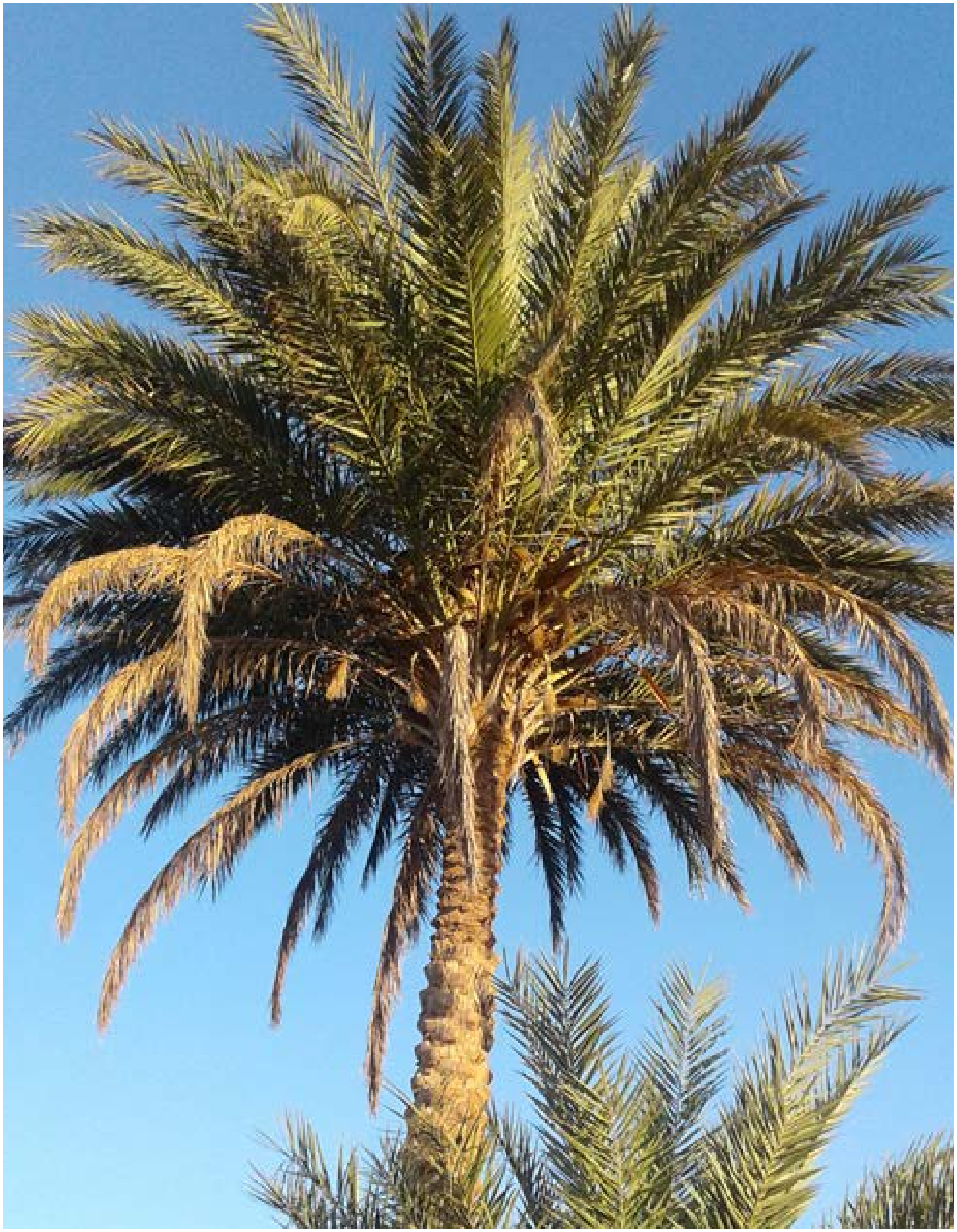


Figure 2- 9: Dates production value of Egypt
Source: United Nations Food and Agriculture Organization database



Chapter 3

Export **value of Egyptian dates**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3

Export value of Egyptian dates

Egypt has the advantage of a great opportunity to export dates, but the evidence indicates that although Egypt ranks first in dates production, Egyptian date exports are not commensurate with its production.

The date crop is considered a strategic crop in Egypt, Globally, Egypt is currently ranked the first producer of dates.

Where the value of dates production in 2020 amounted to 1,690,959 tons out of the value of global production of 9,454,213 tons, according to the estimation of the Economic Affairs Sector of the Ministry of Agriculture and Land Reclamation, Arab Republic of Egypt and the database of the United Nations Agriculture and Food Organization (Figure 3-1&3-2).

The percentage of Egyptian dates proportion to world production ranged from 25.86% in 1961 to 17.89% in 2020 (Figure 3-2).

The value of the date's production in 2020 amounted to 324.243 million dollars (Figure 3-3).

The price of the product ranged from about 196.8 dollars per ton for 2018. The highest value per ton in 2007 reaches 339.9 dollars, and the lowest value per ton in 2017 was

The quantity of date production in Egypt and the world

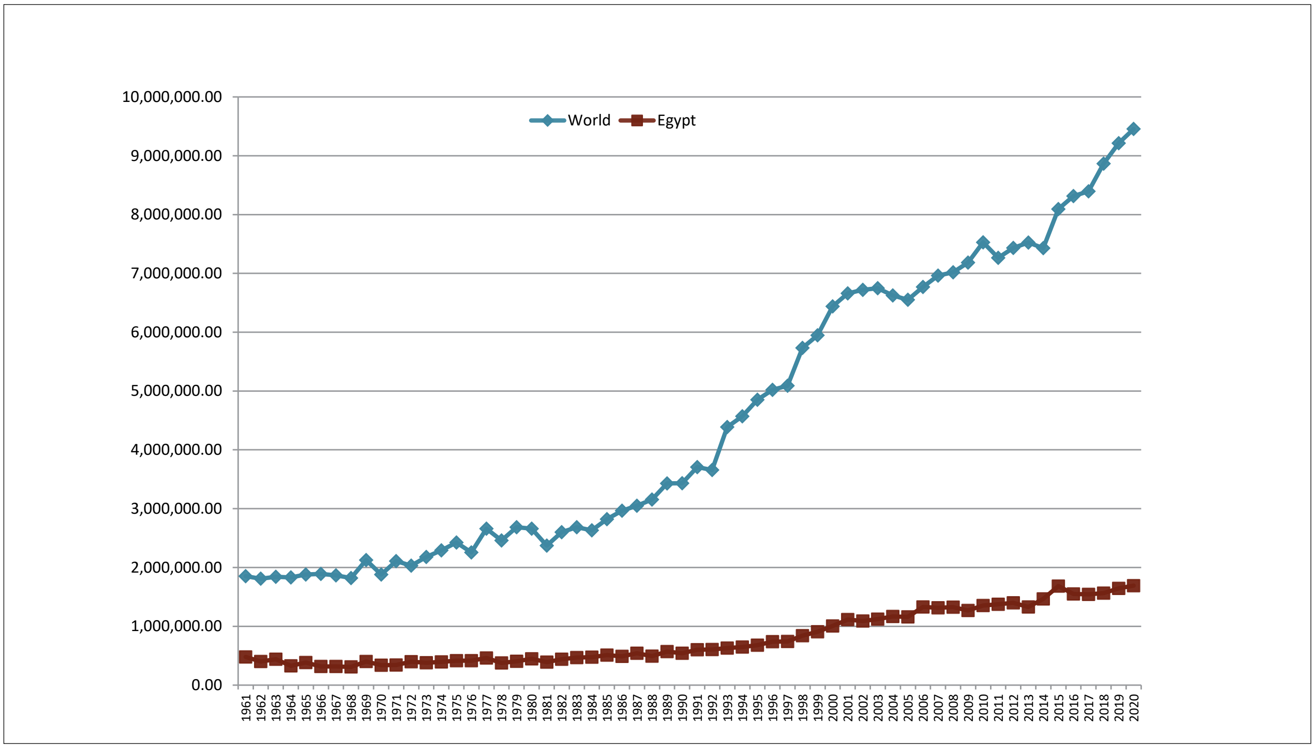


Figure 3- 1: The quantity of date production in Egypt and the world
Source: The database of the United Nations Agriculture and Food Organization

The percentage of date production in Egypt and the world

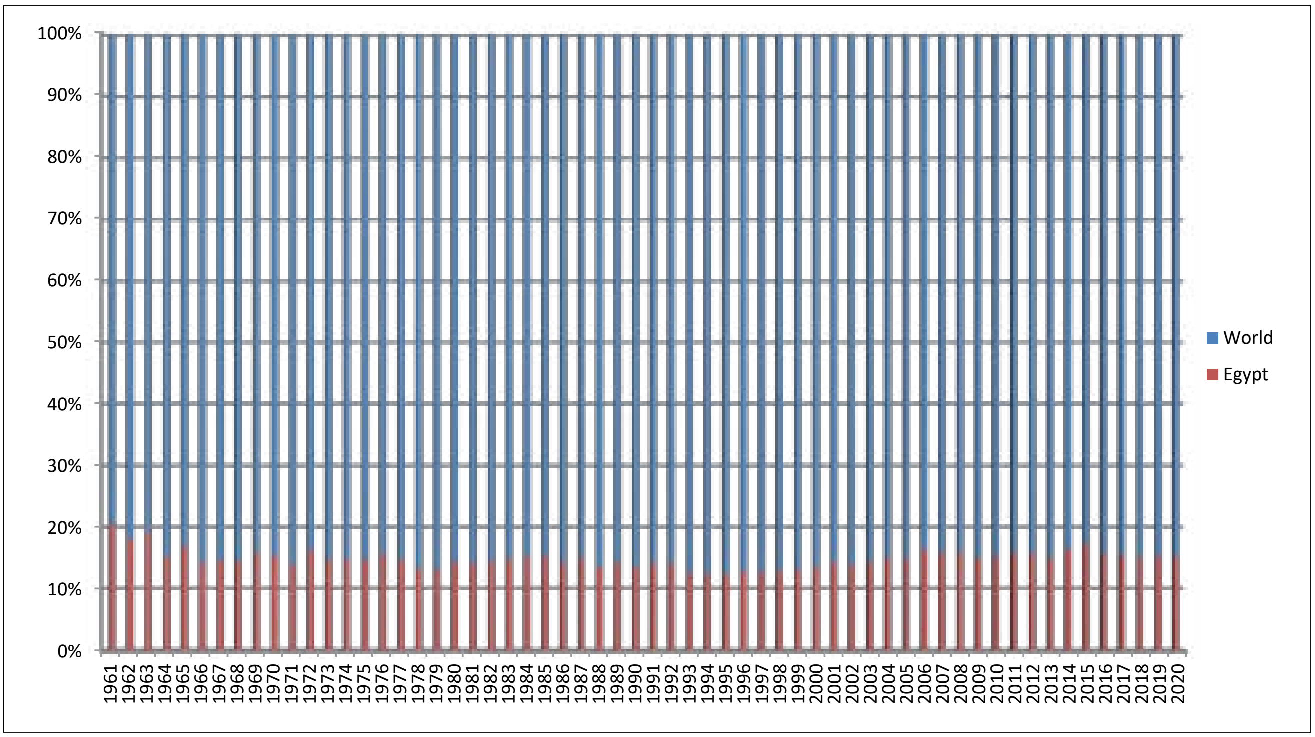


Figure 3- 2: The percentage of date production in Egypt and the world
Source: The database of the United Nations Agriculture and Food Organization

165.4 dollars, according to the database of the United Nations Agriculture and Food Organization (Figure 3-4).

The value of Egyptian dates exports reaches 41.424 million dollars in 2020, The highest export value recorded in 2018 was 49.729 million dollars, While Egypt's import date reached the value of 5.179 million dollars in 2020.

The highest value of importing dates was 9.459 million dollars in 2019 (Figure 3-5).

The quantity amount of date exported from Egypt in 2020 amounted to approximately 29,487 tons, thus Egypt ranked tenth place in the world after the UAE, Saudi Arabia, Iraq, Iran, Israel, Algeria, Tunisia, Pakistan and Mexico, (Figure 3-6).

Regarding the dates export value, Tunisia topped the export value of dates in 2020, amounting to $266,225 million (Figure 3-7) due to the high price value of the Tunisian date's product.

Egypt exported 38 thousand metric tons of dried dates and processed dates (paste) out of total production of 436 thousand tons in 2017, While there is not the quantum of fresh dates was exported in the same year, The percentage of self-sufficiency in dried dates and processed date reached 108.5%, with a surplus of 34 thousand metric tons, or 8.5% (Business Balance Bulletin, Egypt, 2017).

The countries with a large majority Muslim population in Southeast Asia, represented by India, Indonesia, Malaysia and China, consume about 22% of the amount of dates offered in the global market, In contrast, the non-Muslim countries in Southeast Asia such as Japan, Philippines and Thailand consume a small amount of the dates offered in the global market.

Regarding North America, there are more than four million Muslims of Arab origin living in the United States of America and Canada, They consume dates for about 55 million US dollars, which is approximately one-tenth of the value of the global imports of dates (Abdullah, 2018).

The imported quantities of dates in the world increased during the period 2001-2017, from 543.3 thousand tons in 2001 to 894.7 thousand tons in 2017, achieving an increase of about 351 thousand tons, at an increasing rate of 67.4%, with an annual increase rate estimated at 20.6 thousand tons per year in that period.

The values of world imports of dates also increased from about US$ 262.8 million in 2001 to about US$1,163 million in 2017, with an estimated increase of about US$901 million, and an increase of about 342% at an annual increase rate of US$53 million annually in That period (Hassan, 2021).

The value of the total production of date palm in Egypt (Dollar)

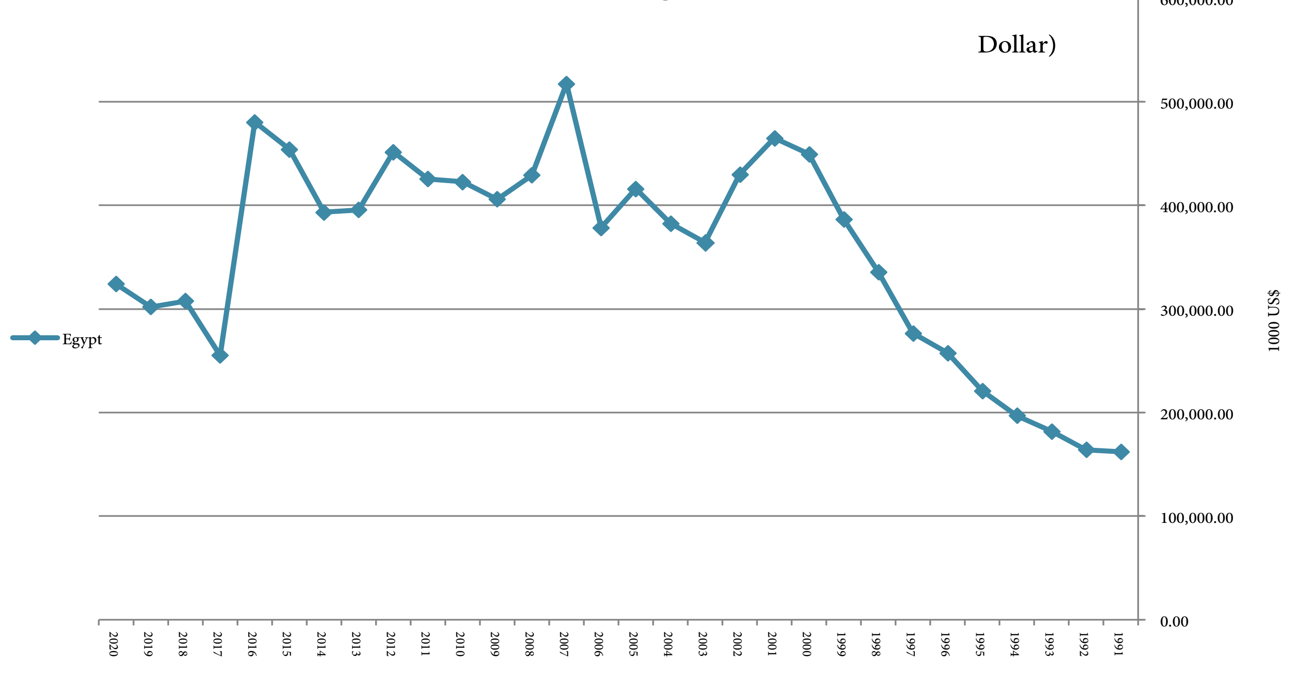


Figure 3- 3: The value of the total production of date palm in Egypt
Source: The database of the United Nations Agriculture and Food Organization

The value of the date produced in Egypt (Dollar/Ton)

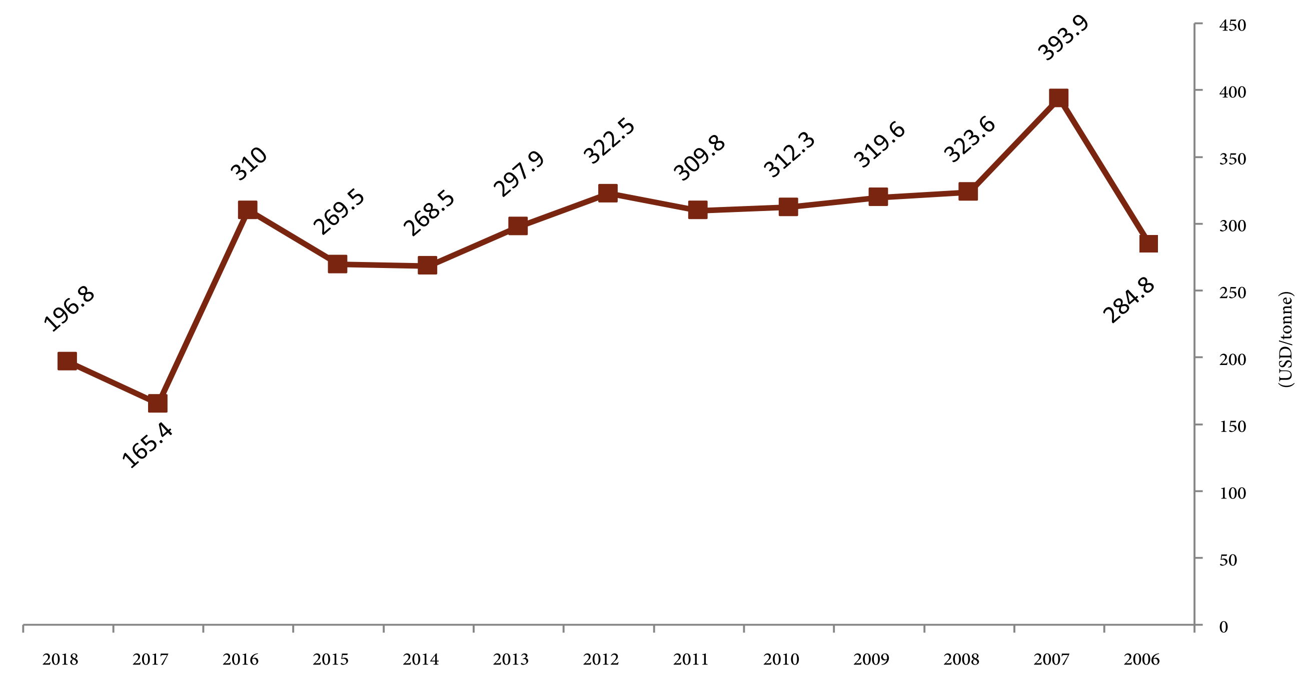


Figure 3-4: The value of the date produced in Egypt (Dollar/ Ton)
Source: The database of the United Nations Agriculture and Food Organization

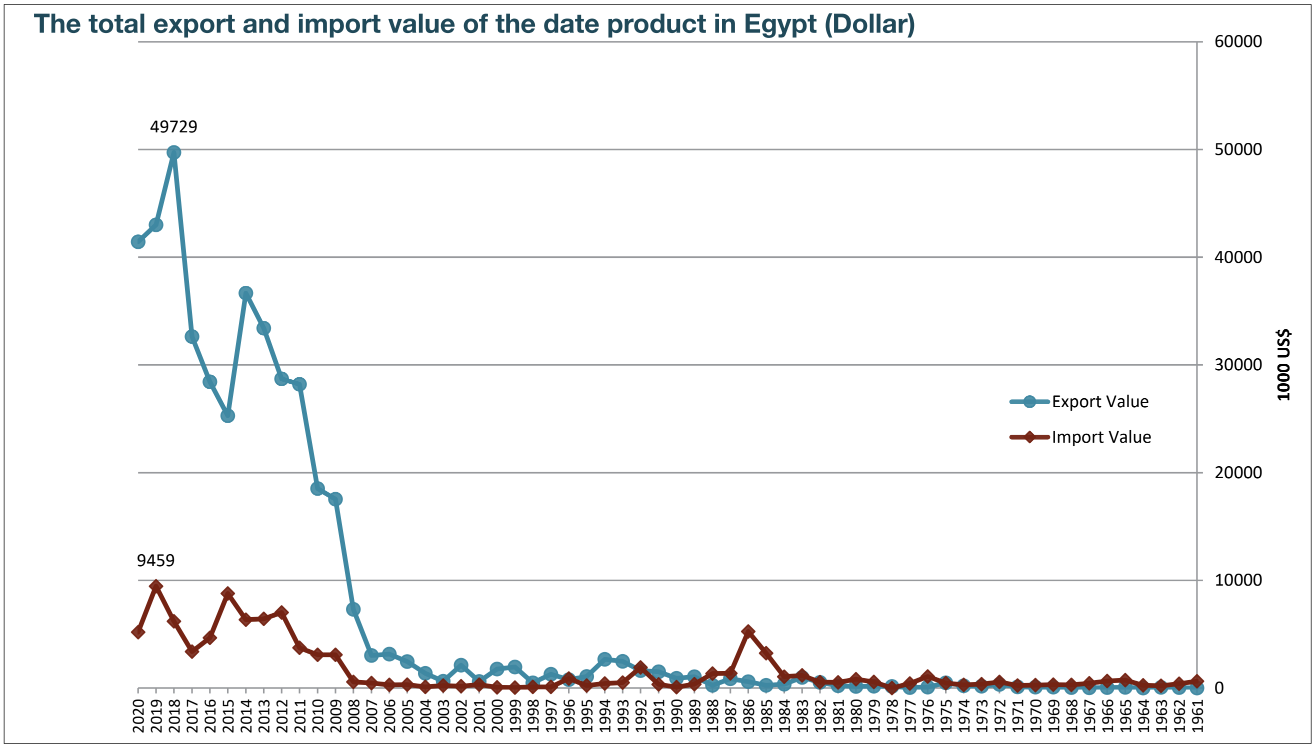


Figure 3-5: The total export and import value of the date product in Egypt
Source: The database of the United Nations Agriculture and Food Organization

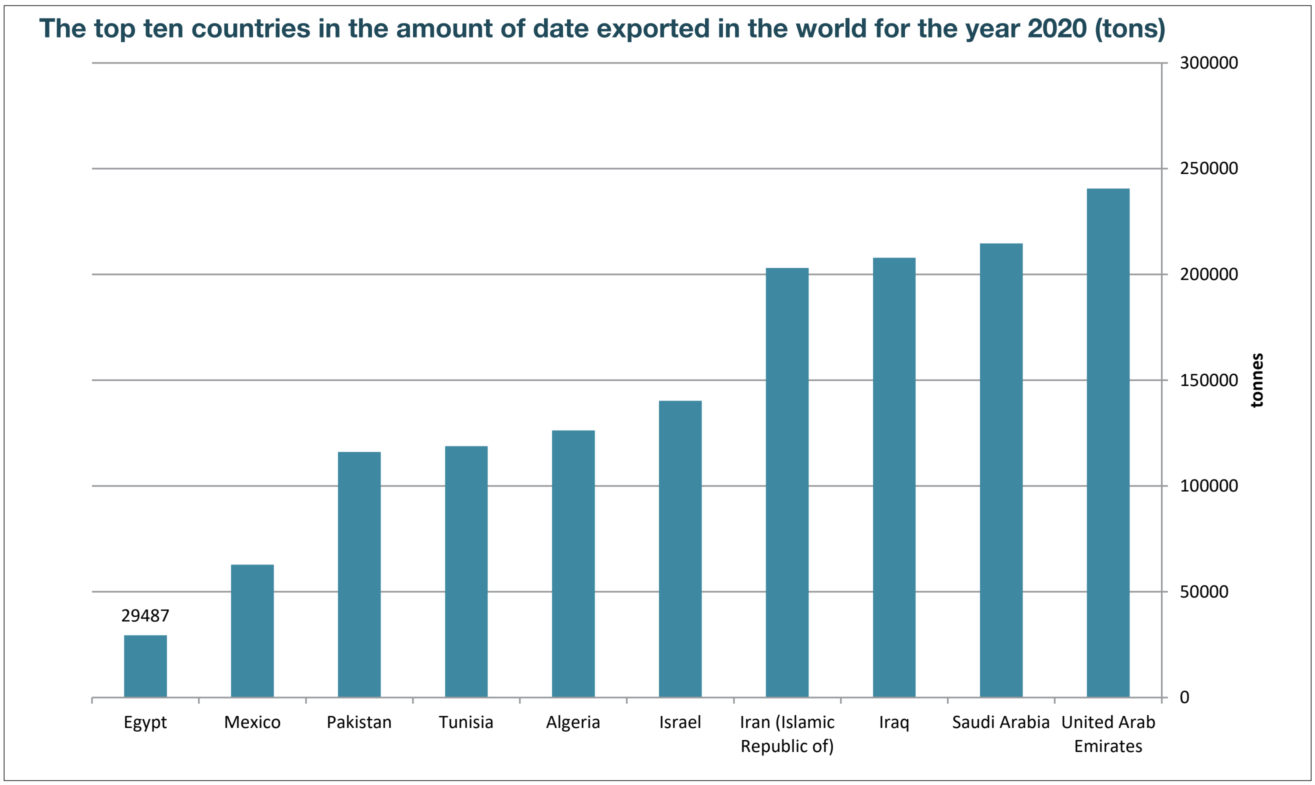


Figure 3-6: The top ten countries in the amount of date exported in the world for the year 2020 (tons)
Source: The database of the United Nations Agriculture and Food Organization

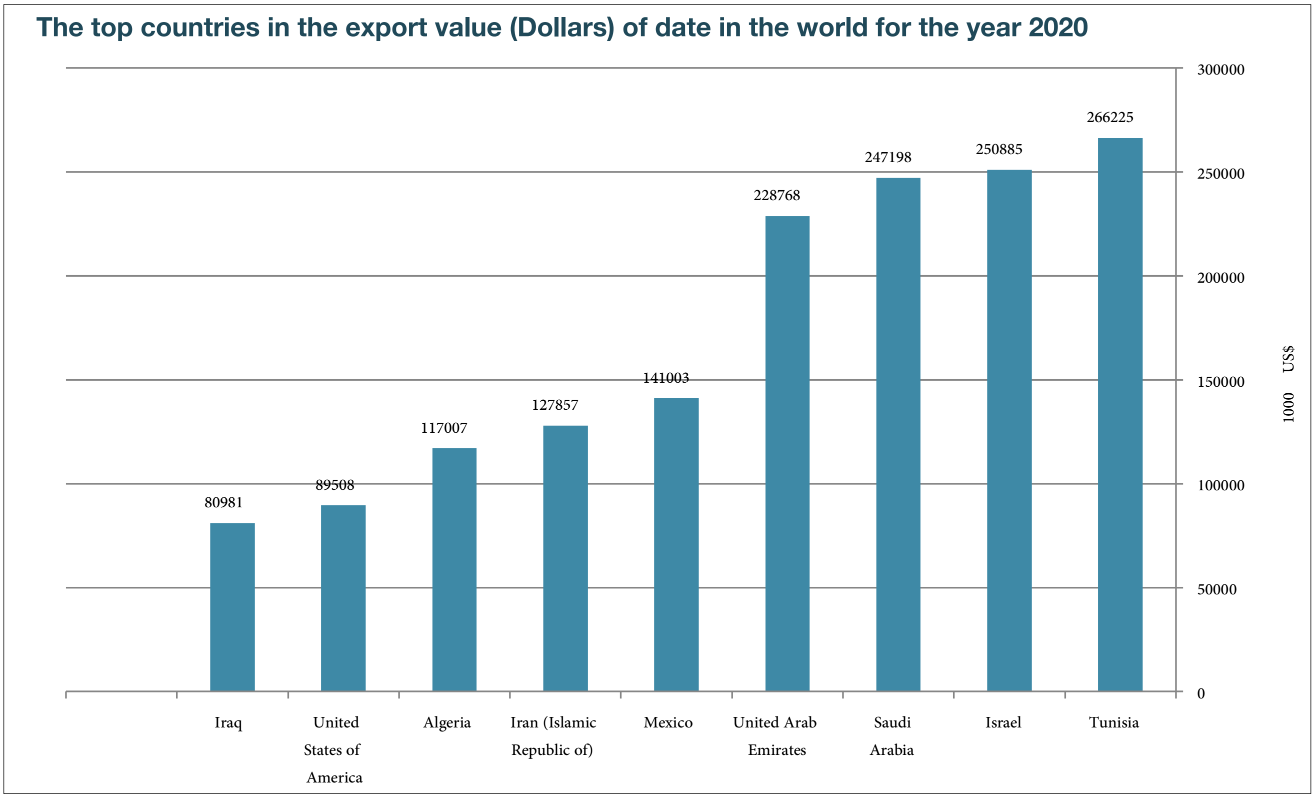


Figure 3-7: The top countries in the export value (dollars) of date in the world for the year 2020
Source: The database of the United Nations Agriculture and Food Organization

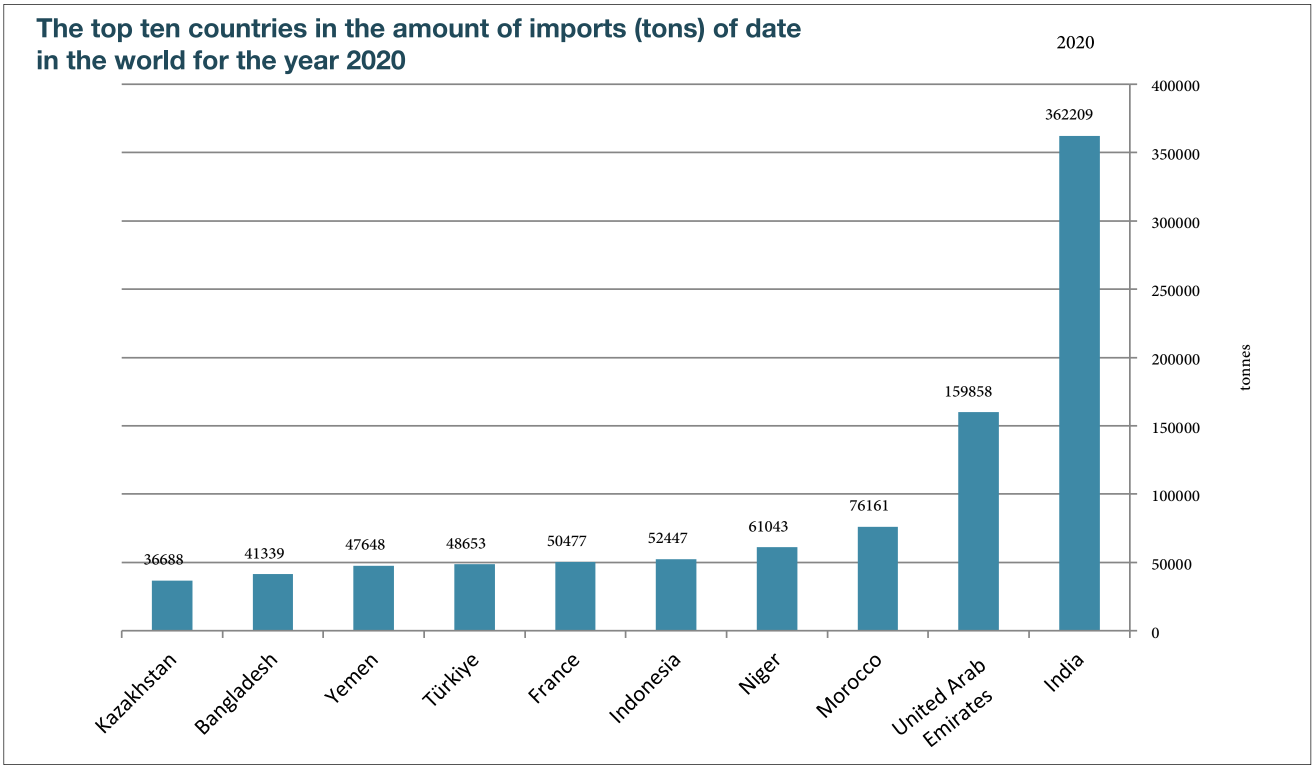


Figure 3-8: The top ten countries in the amount of imports (tons) of date in the world for the year 2020
Source: The database of the United Nations Agriculture and Food Organization

Regarding to date importing countries, India ranked first with a quantity of 362,209 tons of date (Figure 3-8).

Also, with an import value of US$224,980 million, at an average price of US$621.13 per ton (Figure 3-9), While the United Arab Emirates will import a ton at a value of $671.25. The Kingdom of Morocco ranked first with the highest price per ton imported, with a value of US$2,080.46 per ton, followed by Indonesia, with a value of $1,501.49 per ton.

The Moroccan market is considered the most important market for Egyptian dates among the countries of the world, The quantum of Egyptian date exported to Morocco is about 12.2 thousand tons, that is, nearly two-fifths of the total amount of Egyptian dates exported to the world markets and its export value reaches of about 15.3 million dollars.

That is, more than two-fifths of the export value of Egyptian dates to world markets, Indonesia and Malaysia came in the second and third markets respectively with about 9 thousand tons, and 6.5 thousand tons each, respectively, The export values are about 10.1 and 7 1 million dollars respectively, The markets of Morocco, Indonesia and Malaysia are among the most important markets for Egyptian dates (Hassan, 2021).

The European market is considered a low-profit marginal market, and dates are usually bought in northern Europe by European Muslims, and many of those people have limited income.

Since the European Union, North America and Australia import medium quantities in comparison to global exports of dates, but at high prices, It is necessary to study these target markets and the suitable type of dates and cultivars to expand the planting of the needed cultivars in order to increase the quality of date production.

As well as set up effective quality systems and achieve their conditions in the Egyptian product of date, To achieve this goal, it is necessary to follow good agricultural practices.

The level of competition in the markets of the European Union, North America, Australia, Eastern Europe countries and Russia is very strong, Targeting these markets requires an intensive advertising campaign.

In order to develop Egyptian date's exportation, it is necessary to target the Gulf countries, Malaysia, Indonesia and other Arab countries such as Syria, Jordan and Morocco, They import large quantities at reasonable prices and with few quality criteria, as those markets have high population numbers, especially the Muslim inhabitant.

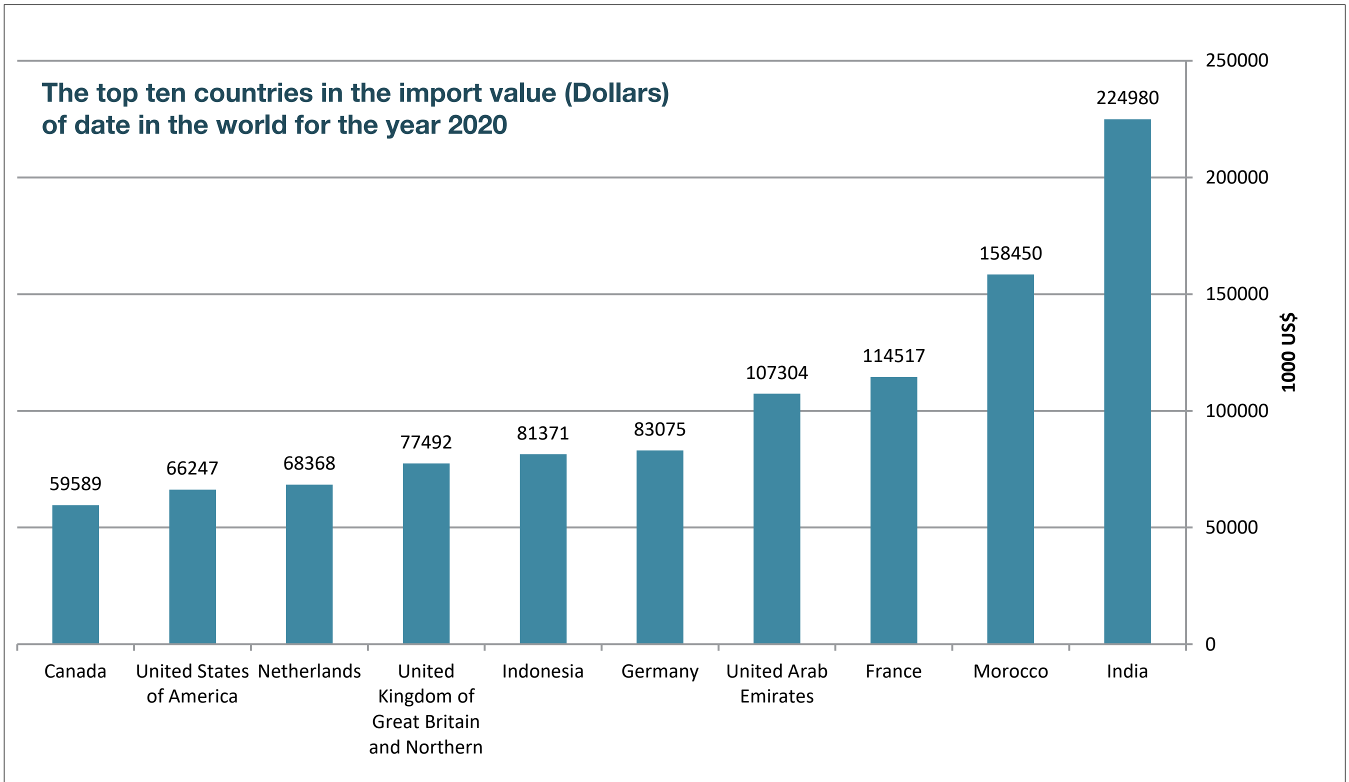


Figure 3-9: The top ten countries in the import value (Dollars) of date in the world for the year 2020
Source: The database of the United Nations Agriculture and Food Organization

Chapter 4

The most suitable climatic factors fordate palm **cultivation**

4.1

Climate factors

Climate is the master of the environmental factors that affect the growth and development of plants (Badawi, 2007). It is one of the most important factors that directly affect plant production, as each crop needs suitable climatic conditions for best growth and quality (Al-Sadi, 1981)

Climate change means the change of the general circulation in the atmosphere and the weather phenomena associated with it, such as droughts, atmospheric depressions, hurricanes, floods and others, as a result of global warming.

The United Nations Convention on Climate Change states in Article (1) that climate change is attributed directly or indirectly to human activities that lead to a change in the composition of the global atmosphere.

Climatic studies are very important when setting agricultural policy, especially those studies that examine the relationship between climate and agriculture.

Studying the relationship or impact of climate on date palm cultivation, its distribution, and the area for future expansion of cultivation is one of the most leading and important modern topics that have not been addressed.

It carefully serves future agricultural planning and projects, especially when clarifying and highlighting the relationship between climate elements and the production of date production.

The impact of different climatic or weather factors on the vegetative growth, size and quality of the fruit production of date palm is one of the basic necessities affecting the distribution of date palm cultivars, determining suitable areas for planting different types of date palm cultivars as well as choosing the suitable one for each region.

To address a high-quality date crop while achieving maximum crop production with optimal use of available resources, is also considered very important to expanding date palm cultivation depending on the future expectations of the effects of climate change (climatic biogeography).

Climatic factors have an important role in influencing the growth of date palm and the quantity and quality of production. The date palm gives a good crop in the areas where the weather of all the growth periods of date fruits, starting from the flowers until The ripening of the fruits is high in temperature, low in moisture, and devoid of rain.

These factors are provided in the area located between latitudes 16-27 ° north of the equator, which is known as the ecological gird for the date palm In case of different climatic conditions, the date palm may not fruitful or even give an uneconomical crop (Abdul Baset 2019).

While Sawaya (2000) stated that the date palm distribution for both the Northern and Southern Hemispheres are between 10°N and 39°N. Abul-Soad et al, (2017) stressed that the main biodiversity centers of date palm distribution are located between 24° and 34°N latitude.

Temperature conceders one of the most effective and influential climatic factors on the growth of agricultural crops. The success of the cultivation of some crops requires the availability of certain climatic elements as the main requirements. Some crops require high temperatures, the higher the temperature, the higher the quality of production .The differences that occur in Plant production from year to year depend on the differences that occur in climatic conditions, such as light, heat, precipitation, wind, and other important climate factors (El-Khashab and Hdeed, 1978).

4.1.1 Temperature

The temperature of any location of the earth is a final lump sum of the outcome of the reciprocal effect of the climate system by an infinite number of natural and human factors. The temperature of any climatic region expresses its distinctive characteristics in terms of its inputs and outputs of energy and moisture.

Climatic studies are concerned with calculating the different averages and rates of the elements of the climate by monitoring and recording the air temperatures every hour for each month. Then, the monthly and annual average temperatures can be calculated.

The daily average temperature is calculated by measuring the air temperature every hour within the day. The daily average temperature is usually calculated using the maximum and minimum temperatures. The monthly average temperature represents the arithmetic mean of the daily averages of temperature. The annual average is the monthly average of temperature during a year divided by the number of months. The daily temperature range is considered as the difference between the maximum and minimum temperatures during the day. The annual temperature range is the difference between the temperature of the least hot months and the average temperature of the hottest months (Map 4-1 & 4-2).

4.1.2 Factors affect temperature

- **Solar radiation:** The value of solar radiation is determined by each the angles of incidence, the length of the day, the clarity of the sky, and the percentage of reflectivity. The high value of solar radiation raises the temperature (Map 4-3).

- **Latitudes:** The temperature varies from one area to another on the surface of the earth according to the different locations of the area in relation to the latitudes. The angle of inclination of the sun's rays on the earth's surface varies from one area to another. The sun's rays are more or less perpendicular near to the equator, so it has the highest temperature. It is lower temperature as gets closer to the pole.

- **Topography:** Topography plays a clear role in influencing the climate. Height above sea level affects the temperature. Whenever the rise 100 meters above sea level, the temperature decreases one degree and the height above the surface of the earth keeps us away from the source of heating. Thus, the chances of air gaining ground rays are reduced, and the height leads to a decrease in air pressure, which helps in its expansion. Elevated areas above 1000 meters are considered not suitable for palm cultivation in Egypt (Map 4-4). The areas of red and violet colors are not suitable for date palm cultivation in Egypt due to the high elevation the lower temperature.

- **Winds and air masses:** The temperature is affected by air fluctuations and the succession of air masses. The western and southwestern winds to which the temperate regions are exposed in winter are an important factor in tempering the temperature of those areas. While the cold north and northwest winds affect the lowering of the temperature.

- **Vegetation cover:** The vegetation cover helps to cool the temperature of the air on the surface of the earth. In barren areas, the sun›s rays fall directly on the surface, Some of these rays are absorbed; the others are bounced back in the form of terrestrial radiation that heats the smooth air of the earth›s surface, While in the areas covered with plants, part of the solar radiation is absorbed by the plant, which works to soften the atmosphere and reduce its temperature through the process of transpiration.

4.1.3 Effect of temperature on date palm

Temperature is one of the most important climatic factors determining the success of palm cultivation. Palm trees tolerate high degrees and do not tolerate low degrees Temperature factor affects flowering, pollination process, fruit set, growth and early ripening. In addition to its effect on the quality of the fruits, Temperature increases the speed of ripening. and coloring of fruits. (El-Deeb and Izz El-Din, 1997).

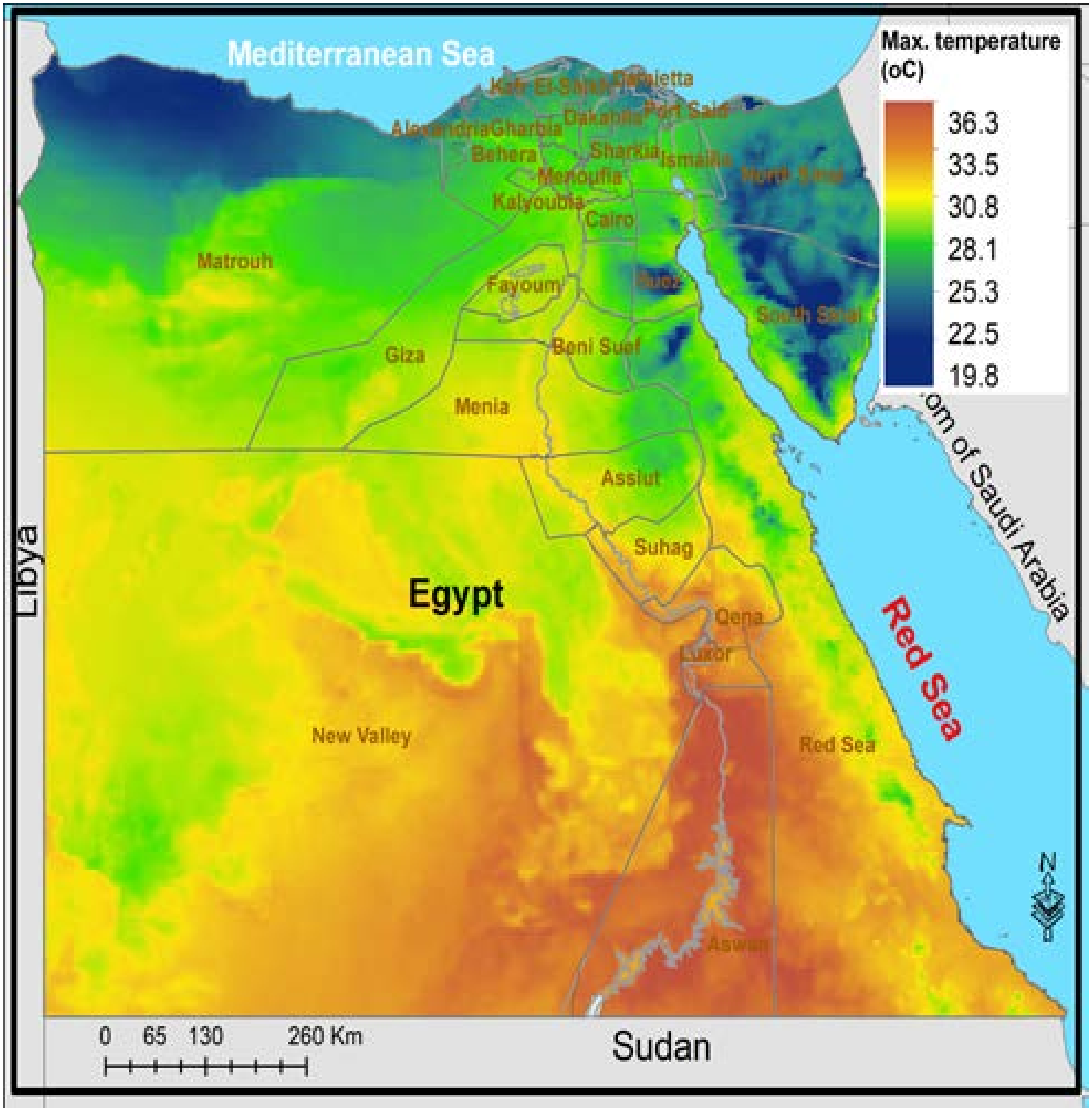
Temperature is one of the fundamental factors determining the spread of date palm. Where the temperature limits of the date palm differ according to the stages of growth, flowering and fruiting as well as the cultivars. The limits of temperature for date palm growth and cultivation range between 9-44°C. It is the ideal limit for palm cultivation and is called the geographical natural range for palm cultivation (Map 4-5). Date palm need rather high temperatures in order to continue to grow throughout the year (El-Khafagy et al, 1990 - Khion, 2013 - Serag El-Deen, 2021).

Targeting a successful commercial date palm crop, specific thermal needs are required to vary according to the cultivars, growth stage and type of fruits. Abdul Basit (2019) listed the basic and necessary temperature degrees for the natural growth and vital activity of the date palm, as is known as the optimum degree, which ranges from 32 to 38° C, where growth increases with increasing temperature up to 38° C and the growth rate decreases as it reaches 38° C (Map 4-6).

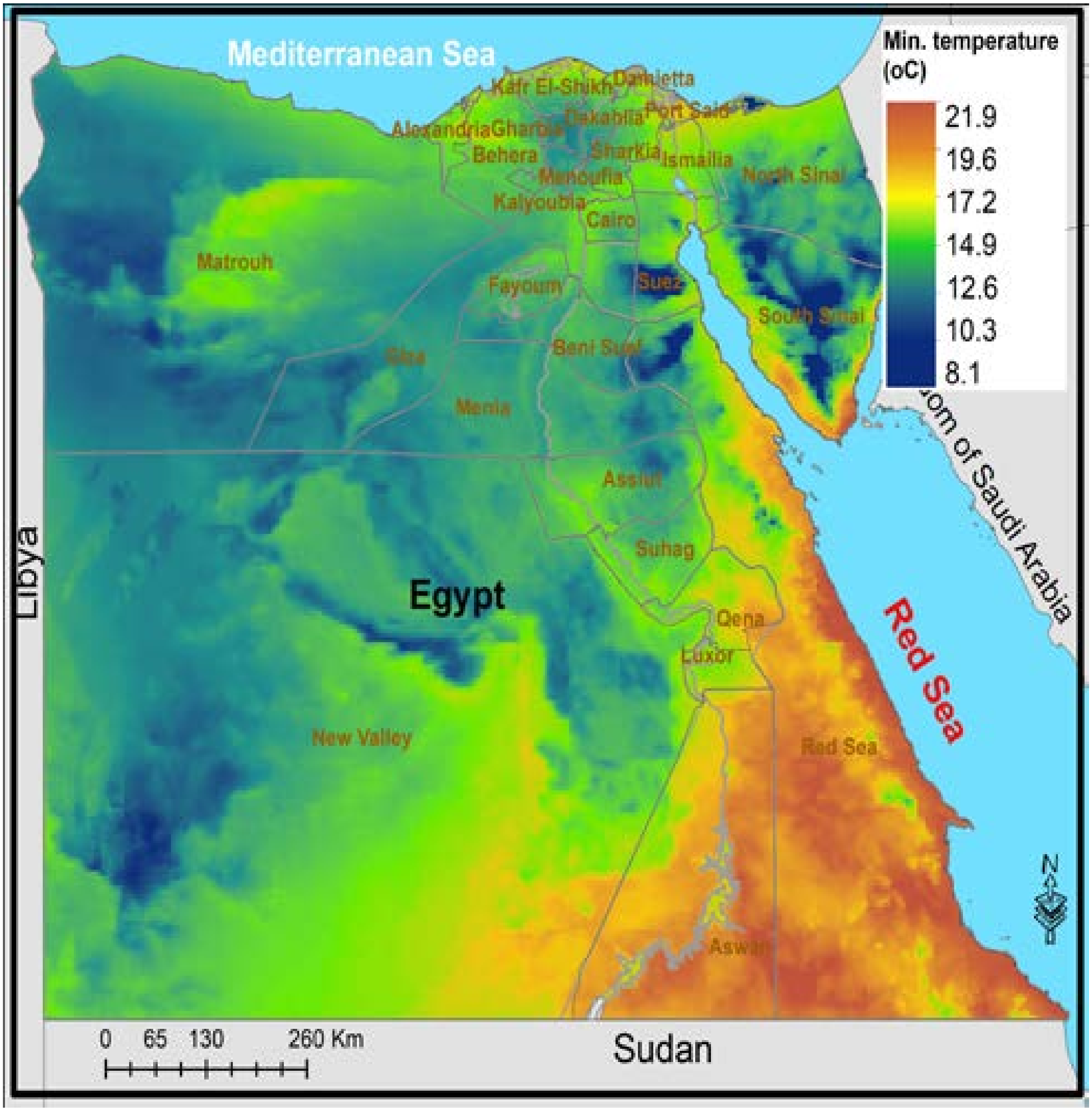
Referring to the temperature limits of the geographical distribution of the ideal vegetative growth mentioned in the references, it was found that all the North African regions from Morocco to the north of the Arab Republic of Egypt, in addition to the region of northern Iraq, Iran and the middle regions of America are outside the range of the optimum growth of the palm. Because it is contrary to the concrete reality in date palm cultivation, therefore, the expert group suggested new limits range for the optimum temperature for date palm growth between 28-38°C (Map 4-7).

Flowering temperature degree

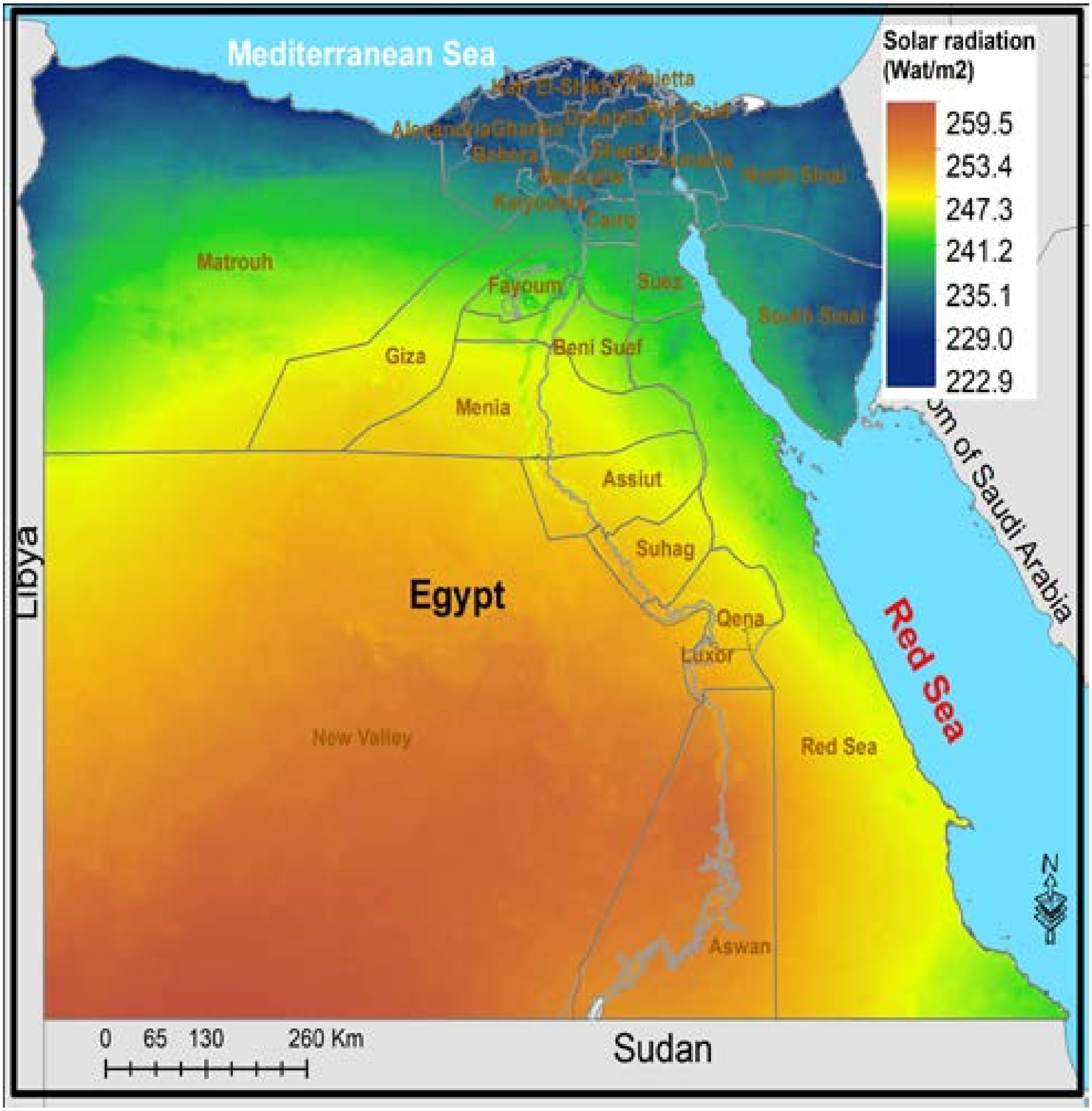
The temperature has an effect on date palm flowering,



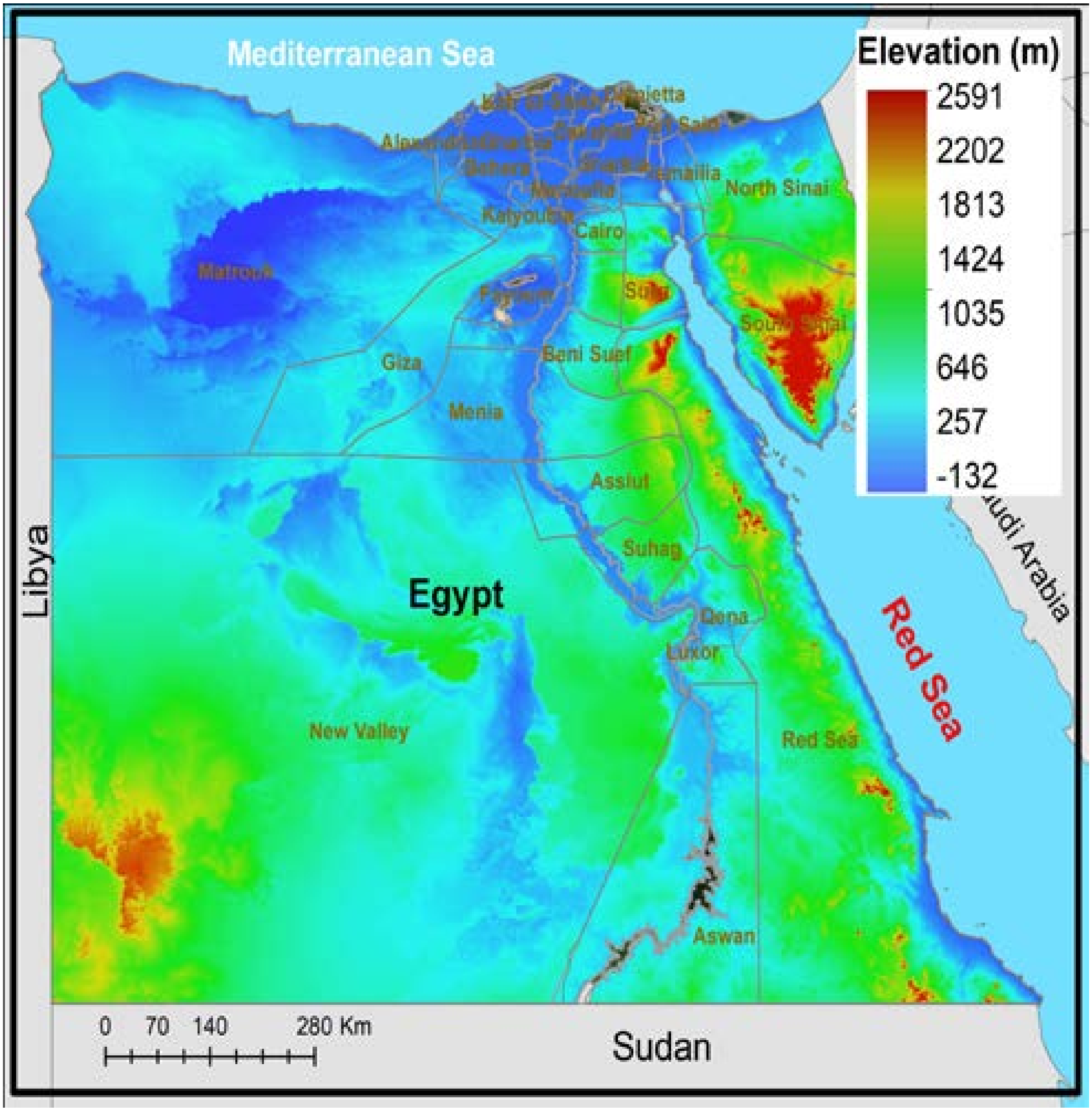
Map 4 - 1: Maximum temperature of Egypt



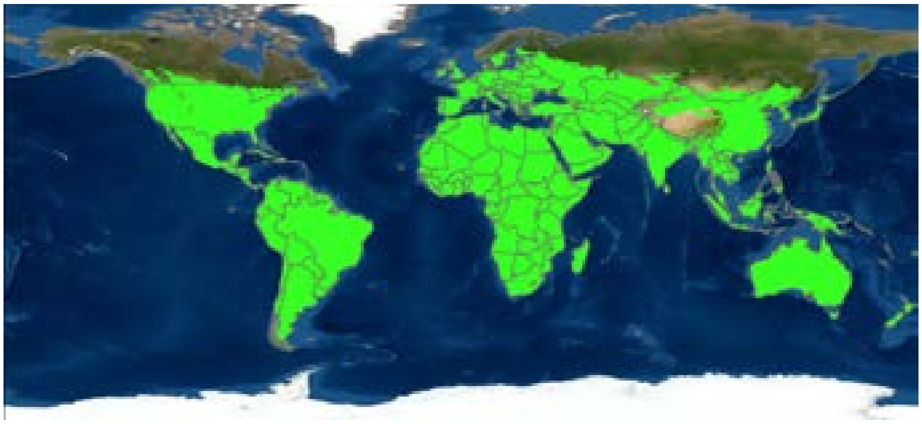
Map 4 - 2: Minimum temperature of Egypt



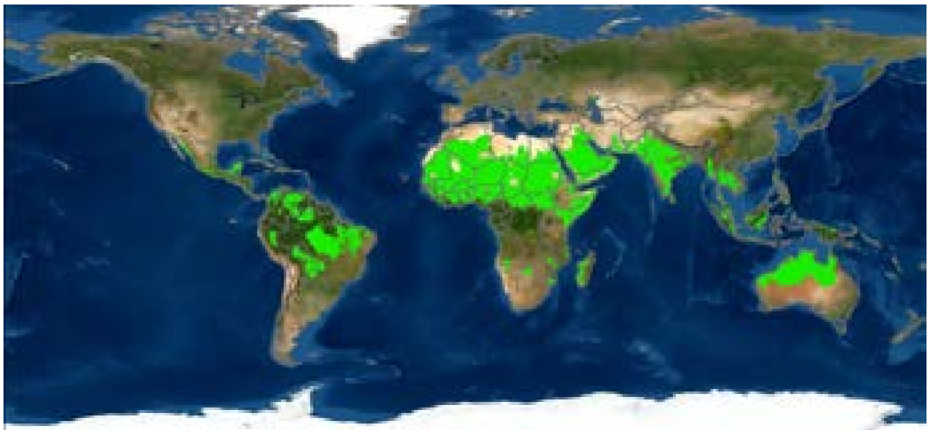
Map 4 - 3: Solar radiation of Egypt



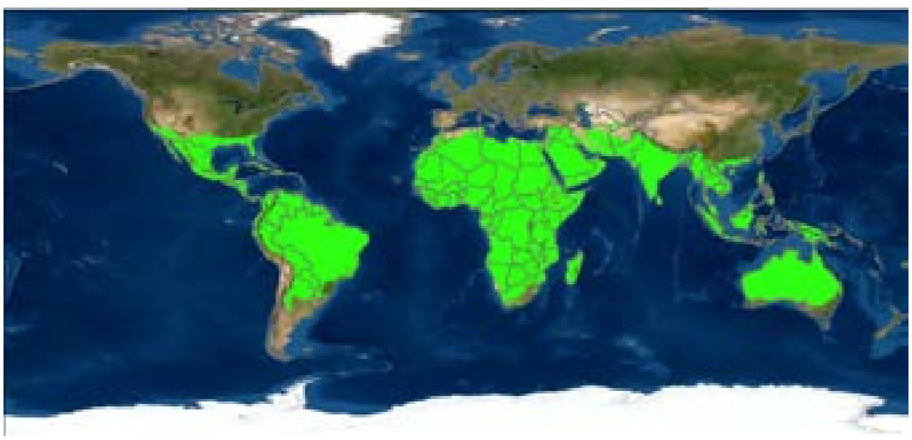
Map 4 - 4: The digital elevation model of Egypt.



Map 4 - 5: The limits temperature for date palm growth and cultivation (9-44°C)



Map 4 - 6: The optimum temperature for date palm growth and cultivation (32-38°C)



Map 4 - 7: The optimum temperature for date palm growth and cultivation (28-38°C)

Date. palm set up flowers at air temperature above 18 ºC during the flowering months of February and March (Map 4-8).

Egypt is considered a suitable area for date palm flowering, except for some high places in southern Sinai and the high areas of Ataka Mountains. The temperature also has a clear effect on the pollen grains germination. The degree of 25-30º C is considered the optimum temperature for pollen grains germination (Map 4-9). The speed of pollen germination decreases rapidly at 43ºC, in addition at the cold weather during the pollination season affects the rate of fruit set (El-Khafagy et al, 1990 - Abdul Basit, 2019).

Fruit set degree

Fruit setting starts at a temperature of 25 ° C, and continues to grow with the temperature rising to 35°C (Map 4-10). The regions of the Arab Republic of Egypt are considered suitable for holding fruits, except for some high places where the temperature drops below 25°C during the months of November and March of each year, These are the areas of central Sinai, the highlands in South Sinai, the Ataka Mountains, and the area of the northwest coast of Matrouh Governorate.

Fruit ripeness degree

In order to produce a successful commercial crop of date palm, specific thermal needs are required that vary according to the cultivars and type of fruits. Where the ripening of the fruits depends on the availability of a daily average temperature above 18°C from early April to October. These are the areas of middle Sinai, the highlands in South Sinai, and Ataka Mountains, south of Suez governorate, limited area at the north of Red Sea governorate and the coastal area located at the north west of Matruh governorate.

4.1.4 Heat units

The importance of studying the thermal needs of date palm cultivars is due to the importance of knowing the possibility of cultivating suitable cultivars and obtaining high-quality production in the appropriate areas. Since it is necessary, before planting any type of date in a new area or importing new cultivars for cultivation, to study the prevailing temperatures in the area based on meteorological data for several years to calculate the thermal units available in it to estimate the success of the desired cultivars.

It was confirmed the necessity of providing specific thermal needs (heat units) during the growing season of fruits. The amount of heat units needed varies according to the different varieties and types of fruits Otherwise, the fruits do not reach the appropriate maturity stage, and therefore the produced fruits do not meet the standard specifications quality of the cultivar when it meets its thermal needs (Map 4-11).

It is possible to calculate the heat units of the cultivar by calculating the period from the month of flowering until the stage of fruiting and harvesting. By days, they differ from one cultivar to another from 120-240 days, as well as the difference according to areas. As well as according to the stage of consumption of the variety in the stage (Khalal - Bisr / soft / date). The heat units are calculated according to the season of growth and ripening of fruits is 184 days, starting from May to the end of October, by calculating, the sum of the average daily average temperature minus 18º (which is the minimum temperature at which fruit growth begins) during this period.

It is also possible to calculate the heat units of the area taking into account the base degree of 18°C, which is the starting degree of the flowers of the date palm. Calculating the period from the beginning of the month in which the temperature rises above 18°C until the month in which the temperature drops below 18°C.

4.1.5 Air humidity

The economical production of date needs a dry atmosphere free from air moisture and rain, especially during the pollination period and the ripening of the fruits. Rainfall and high humidity prior to the pollination season may negatively affect production by impeding the process of pollination and fertilization, as it washes away pollen grains and helps spread fungal diseases (inflorescence rot).

Rainfall during the autumn at the phase of fruits ripening also caused severe damage to the fruits as a result of being infected with many diseases, including the blackening and splitting of the fruits in addition to their exposure to other secondary damages such as rot, fermentation and acidification, which lead to the production damage.

Also, the early winter rainfall before and during the harvest season hinders the collection process and exposes the fruits to infection with the causes of rotting and fermentation. Therefore, in order to obtain good quality fruits, air humidity of less than 40% should be available (Map 4-12).

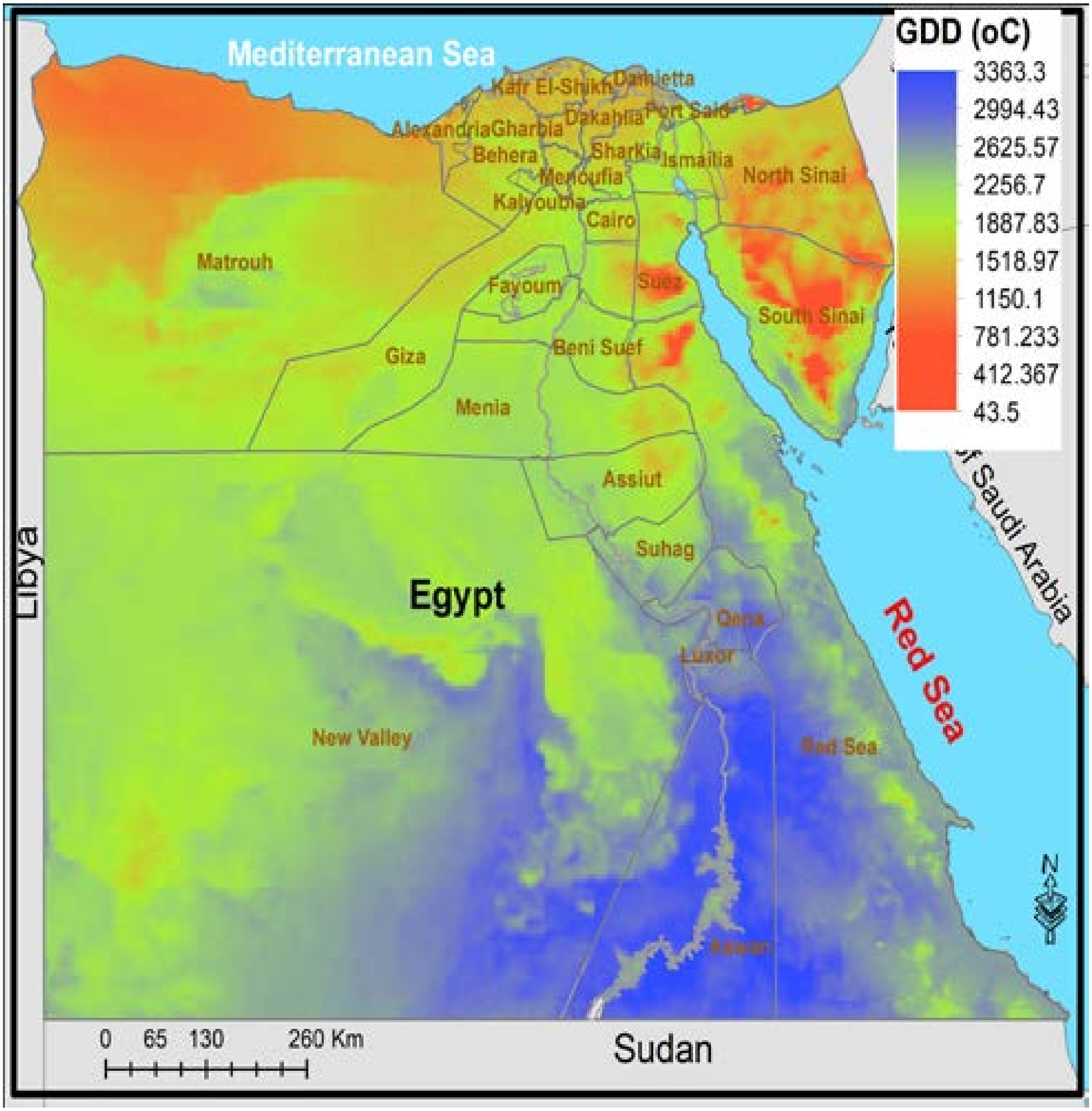
Date palm cultivars vary in their degree of tolerance to the damage of high humidity and rain. It could be divided into:

- High tolerance cultivars
- Medium tolerance cultivars
- Low tolerance cultivars

Map 4- 8: Flowering temperature degree model of date palm.

Map 4- 9: Fruit set degree model of date palm

Map 4- 10: Fruit ripeness degree model of date palm.



Map 4- 11: the heat units of Egypt.

The temperature interacts with the relative humidity to determine the cultivar that can be successfully cultivated in the appropriate area, as the soft cultivar are suitable for areas with annual average relative humidity of 64-72%. While dry cultivars require areas with an annual average relative humidity of not more than 30%. In general, the date palm can withstand a decrease in relative humidity to 5%, as is the case in oases and desert areas Generally, areas with moderate humidity and high temperatures are suitable for date palm cultivation. The relative humidity between 40-60% is considered the upper and lower limits for the growth of date palm trees (Abdul Ghafour, 2018).

4.1.6 Light

The date palm is one of the most fruit trees in need of direct sunlight. Date palm leaves cannot absorb diffused (indirect) light, but a direct light one. Therefore, the lack of direct light absorption may not stimulate the secretion of hormones in the date palm tree, especially the flower hormone (Florigen), which lead to the lack of flowering and thus the lack of fruiting. So the areas with a lot of clouds are not suitable for planting date palm trees (Al-Jubouri and Zayed, 2006).

The effect of light appears during the flowering process between March and April approximately. When the date palm flowers obtain amounts of sunlight that help the date palm complete its various life cycles of vegetative growth, flowering and fruiting. The date palm tree is characterized by its ability to withstand high light intensity compared to other trees. Date palm tree needs a long day with an average of 16 hours of solar radiation.

The average daily sunshine in Egypt ranges between 93 - 108 hours/day. The months of June, July and August are longer and the most months of the year in the average number of hours of sunshine in Egypt. It reaches 14 hours and 4 minutes, 13 hours and 55 minutes, and 13 hours and 55 minutes respectively. So, the sunshine hours in Egypt are appropriate for date palm cultivars (El-Sayed, 2008).

4.1.7 Spatial distribution of date palm:

Knowing the different environmental conditions and their impact on the growth of palm trees and on the quantity and quality of date production. It contributes to determining cultivars to be cultivated, their quality and success, as well as how to make optimal use of them. Also, it identifies the negative factors that hinder the development of date production as well as reaching the optimal model in the date production process.

Date palm cultivation is widespread in most of the governorates of Egypt. The tree has the ability to withstand different natural conditions as well as the date palm is considered one of the most economical, sustainable, productive, and multi-benefit trees.

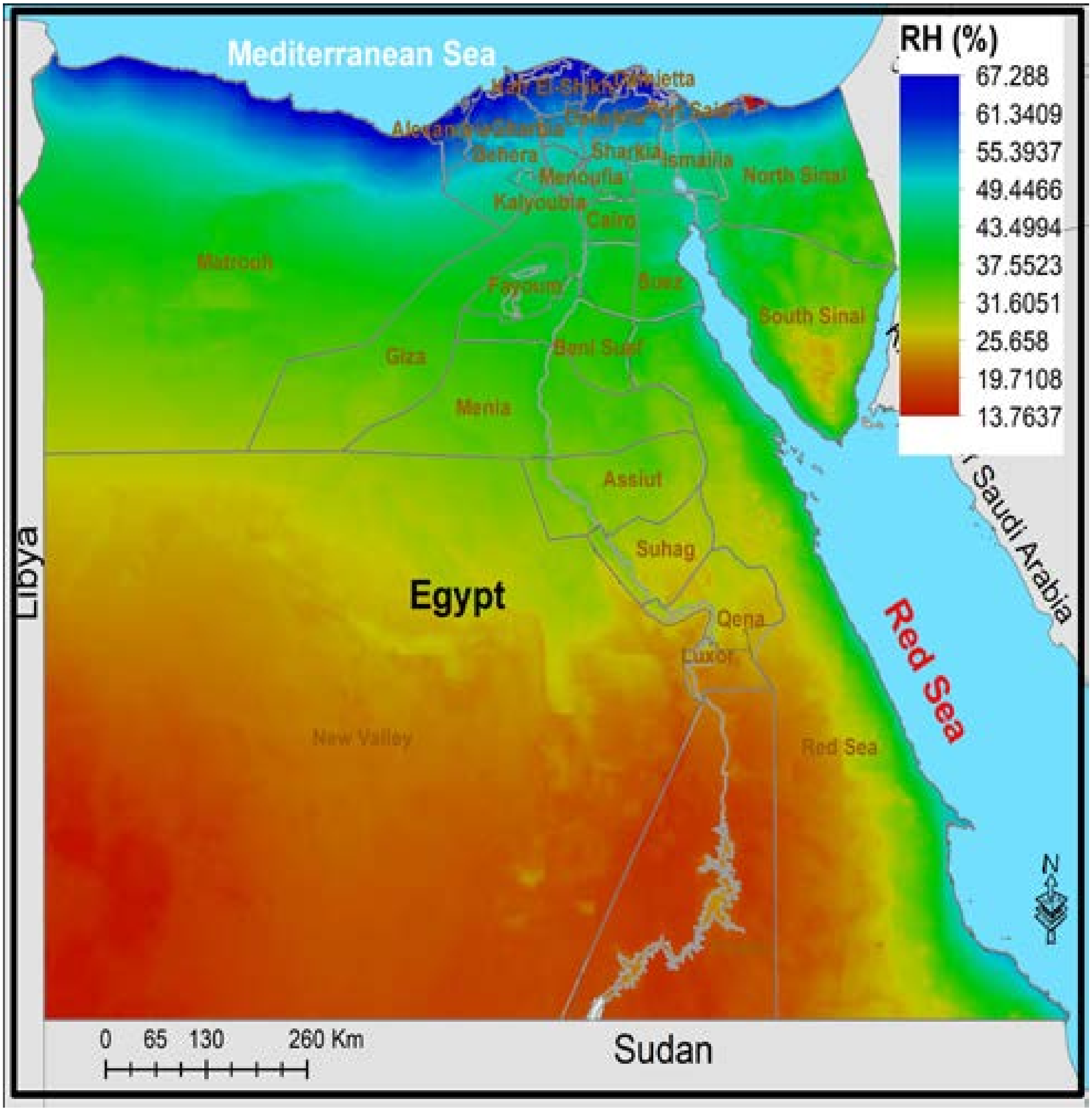
4.1.8 Soft date palm:

Soft date stage: The maturity stage of date complete by hydration of the date tissues It includes cultivars whose fruits vary in color from red to yellow. The fruits of which do not dry naturally to reach the stage of date. They are usually eaten fresh after reaching the stage of maturity or coloring. The fruits of the soft date group are characterized by high moisture content reaching about 30%.

Hgag (2004) calculated the thermal units of different regions of the Arab Republic of Egypt, where he stated that the heat limit degree for the soft date group ranges from 1120-1371. According to a study conducted by the Arab Organization for Agricultural Development (2003), soft cultivars need 1200-1400 eat units during the period of growth and ripening of fruits. Hassan (2021) also emphasized that soft date needs heat units ranging between 1350-1500. Hassan (2021) identified the most appropriate governorates for cultivating soft date in Egypt, which were represented in Seven governorates (Alexandria, Port Said, Dakahlia, Sharqiya, Qalyubia, Monufia, and Beheira). He also confirmed that about 25 million date palm trees have been planted, constituting 52% of the total number of soft fruitful females in Egypt in 2017 outside the climatically appropriate zone, which negatively affects the quantity and quality of the produced fruits.

According to the heat limits of 1200-1400 during the growth and ripening period of the fruits, in addition to the average annual humidity of 64-72%, the spatial distributions of the soft cultivars (Map 4-13) were confined to the northern sector of Nile delta which includes only governorates of Damietta, Kafr El-Sheikh, Beheira, Alexandria and the north coastal region from the west of Alexandria Governorate to the city of Sidi Abdel Rahman In addition to the northern region of North Sinai (north of Lake Bardawil), which includes Bir al-Abed, Romana and Balooza in the North Sinai governorate. This distribution is not a real spatial distribution for the soft cultivars, as they extend to the delta governorates.

Applying the heat limits 1200-1800 during the growth and ripening period of the fruits, in addition to the average annual humidity of 42-72%, the spatial distributions of the soft cultivars (Map 4-14) included the northwestern region of Port Said governorate, Sharqia governorate, and Delta governorates (Damietta, Dakahlia, Kafr El-Sheikh and



Map 4- 12: Annual relative humidity of Egypt.

Map 4- 13: The old spatial distribution of soft date cultivars (heat units of 1200-1400 and average annual humidity of 62-72%).

Map 4- 14: The real spatial distribution of soft date cultivars (heat units of 1200-1800 and average annual humidity of 42-72%).

Gharbia) Monufia and Qalyubia) and the West Delta region in the governorates of Beheira and Alexandria, as well as the northern coastal region from the west of Alexandria governorate to the city of Sidi Abdel Rahman In addition to the northern region of Al-Maghra, north of the Qattara depression, and the reclamation area located north of Siwa Oasis. In addition to North Sinai Governorate and some scattered areas in Giza, Cairo and Suez governorates.

So, the heat units of soft cultivars during the period of fruit growth and ripening needs heat units of 1200-1800 and average annual humidity of 42-72%.

4.1.9 Semi-dry (Semi-soft) date palm:

Fruits of semi-dry date characterize by medium moisture content at full maturity. Fruits contain high quantities of dissolved solids, most of which are sugars, Semi-dry fruits partially loss the hydration stage to the relative dryness stage, but it doesn't get hardness and it keeps their characteristics and quality as well as suitability for consumption for a long period of time The moisture content of these fruits is between 20-30%.According to a study conducted by the Arab Organization for Agricultural Development (2003), the semi-dry varieties need 1600-1800 heat units during the period of growth and ripening of fruits The heat unites of semi-dry date is ranging between 1500-1900 during the period of flowering, fruit growth and ripening (Abdelrahman, 2007 & Hassan, 2021), According to these heat limits, Hassan (2021). identified the most suitable governorates for cultivating semi-dry date in Egypt, which are identical in eight governorates, namely Cairo, Suez, Ismailia, Giza, Faiyum, Ben Suef, Minya, and the Red Sea. According to these thermal limits, Hassan (2021) concluded that there are 55 million fruitful semi-dry date palm, constituting 17% of the total number of semi-dry date palm It locates outside the climatically appropriate zone, which negatively affects the quantity and quality of the produced fruits.

Applying the heat units from 1500-1800 during the growth and ripening period of the fruits, in addition to the average annual humidity of 40%, the spatial distributions of the semi-dry cultivars (map 4-15) included the area lies between 2830° - 3030° latitude .

This distribution is unrealistic for semi-dry varieties, as some climatically suitable areas are outside the spatial distribution of semi-dry date .

Therefore, the heat limits of 1801-2600 during the growth and ripening period of the fruits, in addition to the average annual humidity of 25-41%, is the ideal distribution for the semi-dry cultivars in Egypt. The regions include the south of Matruh governorate, including Siwa Oasis, Al Qara, Qattara Depression, south of Maghra, north of New Valley governorate, including Dakhla and Kharga Oasis, south of Giza and Bahariya Oasis, Minya Governorate, including reclamation areas of west-west Minya, governorates of Faiyum, Beni Suef, Assiut, Sohag and the area located at the north Qena governorate, Red Sea governorate, south of Suez governorate, and coastal desert areas located on the Gulf of Suez and Aqaba in South Sinai governorate (Map 4-16).

4.1.10 Dry date palm:

They are cultivars whose fruits completely dry up at maturity without losing the elements of quality, as the percentage of moisture content of the fruits becomes dry, It can be stored for long periods, The date are dried by exposing them to the sun and the moisture of their fruits is less than 20%.

According to a study conducted by the Arab Organization for Agricultural Development (2003), date dry cultivars need 2500- 3000 heat units or more during the period of growth and ripening of fruits. While Hassan (2021) confirmed that the dry dated need 1900-2600 heat units or more during the flowering, growth and ripening period of the fruits. He also listed the most suitable climatically appropriate governorates for cultivating dry date in Egypt. They are eight governorates, represented by all the governorates of Upper Egypt. The New Valley, the Red Sea, and the desert of South Sinai governorates.

These results were obtained as a result of applying thermal limits only, while when applying the climatic double criterion between the thermal limits (1900-3000) and the relative humidity (less than 30%), we find that South Sinai came out of the climatic range suitable for dry date in Egypt (Map 4-17) .

When comparing the heat units recorded in the areas of dry date cultivation in Egypt during the setting, growth and ripening period of the fruits, it became clear the necessity of increasing the heat limits and applying the double climatic criterion between the thermal limits (2500-2400) and the relative humidity (less than 25%) dry cultivars can be grown in areas south of latitude 2530° to the southern borders of the Arab Republic of Egypt, confined longitudinally between longitudes 2830° - 3430° (Map 4-18).

Applying the dual climatic criterion between the thermal limits recorded in the references (Map 4-19), it was shown that large areas of Egypt are out of the climatic cultivation zone of date palm types (soft - semi-dry - dry), although the date cultivations are abundant in these areas These areas are represented in the area bounded between latitudes 2530° - 2850°, which includes Bahariya, Kharga, Dakhla, Oases and south Siwa Oasis, the governorates of Minya, Assuit, Sohag, Qena and Luxor, as well as the middle and south of Nile Delta and North Sinai. When comparing the heat units recorded in the cultivation areas of the date palm groups in Egypt during the period of the setting, growth and ripening of the fruits, it is clear of increasing the heat limits and applying the double climatic criterion between the thermal limits and relative humidity as follows (Map 4-20):

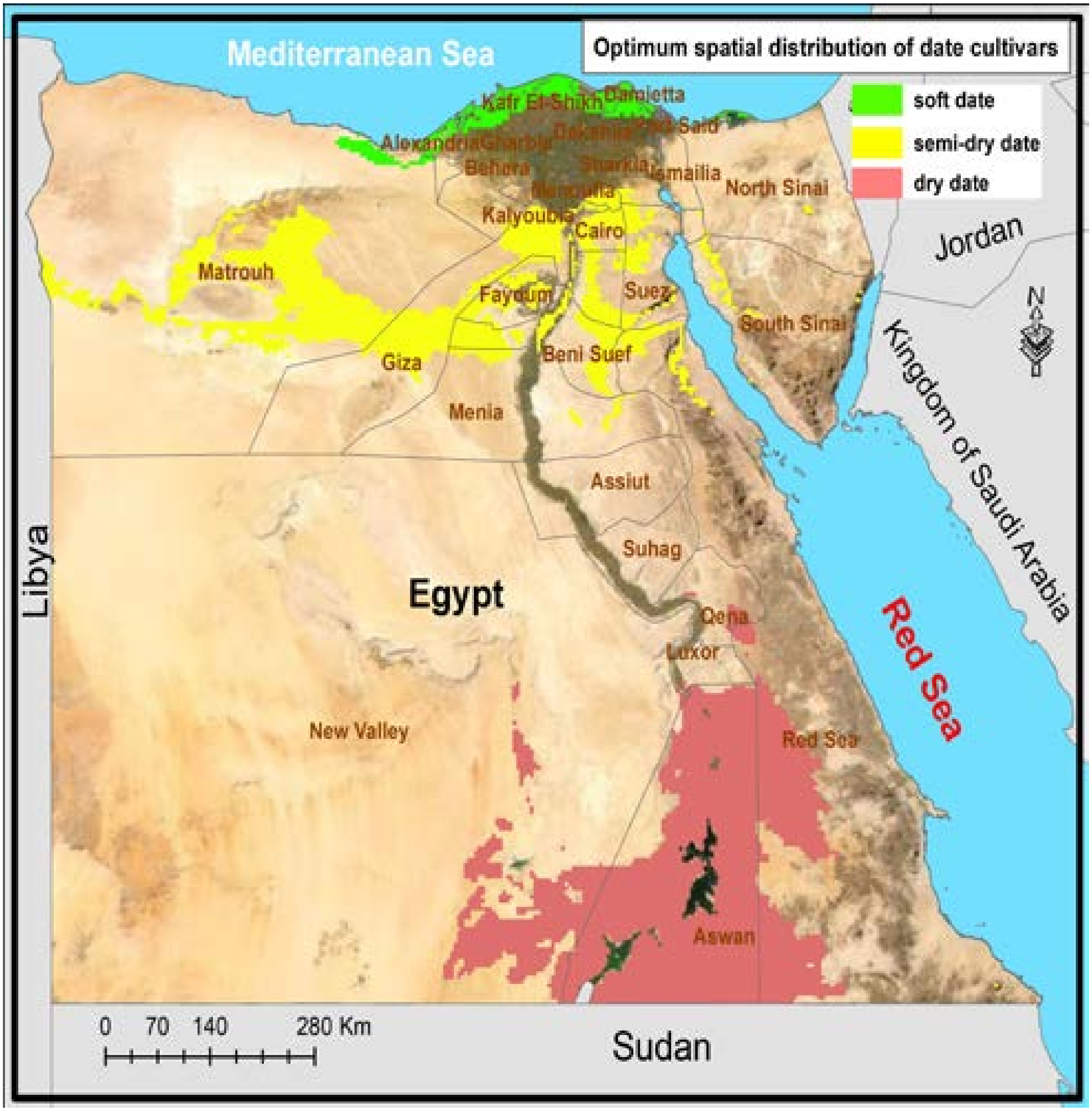
- Soft date: 1200-1800 heat unit and relative humidity of 42-72%.
- Semi-dry date: 1801-2600 heat units, and relative humidity from 25-41%.
- Dry date: 2500-3400 heat units, and the relative humidity is less than 25%.

Map 4- 15: The old spatial distribution of semi-dry date cultivars (heat units of 1500-1800 and average annual humidity 40%).

Map 4- 16: The real spatial distribution of semi-dry date cultivars (heat units of 1801-2600 and average annual humidity of 25-41%).

Map 4- 17: The old spatial distribution of dry date cultivars (heat units of 1900-2500 and average annual humidity < 30%).

Map 4- 18: The real spatial distribution of dry date cultivars (heat units of 2500-3400 and average annual humidity of <25%).



Map 4- 19: The spatial distribution of date groups according to the most applied reference.

Map 4- 20: The real spatial distribution of date palm groups.

Chapter 5

The main date palm cultivars in Egypt

5.1

Cultivars that market at Khalal stage

5.1.1 Selmi

A. Fruits characteristics

Fruit data

Parameter	Character State	Score
Fruit length	(cm.)	4.16±0.59
Fruit width	(cm.)	2.54±0.22
Fruit weight	(gm.)	25.00±5.11
Fruit volume	(cm3)	27.50±4.66
Fruit shape	Obviate-elongate	
Fruit apex	Blunt	
Fruit base	Truncate and emarginated	
Fruit colour (khalal)	Brown-yellow	
Fruit colour of the maturity	Pale brown	
Flesh thickness	(cm.)	0.85
Flesh colour	White	
Flesh texture	Firm	
Flavour	Good	
Flesh taste	Delicious-sweet	

B. Fruits production & storing

Fruits production & storing

Parameter	Character State	Score
Suitable environmental conditions		
Ideal heat unites	Unit	1600-1900
Ideal humidity	%	50-60
Current area of cultivation	Ismailia-Suez-Desert-Alexandria Road	
Cultivated area	Fadden	8×8
Tree No.	Tree	65
Harvest Time	Mid-September	
Harvest stage	The beginning of the Khalal stage	
Harvest period	Week	1-2
Harvest times	Times	1
Production quantity	Kg/tree	120-90
Production area	Ton/Fadden	7.5- 5

Total Area, Yield and Production for Selmi

Production (Ton)	Yield (K. G.\Palm)	Fruiting palm (Palm)	Area (Fed.)
2,876	105	27,370	452

Source: measurements of the team at the cultivation area.

Storage & distribution

Short term storage	week	12
Long term storage	week	2
Refrigerator temperature	°C	0-4
Storage ability	Week	3-5
Shelf time	Day	10-14

C. Fruits consumption & marketing

Sales & Marketing

Fruit stage for marketing	**Khalal (yellow)**	
Fruit stage for export	At the beginning of khalal (Pale yellow)	
Markets types	Local & National	
Quality	Good	
Future markets	Asia, China and neighbouring countries	
Marketing opportunities	Acceptable	
Marketing time	September	
Marketing period	Week	6
Nature of the product	Fresh	
Price value/ Kg	Dollar	1.2
Consumption		
Consumption stage	Khalal - soft	
Fruit humidity	%	50< 40-45

D. Current Agro-production map

Total Area, Yield and Production for Selmi cultivar

Governorates	Selmi			
	Production	Yield	F. Palm	Area
	(Ton)	(K. G.\ Palm)	(Palm)	(Fed.)
Sharkia	349	107	3,250	50
Ismailia	2,104	103	20,520	342
Suez	423	118	3,600	60
Total	2,876	105	27,370	452

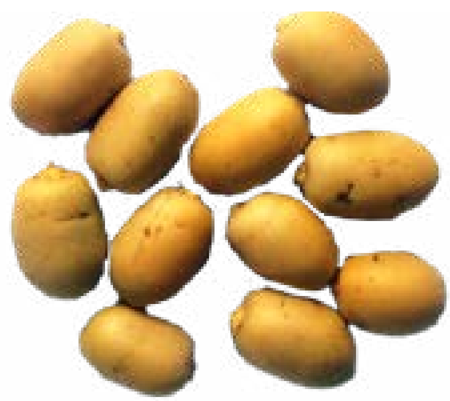
Source: measurements of the team at the cultivation area.

E. Agro-climate map

Excellent quality degree

Regarding the excellent quality degree of the Selmi cultivar, the optimum heat units range between 1600° C and 1900° C, and the relative humidity of 50-60% during the period of flowering, growth and ripening of fruits from April to October. The most suitable areas (Late harvest) for the cultivation of Selmi cultivar in Egypt (Map.5-1), are represented in the following areas:

- The coastal area from Al-Arish valley extends to the west of North Sinai and Port Said Governorates.
- East Delta region in the northern region of Ismailia and Sharkia Governorates and some limited areas around the Bitter Lakes in the center of Ismailia Governorate.
- Areas in the middle of Nile Delta in Kafr El Sheikh Governorate and the areas extend between eastern Dakahlia



Governorate and western Gharbia Governorate, and limited areas in the common area between southern Gharbia Governorate and northern Menoufia Governorate.

- The areas locate in the Suez Gulf of South Sinai Governorate.
- West Delta area in the middle of Beheira Governorate extends to some areas in the west of Alexandria Governorate.
- The area of Matruh Governorate extends between Wadi El-Natrun (west of the Beheira Governorate) to Moghrah area and the east of the Qattara Depression.

Very good quality degree

Regarding the "very good" quality degree of the Selmi cultivar, the optimum heat units range between 1901° C and 2000° C and the relative humidity of 45-49% during the period of flowering, growth and ripening of fruits from April to October. The most suitable areas (Intermediate harvest) for the cultivation of Selmi cultivar in Egypt (Map.5-2), are represented in the following areas:

- The area locates east-north of the Qattara Depression towards Moghrah area.
- Most of areas of Ismailia Governorate.
- Areas locate opposite to the Suez Gulf in Suez Governorate and South Sinai Governorate.

- East of Suez Governorate.
- Belbeis area of Sharkia Governorate.
- Badr area of Beheira Governorate.

Good quality degree

Regarding the "good" quality degree of the Selmi cultivar, the optimum heat units range between 2001° C and 2100° C and the relative humidity of 35-44% during the period of flowering, growth and ripening of fruits from April to October. The most suitable areas (Early harvest) for the cultivation of Selmi cultivar in Egypt (Map.5-3), are represented in the following areas:

- Area covering South Giza, Fayoum, Beni Suef and Minya Governorates (from east to west and west-west of Minya).
- The areas south of Suez Governorate and the northern eastern areas of the Red Sea Governorate (corresponding to Minya Governorate).
- Some areas locate on the Gulf of Suez of South Sinai Governorate.
- The area of Qattara Depression.

Aggregate agricultural areas

Referring to the climatic analyzes and the needs of the fruits for the different quality levels, and comparing the heat and moisture needs of the Selmi cultivar during the period of flowering, growth and ripening of the fruits from April to October with the heat units recorded for the same period in the Governorates, it was possible to determine the agricultural areas suitable for production Selmi cultivar in Egypt (Map 5-4) is as follows:

- It is well cultivated in the Nile Delta and West Delta regions in Beheira Governorate and extends to the Moghrah and Qattara Depression areas of the Matruh Governorate. It can also be grown in places east of the delta, the northern region of North Sinai Governorate, and the Suez Canal region. Salami can be grown in central Egypt and the Fayoum area.
- Taking into account the agricultural production standards that are concerned with good agricultural practices and the requirements for different agricultural activities inside the farm, the required quality can be obtained in the specified places for each appropriate quality grade.

Excellent quality degree

Map 5- 1: Spatial distribution of Selmi cultivar "Excellent Quality" Optimum temperature unites between 1600-1900°C and relative humidity of 50-60%

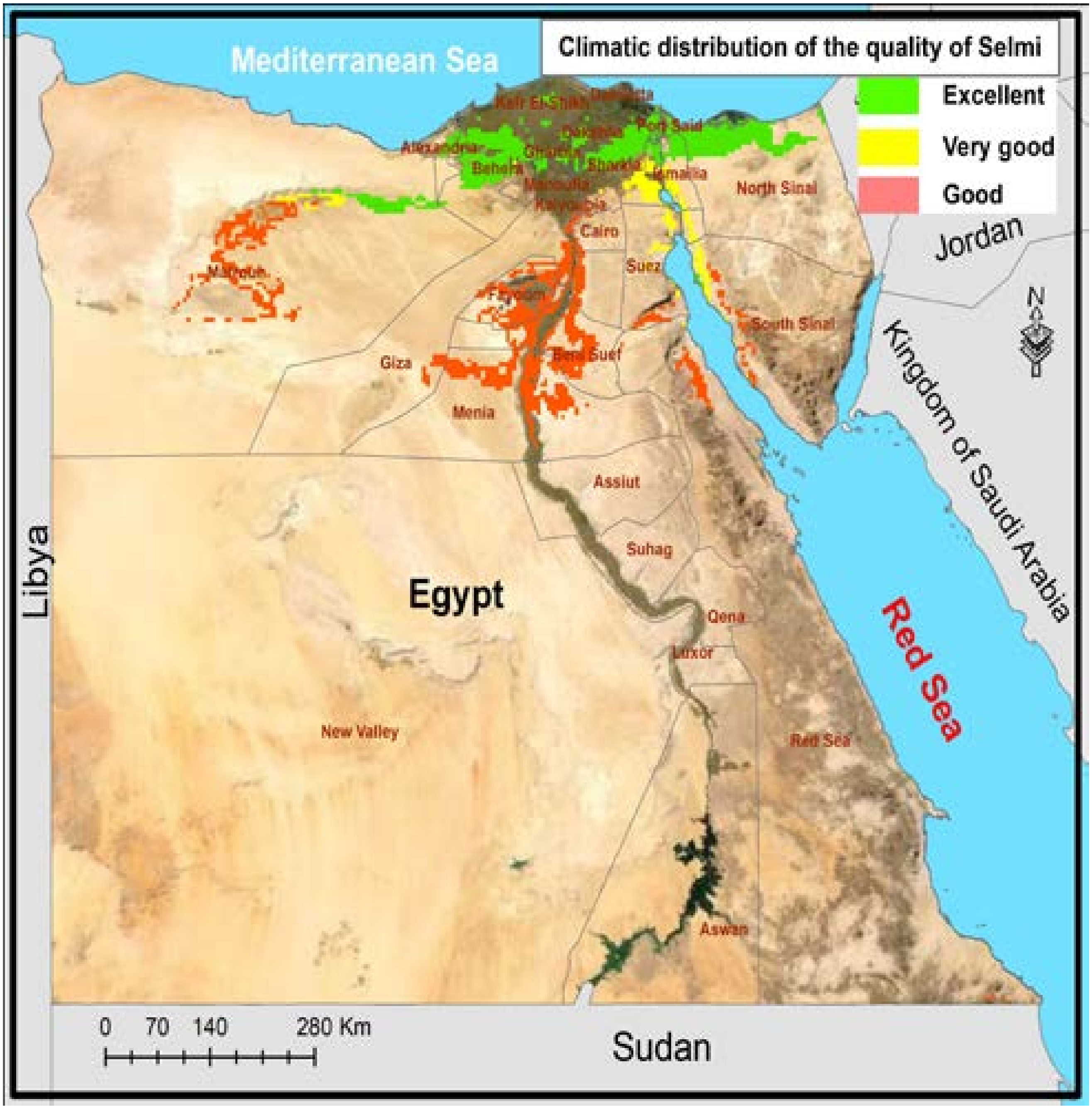
Very good quality degree

Map 5- 2: Spatial distribution of Selmi cultivar "Very good Quality" Optimum temperature unites between 1901-2000°C and relative humidity of 45-49%

Good quality degree

Map 5- 3: Spatial distribution of Selmi cultivar "Good Quality" Optimum temperature unites between 2001-2100°C and relative humidity of 35-44%

Aggregate agricultural areas



Map 5- 4: Spatial distribution of Selmi cultivar “three grade quality”

5.1.2 Zaghloul

A. Fruits characteristics

Fruit data

Parameter	Character State	Score
Fruit length	(cm.)	5.86±0.78
Fruit width	(cm.)	2.66±0.18
Fruit weight	(gm.)	22.66±3.77
Fruit volume	(cm3)	26.02±4.39
Fruit shape	Cylindrical	
Fruit apex	Obtuse	
Fruit base	Truncate	
Fruit colour (khalal)	Shiny red	
Fruit colour of the maturity	Dark red	
Flesh thickness	(cm.)	0.85
Flesh colour	White	
Flesh texture	Firm	
Flavour	Good	
Flesh taste	Delicious-sweet	

B. Fruits production & storing

Fruits production & storing

Parameter	Character State	Score
Suitable environmental conditions		
Ideal heat unites	Unit	1500-1800
Ideal humidity	%	50-65
Current area of cultivation	Lower Egypt Governorates	
Cultivated area	Fadden	8×8
Tree No.	Tree	65
Harvest Time	Mid-September	
Harvest stage	The end of the Khalal stage (dark red)	
Harvest period	Week	2
Harvest times	Times	1
Production quantity	Kg/tree	75- 120
Production area	Ton/Fadden	4.5- 7.5

Total Area, Yield and Production for Zagloul

Production (Ton)	Yield (K. G.\Palm)	Fruiting palm (Palm)	Area (Fed.)
156,767	116	1,354,742	11,534

Source: Economic Affairs Sector (Average of 5y) (2016-2020)

Storage & distribution

Short term storage	week	1
Long term storage	week	2
Refrigerator temperature	°C	0-4

Storage ability	Week	3-4
Shelf time	Day	10-7

C. Fruits consumption & marketing

Sales & Marketing

Fruit stage for marketing	Khalal	
Fruit stage for export	At the beginning of khalal	
Markets types	Local & National	
Quality	Good	
Future markets	Neighbouring countries	
Marketing opportunities	Very Weak	
Marketing time	September - October	
Marketing period	Week	8
Nature of the product	Fresh	
Price value/ Kg	Dollar	0.5
Consumption		
Consumption stage	Khalal - soft	
Fruit humidity	%	50-40

D. Current Agro-production map

Total Area, Yield and Production for Zaghloul cultivar (Average 5Y) (2016-2020)

Governorates	Zagloul			
	Production	Yield	F. Palm	Area
	(Ton)	(K. G.\Palm)	(Palm)	(Fed)
Alexandria	5,736	108	52,889	306
Beheira	52,122	115	453,240	5,738
Gharbia	2,852	102	28,034	180
Kafr-El Sheikh	3,095	116	26,682	81
Dakahlia	1,983	101	19,702	252
Damietta	193	100	1,928	
Sharkia	25,091	157	160,016	133
Ismailia	14,169	128	110,697	342
Suez	785	90	8,716	8
Menoufia	8,741	124	70,385	55
Qalyoubia	2,808	115	24,419	52
Cairo	540	63	8,577	521
Lower Egypt	118,115	122	965,285	7,668
Giza	5,208	150	34,723	394
Beni Suef	416	90	4,624	1
Fayoum	6,001	132	45,529	553
Middle Egypt	11,625	137	84,876	948
Assuit	746	80	9,330	125
Luxor	82	40	2,025	30
Upper Egypt	828	73	11,355	155
Inside the valley	130,568	123	1,061,516	8,771
Red Sea	240	50	4,800	9
Noubaria	25,959	90	288,426	2,754
Outside the valley	26,199	89	293,226	2,763
Total	156,767	116	1,354,742	11,534

Source : Economic Affairs Sector

E. Agro-climate map

Excellent quality degree

Regarding the "excellent" quality degree of the Zaghloul cultivar, the optimum heat units range between 1500° C and 1800° C and the relative humidity of 50-65% during the period of flowering, growth and ripening of fruits from April to October. The most suitable areas (Late harvest) for the cultivation of the Zaghloul cultivar in Egypt (Map. 5-5), are represented in the following areas:

- The north coastal area of North Sinai Governorate.
- East Delta region of Port Said, Sharkia and Damietta Governorates.
- The areas at north of Ismailia Governorate and some limited areas around the Bitter Lakes at the center of Ismailia Governorate.
- Limited areas locate in the Suez Gulf of South Sinai Governorate.
- Most areas in the middle of Nile Delta in Kafr El Sheikh, Damietta, Dakahlia and Gharbia Governorate.
- West Delta area of most Alexandria Governorate and

the northern area of Beheira Governorate extend to some area of Matruh Governorate that extends between Wadi El-Natrun (west of the Beheira Governorate) to Moghrah area.

Very good quality degree

Regarding the "very good" quality degree of the Zaghloul cultivar, the optimum heat units range between 1901° C and 2000° C and the relative humidity of 45-49% during the period of flowering, growth and ripening of fruits from April to October. The most suitable areas (Intermediate harvest) for the cultivation of the Zaghloul cultivar in Egypt (Map. 5-6), are represented in the following areas:

- The area locates in the north of Qattara Depression includes the west of Moghrah area of Matruh Governorate.
- The areas of Badr district in Beheira Governorate including some limited area in the south and extend to Tahrir and Sadat areas of Menoufia Governorate.
- South areas and limited area of middle Menoufia Governorate.
- South of Qalyubia Governorate and Benha district as well as the reclamation area west of El-Obour (Orabi).

- Limited area of north Giza Governorate.
- South of Sharkia Governorate and most area of Ismailia Governorate extend south-word to Suez Governorate and locations around the Suez Gulf in Suez and South Sinai Governorates.

Good quality degree

Regarding the "good" quality degree of the Zaghloul cultivar, the optimum heat units range between 2001° C and 2100° C and the relative humidity of 40-44% during the period of flowering, growth and ripening of fruits from April to October. The most suitable areas (Early harvest) for the cultivation of the Zaghloul cultivar in Egypt (Map. 5-7), are represented in the following areas:

- The area around Qattara Depression of Matruh Governorate.
- Limited areas locate North Cairo Governorate extends to south-east area of Qalyubia Governorate as well as the west longitudinal sector of Cairo Governorate.
- Most areas of Giza, Fayoum and some limited north areas Beni Suef Governorate.
- The areas south of Suez Governorate and the northern eastern areas of the Red Sea Governorate (corresponding to Minya Governorate).
- Some areas locate on the Gulf of Suez of South Sinai Governorate.

Aggregate agricultural areas

Referring to the climatic analyzes and the needs of the fruits for the different quality levels, and comparing the heat and moisture needs of the Zaghloul cultivar during the period of flowering, growth and ripening of the fruits from April to October with the heat units recorded for the same period in the Governorates, it was possible to determine the agricultural areas suitable for production Zaghloul cultivar in Egypt (Map 5-8) is as follows:

- It could be cultivated in the northern coastal area of north Sinai Governorate extends to Nile Delta and Moghrah and Qattara Depression. Also could be cultivated in east delta region and Suez Canal & gulf area.
- Taking into account the agricultural production standards that are concerned with good agricultural practices and the requirements for different agricultural activities inside the farm, the required quality can be obtained in the specified places for each appropriate quality grade.

Excellent quality degree

Map 5- 5: Spatial distribution of Zaghloul cultivar "Excellent Quality" Optimum temperature unites between 1500-1800°C and relative humidity of 50-65%

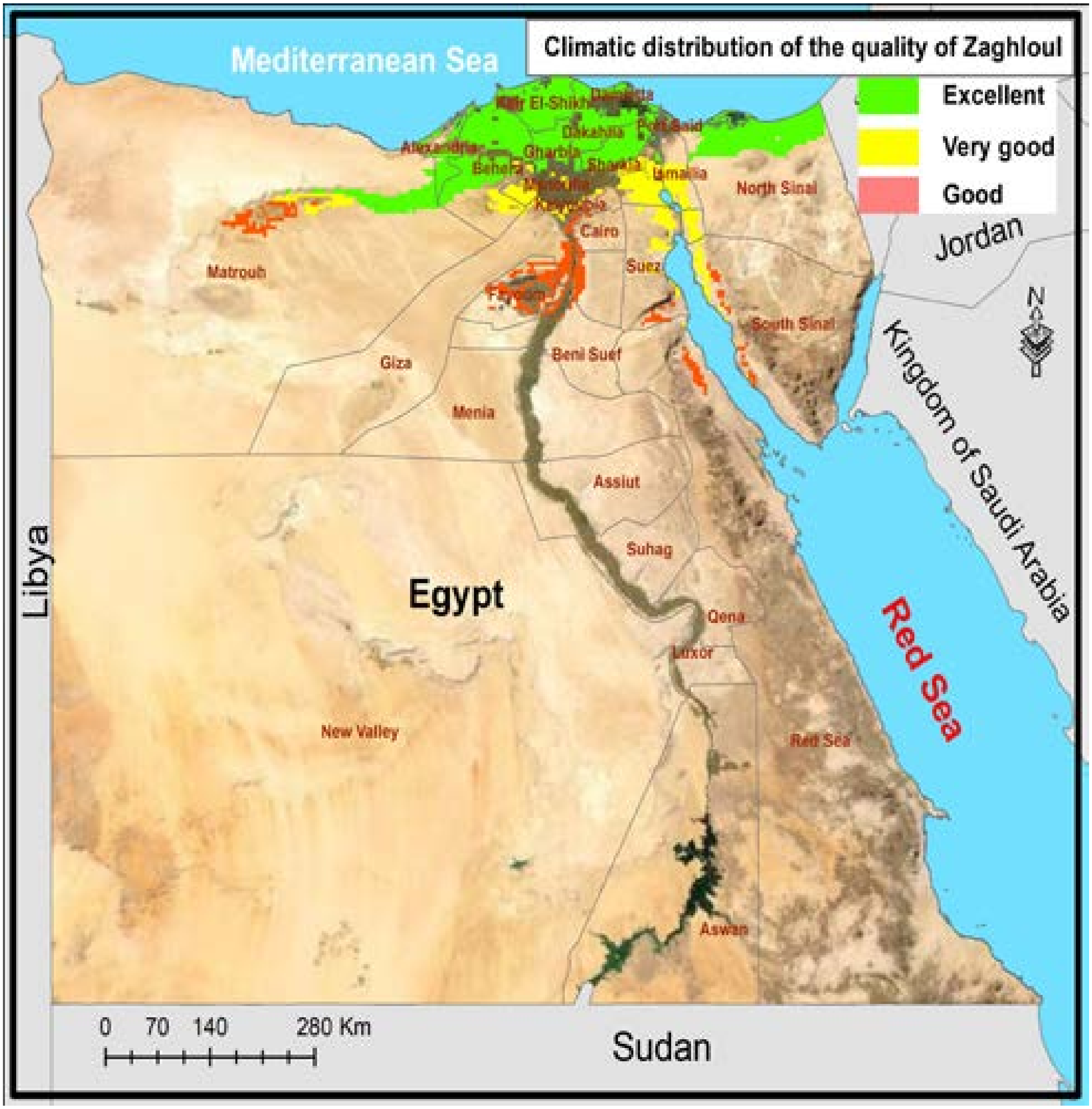
Very good quality degree

Map 5- 6: Spatial distribution of Zaghloul cultivar "Very good Quality" Optimum temperature unites between 1801-2000°C and relative humidity of 45-49%

Good quality degree

Map 5- 7: Spatial distribution of Zaghloul cultivar "Good Quality" Optimum temperature unites between 2001-2100°C and relative humidity of 40-44%

Aggregate agricultural areas



Map 5- 8: Spatial distribution of Zaghloul cultivar “three grade quality”

5.2

Cultivars that market at soft stage

5.2.1 Amhaat

A. Fruits characteristics

Fruit data

Parameter	Character State	Score
Fruit length	(cm.)	3.50±0.28
Fruit width	(cm.)	2.16±0.04
Fruit weight	(gm.)	8.90±1.26
Fruit volume	(cm3)	8.32±1.15
Fruit shape	Falcoid-elongate	
Fruit apex	Obtuse	
Fruit base	Truncate	
Fruit colour (khalal)	Pale yellow	
Fruit colour of the maturity	Brownish black	
Flesh thickness	(cm.)	0.65
Flesh colour	Cream-brown	
Flesh texture	Soft	
Flavour	Good	
Flesh taste	Delicious	

B. Fruits production & storing

Fruits production & storing

Parameter	Character State	Score
Suitable environmental conditions		
Ideal heat unites	Unit	1800 - 2000
Ideal humidity	%	45 - 55
Current area of cultivation	Giza & Fayoum Governorates	
Cultivated area	Fadden	8×8
Tree No.	Tree	65
Harvest Time	Mid-August: mid-September	
Harvest stage	Soft stage	
Harvest period	Week	1
Harvest times	Times	1
Production quantity	Kg/tree	120-200
Production area	Ton/Fadden	7- 12

Total Area, Yield and Production for Amhat

Production (Ton)	Yield (K. G.\ Palm)	Fruiting palm (Palm)	Area (Fed.)
30,539	125.62	243,111	2,199

Source: Economic Affairs Sector (Average of 5y) (2016-2020)

Storage & distribution

Short term storage	week	>1
Long term storage	week	1
Refrigerator temperature	°C	0-(-5)
Storage ability	Week	4
Shelf time	Day	3-5

C. Fruits consumption & marketing

Sales & Marketing

Fruit stage for marketing	Soft stage	
Fruit stage for export	khalal	
Markets types	Local & national	
Quality	Acceptable	
Future markets	Asia and neighbouring countries	
Marketing opportunities	Very Weak	
Marketing time	Mid September – Mid October	
Marketing period	Week	4
Nature of the product	Fresh	
Price value/ Kg	Dollar	0.5
Consumption		
Consumption stage	Soft -soft	
Fruit humidity	%	30-40

D. Current Agro-production map

Total Area, Yield and Production for Amhat cultivar (Average 5Y) (2016-2020)

Governorates	Amhat			
	Production	Yield	F. Palm	Area
	(Ton)	(K. G.\Palm)	(Palm)	(Fed)
Beheira	43	62.139	692	
Gharbia	13	118.182	110	1
Dakahlia	116	100.259	1157	4
Sharkia	942	124.818	7547	
Ismailia	1558	174.546	8926	95
Suez	67	73.789	908	2
Menoufia	155	114.560	1353	
Qalyoubia	263	110.273	2385	3
Cairo	95	65.292	1455	
Lower Egypt	3252	132.556	24533	105
Giza	16942	123.578	137096	2022
Beni Suef	358	109.917	3257	
Fayoum	9987	127.670	78225	72
Middle Egypt	27287	124.839	218578	2094
Inside the valley	30539	125.618	243111	2199
Total	30539	125.618	243111	2199

Source : Economic Affairs Sector

E. Agro-climate map

Excellent quality degree

Regarding the excellent quality degree of the Amhat cultivar, the optimum heat units range between 1800° C and 2000° C and the relative humidity of 45-55% during the period of flowering, growth and ripening of fruits from April to October. The most suitable areas (Late harvest) for the cultivation of the Amhat cultivar in Egypt (Map 5-9), are represented in the following areas:

- The area of Qattara depression and west of Moghrah area of Matruh Governorate.
- West Delta area in the middle of Beheira Governorate and the eastern area of Wadi El-Natrun extend to the south-west area of Menoufia Governorate.
- South of Qalyubia Governorate and Benha district as well as the reclamation area at west of El-Obour (Orabi).
- Limited area in the north of Giza Governorate, Suez canal region from south of Port Said Governorate and south of Sharkia Governorate and Ismailia Governorate extends to Suez Governorate, including area around Gulf of Suez in Suez and south Sinai Governorates.

- Limited area of Red Sea Governorate in the coastal area extends from Zaafrana to Hurghada.
- The areas locate in the west of North Sinai Governorate occupied the west of Sahl El-Teena.

Very good quality degree

Regarding the "very good" quality degree of the Amhat cultivar, the optimum heat units range between 2001° C and 2100° C and the relative humidity of 40-44% during the period of flowering, growth and ripening of fruits from April to October. The most suitable areas (Intermediate harvest) for the cultivation of the Amhat cultivar in Egypt (Map 5-10), are represented in the following areas:

- The area of Qattara Depression extends west to Qara Oasis.
- The longitudinal west and east sectors of Fayoum Governorate.
- The northern-east area of Cairo Governorate adjacent to Qalyubia Governorate.
- The south-west area of Cairo Governorate extends to the south of Giza Governorate and the northern area of Beni Suif.
- The areas locate in the Suez Gulf of South Sinai Governorate.
- The south area in Suez Governorate adjacent to Red Sea Governorate.
- The desert areas in Red Sea Governorate from Ras Ghareb extended northward to Amba Paula Monastery.

Good quality degree

Regarding the "good' quality degree of the Amhat cultivar, the optimum heat units range between 2101° C and 2200° C and the relative humidity of 36-39% during the period of flowering, growth and ripening of fruits from April to October. The most suitable areas (Early harvest) for the cultivation of the Amhat cultivar in Egypt (Map 5-11), are represented in the following areas:

- The area locates in north and south Qattara Depression (south the second quality area) and Qara Oasis .
- The longitudinal desert area in Minya Governorate extends west and east.
- Limited areas locate at the Suez and Aqaba Gulfs at South Sinai Governorate.

- The desert areas in Red Sea Governorate from Ras Ghareb extended southward to Ras Shoqeer.

Aggregate cultivation areas

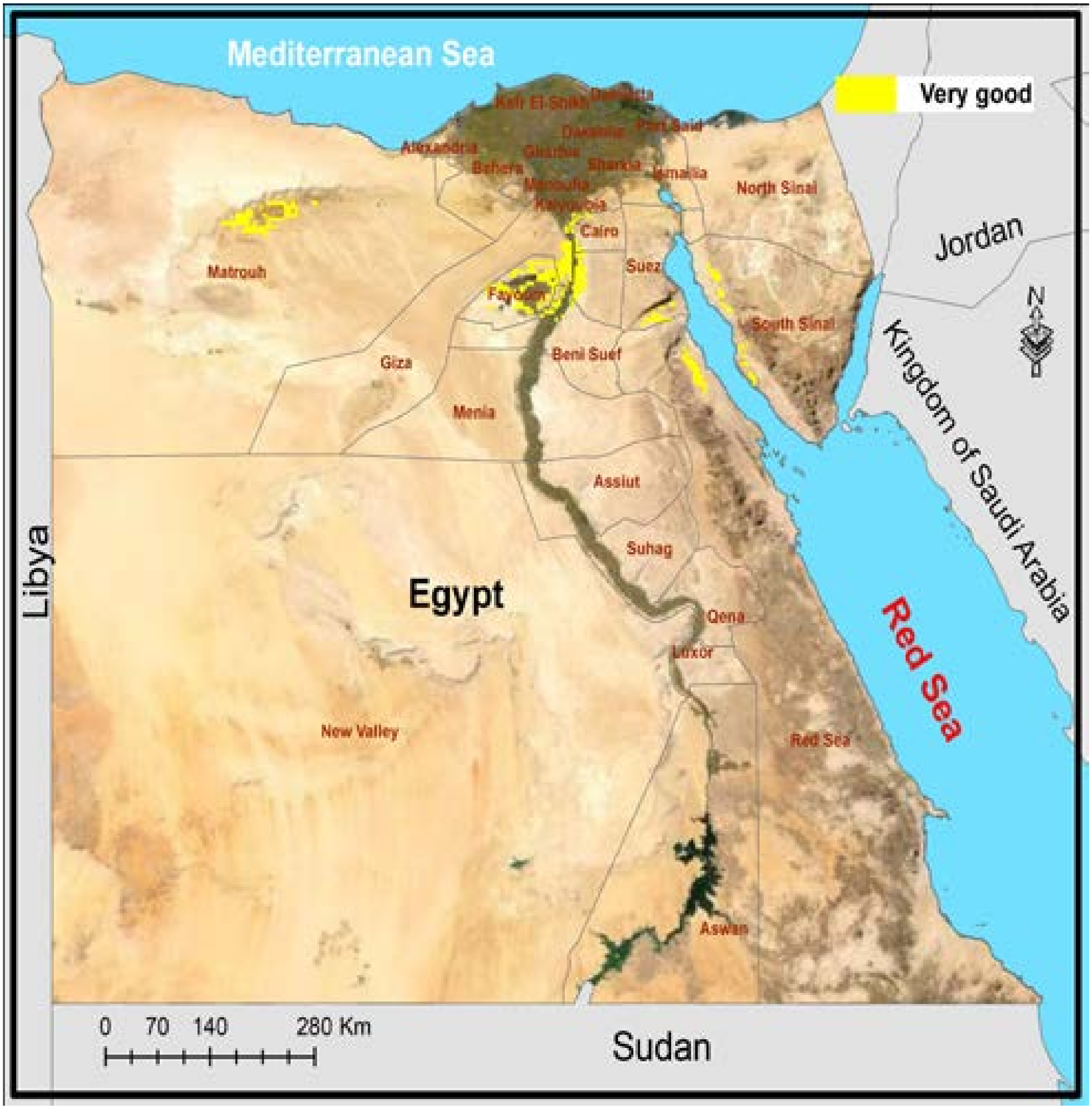
Referring to the climatic analyzes and the needs of the fruits for the different quality levels, and comparing the heat and moisture needs of the Amhat cultivar during the period of flowering, growth and ripening of the fruits from April to October with the heat units recorded for the same period in the Governorates, it was possible to determine the agricultural areas suitable for production Amhat cultivar in Egypt (Map 5-12) is as follows:

- It could be cultivated in the areas of the Suez Canal area, starting from the south of both Port Said and of the Sharqiya Governorates, passing through the Ismailia Governorate and the Suez Governorate, including the areas locate on the Gulf of Suez in the Governorates of Suez and South Sinai extends to north area of red sea Governorate.
- Some areas to the west of the Delta and the Qattara Depression to the west as well as some areas in middle Egypt.
- Taking into account the agricultural production standards that are concerned with good agricultural practices and the requirements for different agricultural activities inside the farm, the required quality can be obtained in the specified places for each appropriate quality grade.

Excellent quality degree

Map 5- 9: Spatial distribution of Amhat cultivar "Excellent Quality" Optimum temperature unites between 2001-2100°C and relative humidity of 45-50%

Very good quality degree

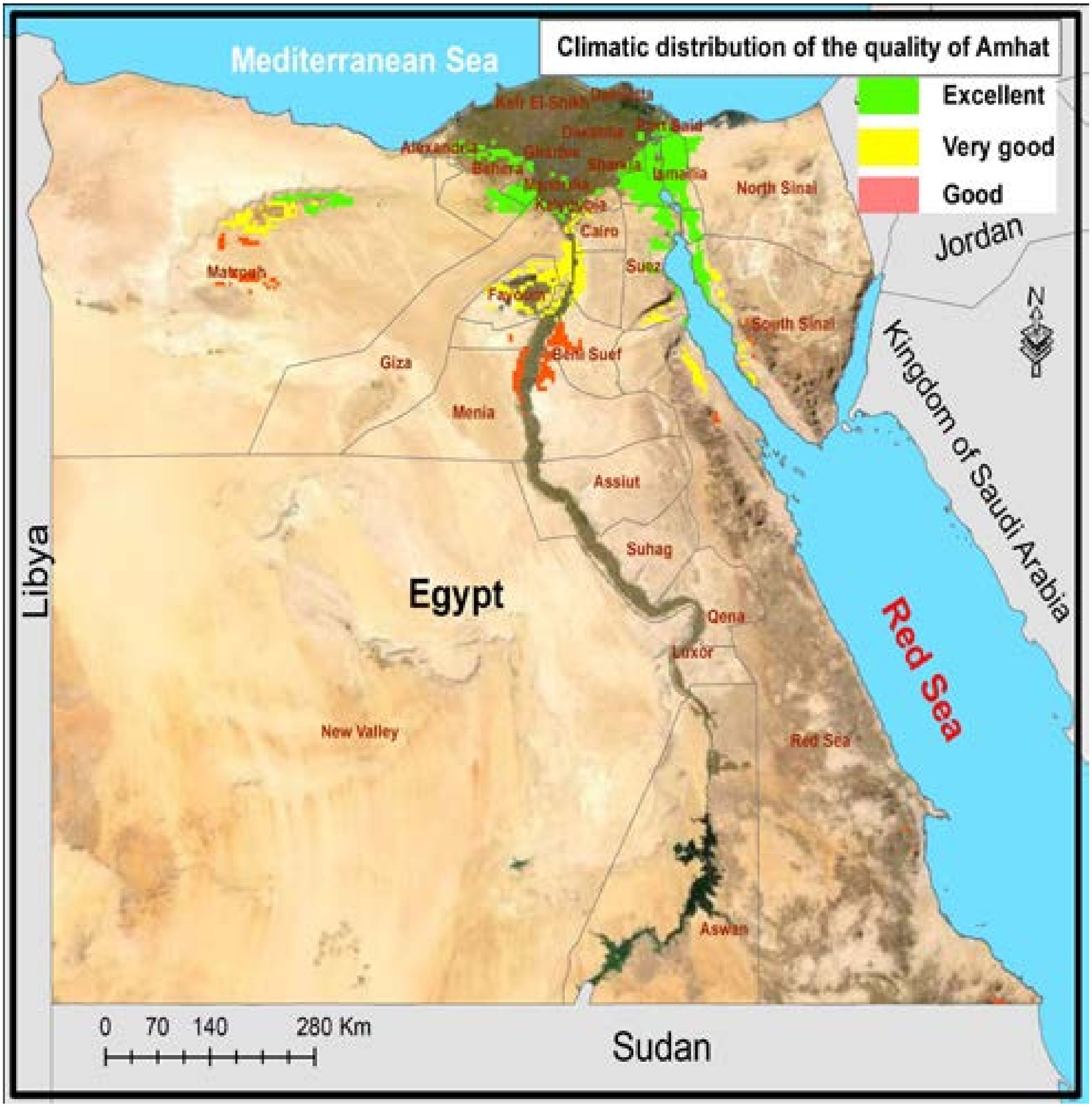


Map 5- 10: Spatial distribution of Amhat cultivar "Very good Quality" Optimum temperature unites between 1801-2000°C and relative humidity of 40-44%

Good quality degree

Map 5- 11: Spatial distribution of Amhat cultivar "Good Quality" Optimum temperature unites between 2101-2200°C and relative humidity of 36-39%

Aggregate agricultural areas



Map 5- 12: Spatial distribution of Amhat cultivar "three grade quality"

5.2.2 Bent Eisha

A. Fruits characteristics

Fruit data

Parameter	Character State	Score
Fruit length	(cm.)	3.96±0.36
Fruit width	(cm.)	2.28±0.05
Fruit weight	(gm.)	10.10±1.48
Fruit volume	(cm3)	8.34±1.16
Fruit shape	Obviate	
Fruit apex	Retuse	
Fruit base	Obtuse	
Fruit colour (khalal)	Shiny red	
Fruit colour of the maturity	Brownish black	
Flesh thickness	(cm.)	0.65
Flesh colour	White	
Flesh texture	Soft	
Flavour	Excellent	
Flesh taste	Delicious	

B. Fruits production & storing

Fruits production & storing

Parameter	Character State	Score
Suitable environmental conditions		
Ideal heat unites	Unit	1500-1800
Ideal humidity	%	50-65
Current area of cultivation	Lower Egypt Governorates	
Cultivated area	Fadden	7×7
Tree No.	Tree	85
Harvest Time	mid-September	
Harvest stage	Khalal stage	
Harvest period	Week	2
Harvest times	Times	1
Production quantity	Kg/tree	80-175
Production area	Ton/Fadden	6-12

Total Area, Yield and Production for bent Eisha

Production (Ton)	Yield (K. G.\Palm)	Fruiting palm	Area (Fed.)
45670	136.854	333714	1759

Source: Economic Affairs Sector (Average of 5y) (2016-2020)

Table 5-16: Storage & distribution

Short term storage	week	1
Long term storage	week	4
Refrigerator temperature	°C	0-(-5)
Storage ability	Week	3-8
Shelf time	Day	7-10

C. Fruits consumption & marketing

Sales & Marketing

Fruit stage for marketing	Khalal - soft	
Fruit stage for export	khalal	
Markets types	Local & national	
Quality	Acceptable	
Future markets	Asia, China and neighbouring countries	
Marketing opportunities	Weak	
Marketing time	Mid – October, November	
Marketing period	Week	10
Nature of the product	Fresh	
Price value/ Kg	Dollar	0.5
Consumption		
Consumption stage	Khalal	
Fruit humidity	%	Khalal 50-40 soft 30-40

D. Current Agro-production map

Total Area, Yield and Production for Bent Eisha cultivar (Average 5Y) (2016-2020)

Governorates	Bent Eisha			
	Production (Ton)	Yield (K. G.\Palm)	F. Palm (Palm)	Area (Fed.)
Alexandria	295	92.332	3195	7
Beheira	12142	133.008	91288	1161
Gharbia	1339	126.273	10604	59
Kafr-El Sheikh	4985	112.975	44125	400
Dakahlia	1714	88.914	19277	100
Damietta	116	100.259	1157	
Sharkia	19474	169.695	114759	18
Ismailia	1522	139.993	10872	3
Port Said	362	94.050	3849	
Suez	48	102.128	470	
Menoufia	3186	112.823	28239	3
Qalyoubia	249	115.868	2149	1
Lower Egypt	45432	137.679	329984	1752
Giza	88	120.548	730	3
Middle Egypt	88	120.548	730	3
Inside the valley	45520	137.642	330714	1755
Red Sea	150	50.000	3000	4
Outside the valley	150	50.000	3000	4
Total	45670	136.854	333714	1759

Source: Economic Affairs Sector (Average of 5y). (2016-2020)

E. Agro-climate map

Excellent quality degree

Regarding the "excellent" quality degree of the Bent Eisha cultivar, the optimum heat units range between 1500° C and 1800° C and the relative humidity of 50-65% during the period of flowering, growth and ripening of fruits from April to October. The most suitable areas (Late harvest) for the cultivation of the Bent Eisha cultivar in Egypt (Map 5-13), are represented in the following areas:

- The north coastal area in North Sinai Governorate.
- East Delta region in port Said, Sharkia and Damietta Governorates.
- The areas in north of Ismailia Governorate and some limited areas around the Bitter Lakes in the center of Ismailia Governorate.
- Limited areas locate in the Suez Gulf of South Sinai Governorate.
- Most areas in the middle of Nile Delta in Kafr El Sheikh, Damietta, Dakahlia and Gharbia Governorate.
- West Delta area of most Alexandria Governorate and the northern area of Beheira Governorate extend to some area of Matruh Governorate extends between Wadi El-Natrun (west of the Beheira Governorate) to Moghrah area.

Very good quality degree

Regarding the "very good" quality degree of the Bent Eisha cultivar, the optimum heat units range between 1801° C and 2000° C and the relative humidity of 45-49% during the period of flowering, growth and ripening of fruits from April to October. The most suitable areas (Intermediate harvest) for the cultivation of the Bent Eisha cultivar in Egypt (Map 5-14), are represented in the following areas:

- The area locates in the north of Qattara Depression including the west of Moghrah area of Matruh Governorate.
- Areas of Badr district in Beheira Governorate including some limited area in the south and extend to Tahrir and Sadat areas of Menoufia Governorate.
- South areas and limited area of middle Menoufia Governorate.
- South of Qalyubia Governorate and Benha district as well as the reclamation area west of El-Obour (Orabi).
- Limited area of north Giza Governorate.
- South of Sharkia Governorate and most areas of Ismailia Governorate extend southward to Suez Governorate and locations on the around Suez Gulf in Suez and South Sinai Governorates.

Good quality degree

Regarding the "good" quality degree of the Bent Eish cultivar, the optimum heat units range between 2001° C and 2100° C and the relative humidity of 40-44% during the period of flowering, growth and ripening of fruits from April to October. The most suitable areas (Early harvest) for the cultivation of the Bent Eish cultivar in Egypt (Map 5-15), are represented in the following areas:

- Area around Qattara Depression of Matruh Governorate...
- Limited areas locate North Cairo Governorate extends south-east area of Qalyubia Governorate as well as the west longitudinal sector of Cairo Governorate.
- Most areas of Giza, Fayoum and some limited north areas Beni Suef Governorate.
- The areas south of Suez Governorate and the northern eastern areas of the Red Sea Governorate (corresponding to Minya Governorate).
- Some areas locate on the Gulf of Suez of South Sinai Governorate.

Aggregate agricultural areas

By comparing the thermal and moisture needs of the Bent Eisha cultivar during the period of flowering, growth and ripening of the fruits from April to October with the thermal units recorded for the same period in the Governorates, it was possible to determine the agricultural areas of the cultivar in Egypt (Map). It could be cultivated in the northern coastal area of north Sinai Governorate extending to Nile Delta and Moghrah and Qattara depression. Also could be cultivated in east delta region and Suez canal & gulf area.

Taking into account the agricultural production standards that are concerned with good agricultural practices and the requirements for different agricultural activities inside the farm, the required quality can be obtained in the specified places for each appropriate quality grade.

Excellent quality degree

Map 5- 13: Spatial distribution of Bent Eisha cultivar "Excellent Quality" Optimum temperature unites between 1500-1800°C and relative humidity of 50-65%

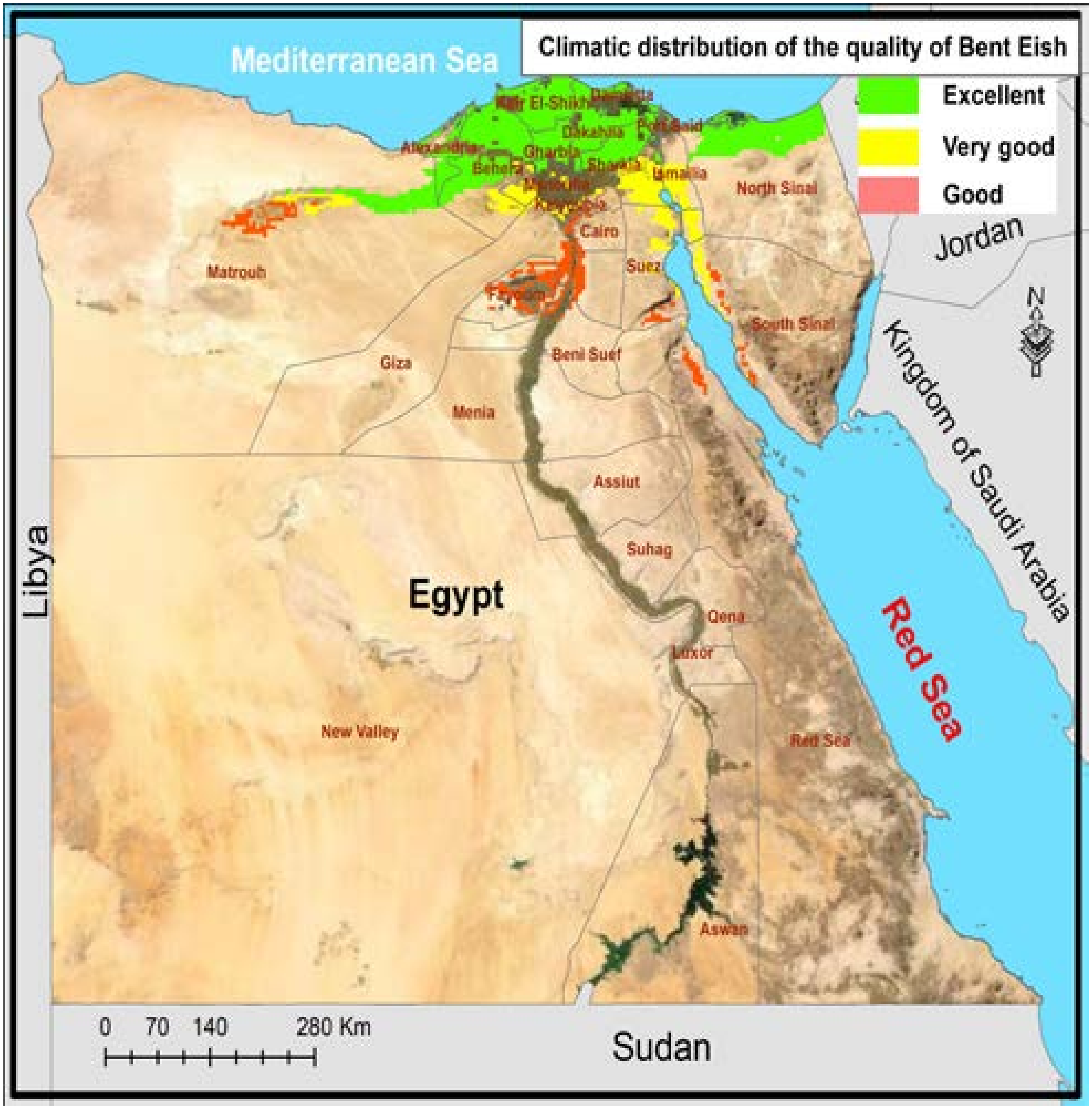
Very good quality degree

Map 5- 14: Spatial distribution of Bent Eisha cultivar "Very good Quality" Optimum temperature unites between 1801-2000°C and relative humidity of 45-49%

Good quality degree

Map 5- 15: Spatial distribution of Bent Eisha cultivar "Good Quality" Optimum temperature unites between 2001-2100°C and relative humidity of 40-44%

Aggregate agricultural areas



Map 5- 16: Spatial distribution of Bent Eisha cultivar “three grade quality”

5.2.3 Hayani

A. Fruits characteristics

Fruit data

Parameter	Character State	Score
Fruit length	(cm.)	5.40±0.66
Fruit width	(cm.)	2.54±0.14
Fruit weight	(gm.)	21.80±3.62
Fruit volume	(cm3)	20.00±3.29
Fruit shape	Cylindrical	
Fruit apex	Obtuse	
Fruit base	Truncate	
Fruit colour (khalal)	Shiny red	
Fruit colour of the maturity	Brownish black	
Flesh thickness	(cm.)	0.8
Flesh colour	Cream-brown	
Flesh texture	Soft	
Flavour	Good	
Flesh taste	Delicious-sweet	

B. Fruits production & storing

Fruits production & storing

Parameter	Character State	Score
Suitable environmental conditions		
Ideal heat unites	Unit	1550-1850
Ideal humidity	%	55-62
Current area of cultivation	Lower Egypt Governorates	
Cultivated area	Fadden	8×8
Tree No.	Tree	65
Harvest Time	Mid-August: mid-September	
Harvest stage	At the end of khalal stage and beginning of soft stage	
Harvest period	Week	2-3
Harvest times	Times	1-2
Production quantity	Kg/tree	90-225
Production area	Ton/Fadden	5-12

Total Area, Yield and Production for Hayani

Production (Ton)	Yield (K. G.\Palm)	Fruiting palm	Area (Fed.)
357,304	142	2,515,239	7,230

Source: Economic Affairs Sector (Average of 5y) (2016-2020)

Storage & distribution

Short term storage	week	1
Long term storage	week	3
Refrigerator temperature	°C	0-(-5)
Storage ability	Week	6-10
Shelf time	Day	7

C. Fruits consumption & marketing

Table 5-17: Sales & Marketing

Fruit stage for marketing	Soft stage	
Fruit stage for export	At the end of khalal stage and at the beginning of soft stage	
Markets types	Local & national	
Quality	Good	
Future markets	Asia, China & neighbouring countries	
Marketing opportunities	Good	
Marketing time	Mid September	
Marketing period	Week	6
Nature of the product	Fresh	
Price value/ Kg	Dollar	1
Consumption		
Consumption stage	Soft -soft	
Fruit humidity	%	30-40

D. Current Agro-production map

Total Area, Yield and Production for Hayani cultivar (Average 5Y) (2016-2020)

Governorates	Hayani			
	Production	Yield	F. Palm	Area
	(Ton)	(K. G.\ Palm)	(Palm)	(Fed.)
Alexandria	794	109	7,311	19
Beheira	17,361	136	127,657	1,845
Gharbia	944	109	8,660	18
Kafr-El Sheikh	25,051	127	197,253	2,408
Dakahlia	22,208	123	179,919	159
Damietta	98,593	127	776,608	12
Sharkia	85,518	182	470,804	35
Ismailia	63,253	170	371,442	470
Port Said	516	94	5,485	
Suez	2,834	80	35,434	69
Menoufia	2,974	110	27,084	5
Qalyoubia	16,014	120	133,455	453
Cairo	1,177	47	25,041	251
Lower Egypt	337,237	143	2,366,153	5,744
Giza	16,045	223	71,969	825
Beni Suef	546	68	7,997	
Middle Egypt	16,591	207	79,966	825
Assuit	90	65	1,390	16
Upper Egypt	90	65	1,390	16
Inside the valley	353,918	145	2,447,509	6,585
Noubaria	3,386	50	67,730	645
Outside the valley	3,386	50	67,730	645
Total	357,304	142	2,515,239	7,230

Source : Economic Affairs Sector .

E. Agro-climate map

Excellent quality degree

Regarding the "excellent" quality degree of the Hayani cultivar, the optimum heat units range between 1550° C and 1850° C and the relative humidity of 55-62% during the period of flowering, growth and ripening of fruits from April to October. The most suitable areas (Late harvest) for the cultivation of the Hayani cultivar in Egypt (Map 5-17), are represented in the following areas:

- The north coastal area of North Sinai Governorate.
- The north sector of Port Said Governorate extended to north of Sharkia Governorate and the middle sector of Dakahlia Governorate.
- Areas in north of Damietta Governorate.
- Most areas of Kafr El Sheikh Governorate extends to limited north area of both Gharbia and Dakahlia Governorates
- The northern area of Beheira Governorate.
- The middle sector of Alexandria Governorate and few limited area in the north of the Governorate.

Very good quality degree

Regarding the “very good” quality degree of the Hayani cultivar, the optimum heat units range between 1851° C and 2000° C and the relative humidity of 50-54% during the period of flowering, growth and ripening of fruits from April to October. The most suitable areas (Intermediate harvest) for the cultivation of the Hayani cultivar in Egypt (Map), are represented in the following areas:

- The area locates in the north of Ismailia Governorate at the two sides of Suez Canal extended to the south Port Said at the east bank of Suez Canal.
- Limited areas of middle sector of Beheira Governorate.
- Limited areas scattered in the Suez gulf of South Sinai Governorate.

Limited small area in the south of Suez Governorate locates in Suez gulf area.

Good quality degree

Regarding the “good” quality degree of the Hayani cultivar, the optimum heat units range between 2001° C and 2100° C and the relative humidity of 45-49% during the period of flowering, growth and ripening of fruits from April to October. The most suitable areas (Early harvest) for the cultivation of the Hayani cultivar in Egypt (Map 5-19), are represented in the following areas:

- The areas of the middle sector of the Suez Governorate, locate between the bitter Lakes in the north and the Gulf of Suez in the south, and extend on both sides of the Suez Canal.
- Coastal area locates in Suez gulf of Suez Governorate.
- The extending area in the east of Suez gulf of South Sinai Governorate.
- Areas locate in the Gulf of Suez of Red Sea Governorate.

Aggregate agricultural areas

Referring to the climatic analyzes and the needs of the fruits for the different quality levels, and comparing the heat and moisture needs of the Hayani cultivar during the period of flowering, growth and ripening of the fruits from April to October with the heat units recorded for the same period in the Governorates, it was possible to determine the agricultural areas suitable for production Hayani cultivar in Egypt (Map 5-20) is as follows:

- Hayani cultivation extends from the coastal area of North Sinai to north as well as west Nile Delta. It could be cultivated at the two sides of Suez gulf.
- Taking into account the agricultural production standards that are concerned with good agricultural practices and the requirements for different agricultural activities inside the farm, the required quality can be obtained in the specified places for each appropriate quality grade.

Excellent quality degree

Map 5- 17: Spatial distribution of Hayani cultivar "Excellent Quality" Optimum temperature unites between 1550-1850°C and relative humidity of 55-62%

Very good quality degree

Map 5- 18: Spatial distribution of Hayani cultivar "Very good Quality" Optimum temperature unites between 1851-2000°C and relative humidity of 50-54%

Good quality degree

Map 5- 19: Spatial distribution of Hayani cultivar "Good Quality" Optimum temperature unites between 2001-2100°C and relative humidity of 45-49%

Aggregate agricultural areas

Map 5- 20: Spatial distribution of Hayani cultivar "three grade quality"

5.2.4 Oreebi

A. Fruits characteristics

Fruit data

Parameter	Character State	Score
Fruit length	(cm.)	3.96±0.36
Fruit width	(cm.)	2.84±0.16
Fruit weight	(gm.)	13.22±2.05
Fruit volume	(cm3)	11.50±1.73
Fruit shape	Ovate	
Fruit apex	Obtuse	
Fruit base	Blunt	
Fruit colour (khalal)	Pale red	
Fruit colour of the maturity	Dark red	
Flesh thickness	(cm.)	0.75- 0.80
Flesh colour	Whitish yellow	
Flesh texture	Firm	
Flavour	Poor	
Flesh taste	Delicious	

B. Fruits production & storing

Fruits production & storing

Parameter	Character State	Score
Suitable environmental conditions		
Ideal heat unites	Unit	1550-1800
Ideal humidity	%	50-65
Current area of cultivation	Beheira Governorate (Edko, Rasheed)	
Cultivated area	Fadden	7×7
Tree No.	Tree	85
Harvest Time	First October	
Harvest stage	At the end of khalal stage and beginning of soft stage	
Harvest period	Week	2-3
Harvest times	Times	1-2
Production quantity	Kg/tree	100-140
Production area	Ton/Fadden	8-10

Total Area, Yield and Production for Oreebi

Production (Ton)	Yield (K. G.\Palm)	Fruiting palm	Area (Fed.)
30188	137.386	219731	2831

Source: Economic Affairs Sector (Average of 5y) (2016-2020)

Storage & distribution

Short term storage	week	2
Long term storage	week	6
Refrigerator temperature	°C	0-(-5)
Storage ability	Week	10-12
Shelf time	Day	10-14

C. Fruits consumption & marketing

Sales & Marketing

Fruit stage for marketing	At the beginning of soft stage	
Fruit stage for export	At the end of khalal stage and at the beginning of soft stage	
Markets types	Local & national	
Quality	Good	
Future markets	Asia, China & neighboring countries	
Marketing opportunities	Good	
Marketing time	Mid September	
Marketing period	Week	10
Nature of the product	Fresh	
Price value/ Kg	Dollar	1
Consumption		
Consumption stage	Soft -soft	
Fruit humidity	%	35-40

D. Current Agro-production map

Total Area, Yield and Production for Oreebi cultivar (Average 5Y) (2016-2020)

Governorates	Oreebi			
	Production (Ton)	Yield (K. G.\ Palm)	F. Palm (Palm)	Area (Fed.)
Alexandria	18	72.000	250	2
Beheira	19574	174.830	111960	857
Kafr-El Sheikh	8174	144.614	56523	1673
Dakahlia	762	68.231	11168	99
Damietta	428	130.012	3292	
Lower Egypt	28956	158.063	183193	2631
Inside the valley	28956	158.063	183193	2631
Noubaria	1232	33.718	36538	200
Outside the valley	1232	33.718	36538	200
Total	30188	137.386	219731	2831

Source: Economic Affairs Sector

E. Agro-climate map

Excellent quality degree

Regarding the "excellent" quality degree of the Oreebi cultivar, the optimum heat units range between 1550° C and 1800° C and the relative humidity of 50-65% during the period of flowering, growth and ripening of fruits from April to October. The most suitable areas (Late harvest) for the cultivation of the Oreebi cultivar in Egypt (Map 5-21), are represented in the following areas:

- The northern coastal sector extends from the Far East to the west of North Sinai Governorate.
- Some areas in the center of Ismailia Governorate, as well as east and west of the bitter lakes.
- The northern and middle region of Port Said Governorate and its extension to most regions of the north and middle Sharkia Governorate.
- The regions of the south and north of Dakahlia Governorate reach to the area the northern coastal sector of Damietta Governorate.
- Most of the areas of Kafr El Sheikh Governorate and it are extend to the east of Gharbia Governorate.
- The area of Beheira Governorate extends east to the west of Gharbia Governorate and west to the eastern regions of Alexandria Governorate.
- The middle sector of Alexandria Governorate and the northern regions (Burj Al Arab regions).
- The central sector of the Beheira Governorate started from the west of the Dillingat district, pass over Nubariya and Wadi El-Natrun, Moghrah districts, and north of the Qattara region in the Matruh Governorate.
- Some areas of Ras Sidr district on the Gulf of Suez in South Sinai Governorate.

Very good quality degree

Regarding the "very good" quality degree of the Oreebi cultivar, the optimum heat units range between 1801° C and 2000° C and the relative humidity of 45-49% during the period of flowering, growth and ripening of fruits from April to October. The most suitable areas (Intermediate harvest) for the cultivation of the Oreebi cultivar in Egypt (Map 5-22), are represented in the following areas:

- South of Sharkia Governorate and extends to most of

Ismailia Governorate on both sides of the Suez Canal.

- Suez Governorate on both sides of the Suez Canal and extends to Suez and Ataka districts as well as some areas on the Gulf of Suez.
- The areas locate east of the Gulf of Suez in South Sinai Governorate.
- A limited area locates on the coast area of south of Al-Zafarana in Red Sea Governorate .
- Belbeis district in Sharkia Governorate.
- Benha district and the southern areas of Qalyubia Governorate.
- The southern areas of Menoufia Governorate, extends to the Sadat district as well as the Tahrir and Nubariya districts, and the eastern region of Wadi El-Natrun of Beheira Governorate.
- North and east of the Qattara Depression and west Moghrah area of Matruh Governorate.

Good quality degree

Regarding the "very good" quality degree of the Oreebi cultivar, the optimum heat units range between 1801° C and

2000° C and the relative humidity of 45-49% during the period of flowering, growth and ripening of fruits from April to October. The most suitable areas (Intermediate harvest) for the cultivation of the Oreebi cultivar in Egypt (Map 5-22), are represented in the following areas:

- South of Sharkia Governorate and
- extends to most of Ismailia Governorate on both sides of the Suez Canal.
- Suez Governorate on both sides of the Suez Canal and extends to Suez and Ataka districts as well as some areas on the Gulf of Suez.
- The areas locate east of the Gulf of Suez in South Sinai Governorate.
- A limited area locates on the coast area of south of Al-Zafarana in Red Sea Governorate .
- Belbeis district in Sharkia Governorate.
- Benha district and the southern areas of Qalyubia Governorate.
- The southern areas of Menoufia Governorate, extends to the Sadat district as well as the Tahrir and Nubariya districts, and the eastern region of Wadi El-Natrun of Beheira Governorate.
- North and east of the Qattara Depression and west Moghrah area of Matruh Governorate.

Aggregate agricultural areas

Referring to the climatic analyzes and the needs of the fruits for the different quality levels, and comparing the heat and moisture needs of the Oreebi cultivar during the period of flowering, growth and ripening of the fruits from April to October with the heat units recorded for the same period in the Governorates, it was possible to determine the agricultural areas suitable for production Oreebi cultivar in Egypt (Map 5-24) is as follows:

- The cultivation including the north coastal area from the east to west Alexandria Governorate and Extends to Moghrah and Qattara Depression.
- It could be cultivated in the middle Egypt and area around Suez gulf.
- Taking into account the agricultural production standards that are concerned with good agricultural practices and the requirements for different agricultural activities inside the farm, the required quality can be obtained in the specified places for each appropriate quality grade.

Excellent quality degree

Map 5- 21: Spatial distribution of Oreebi cultivar "Excellent Quality" Optimum temperature unites between 1500-1800°C and relative humidity of 50-65%

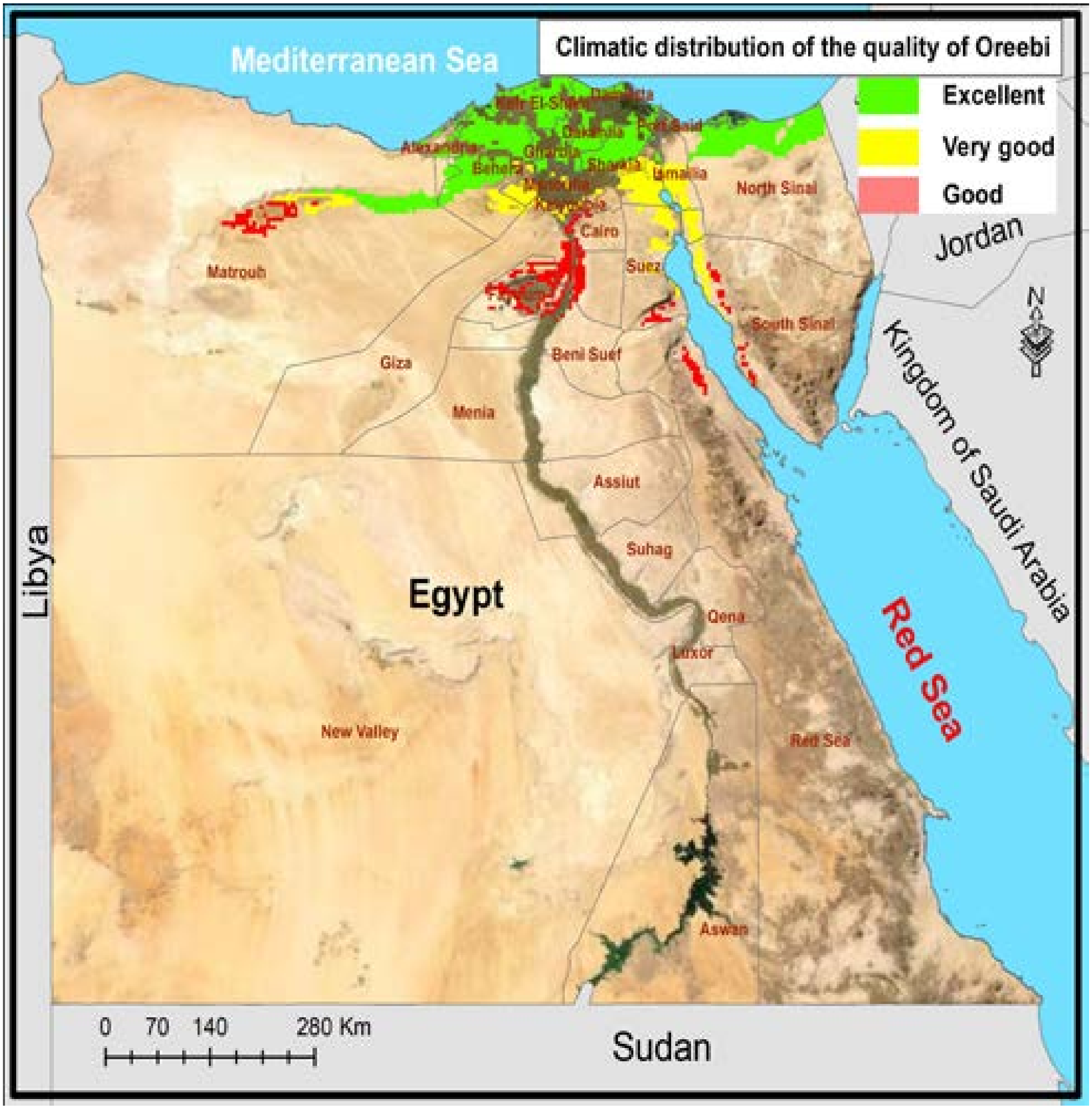
Very good quality degree

Map 5- 22: Spatial distribution of Oreebi cultivar "Very good Quality" Optimum temperature unites between 1801-2000°C and relative humidity of 45-49%

Good quality degree

Map 5- 23: Spatial distribution of Oreebi cultivar "Good Quality" Optimum temperature unites between 2001-2100°C and relative humidity of 40-44%

Aggregate agricultural areas



Map 5- 24: Spatial distribution of Oreebi cultivar “three grade quality”

5.3

Cultivars that market at semi-dry stage

5.3.1 Saidi

A. Fruits characteristics

Fruit data

Parameter	Character State	Score
Fruit length	(cm.)	4.26±0.38
Fruit width	(cm.)	2.44±0.09
Fruit weight	(gm.)	15.00±2.37
Fruit volume	(cm3)	12.00±1.83
Fruit shape	Ovate-elongate	
Fruit apex	Obtuse	
Fruit base	Obtuse	
Fruit colour (khalal)	Orange-yellow	
Fruit colour of the maturity	Brown-yellow	
Flesh thickness	(cm.)	0.8
Flesh colour	Whitish yellow	
Flesh texture	Firm	
Flavour	Good	
Flesh taste	Delicious	

B. Fruits production & storing

Fruits production & storing

Parameter	Character State	Score
Suitable environmental conditions		
Ideal heat unites	Unit	2600-2750
Ideal humidity	%	19-30
Current area of cultivation	New valley Governorate	
Cultivated area	Fadden	8×8
Tree No.	Tree	65
Harvest Time	First September	
Harvest stage	Semi-dry stage	
Harvest period	Week	2-3
Harvest times	Times	3-2
Production quantity	Kg/tree	70-100
Production area	Ton/Fadden	6.5-4.5

Total Area, Yield and Production for Saidi

Production (Ton)	Yield (K. G.\Palm)	Fruiting palm	Area (Fed.)
105,607	80.28	1,315,542	18,738

Source: measurements of the team at the date cultivation at New valley Governorate.

Storage & distribution

Short term storage	week	4
Long term storage	week	12
Refrigerator temperature	°C	4-7
Storage ability	Week	52
Shelf time	Day	90

C. Fruits consumption & marketing

Sales & Marketing

Fruit stage for marketing	At the end of Khalal – semi-dry	
Fruit stage for export	Semi-dry (hard)	
Markets types	Local & national - Indonesia – Malaysia – Morocco.	
Quality	Excellent	
Future markets	Very Good	
Marketing opportunities	Asia And China	
Marketing time	At the end of August until end of September	
Marketing period	All the year	
Nature of the product	1. Fresh 2. De-seeded 3. Dried, 4. Packaged 5. Manufactured	
Price value/ Kg	Dollar	1.5 - 2
Consumption		
Consumption stage	Soft, Semi-dry, semidry (hard)	
Fruit humidity	Soft Semi-dry semidry (hard)	35 - 40 % 23 - 22% 21-19%

D. Current Agro-production map

Total Area, Yield and Production for Saidi cultivar (Average 5Y) (2016-2020)

Governorates	Saidi			
	Production (Ton)	Yield (K. G.\ Palm)	F. Palm (Palm)	Area (Fed.)
New Valley	105,607	80.28	1,315,542	18,738
Outside the valley	105,607	80.28	1,315,542	18,738
Total	105,607	80.28	1,315,542	18,738

Source: measurements of the team at the date cultivation in New valley Governorate.

E. Agro-climate map

Excellent quality degree

Regarding the "excellent" quality degree of the Saidi cultivar, the optimum heat units range between 2600° C and 2750° C and the relative humidity of 19-30% during the period of flowering, growth and ripening of fruits from April to October. The most suitable areas (Intermediate harvest) for the cultivation of the Saidi cultiv cultivar ars in Egypt (Map 5-25), are represented in the following areas:

- Areas of Kharga, Dakhla, Paris Oases, and the East Owainat region as well as areas north and around and Toshka Lake in the New Valley Governorate.
- The areas locate in the far east of the New Valley Governorate, adjacent to the Governorates of Sohag, Qena, Luxor, and northern Aswan Governorate.
- Southwest areas of Sohag Governorate.
- The areas locate in the eastern desert of the Governorates of Qena and Luxor.
- Spreading areas in the middle longitudinal sector of Aswan Governorate

The Eastern Desert of the Red Sea Governorate, starting from the areas opposite Sohag Governorate, which extends southward to the southern international borders of the Arab Republic of Egypt.

Very good quality degree

Regarding the "very good" quality degree of the Saidi cultivar, the optimum heat units range between 2751° C and 3000° C and the relative humidity of 16-25% during the period of flowering, growth and ripening of fruits from April to October. The most suitable areas (Early harvest) for the cultivation of the Saidi cultivar in Egypt (Map 5-26), are represented in the following areas:

- Areas of New Valley Governorate from the south Kharga Oasis extends south ward to east Paris Oasis to areas of Toshka and Owainat (east the area of the first excellent quality) to the south border of Egypt.
- The area of North Aswan Governorate includes area of Koom Ombo district. The areas locate in the desert of west and east Aswan Governorate.
- The common border area between the south west of Luxor Governorate with the eastern region of the New Valley Governorate.
- The area of Eastern Desert in the Red Sea

Governorate locates at the east of Luxor and Aswan Governorates.

Good quality degree

Regarding the “good” quality degree of the Saidi cultivar, the optimum heat units range between 2400° C and 2599° C and the relative humidity of 31-33% during the period of flowering, growth and ripening of fruits from April to October. The most suitable areas (Late harvest) for the cultivation of the Saidi cultivar in Egypt (Map 5-27), are represented in the following areas:

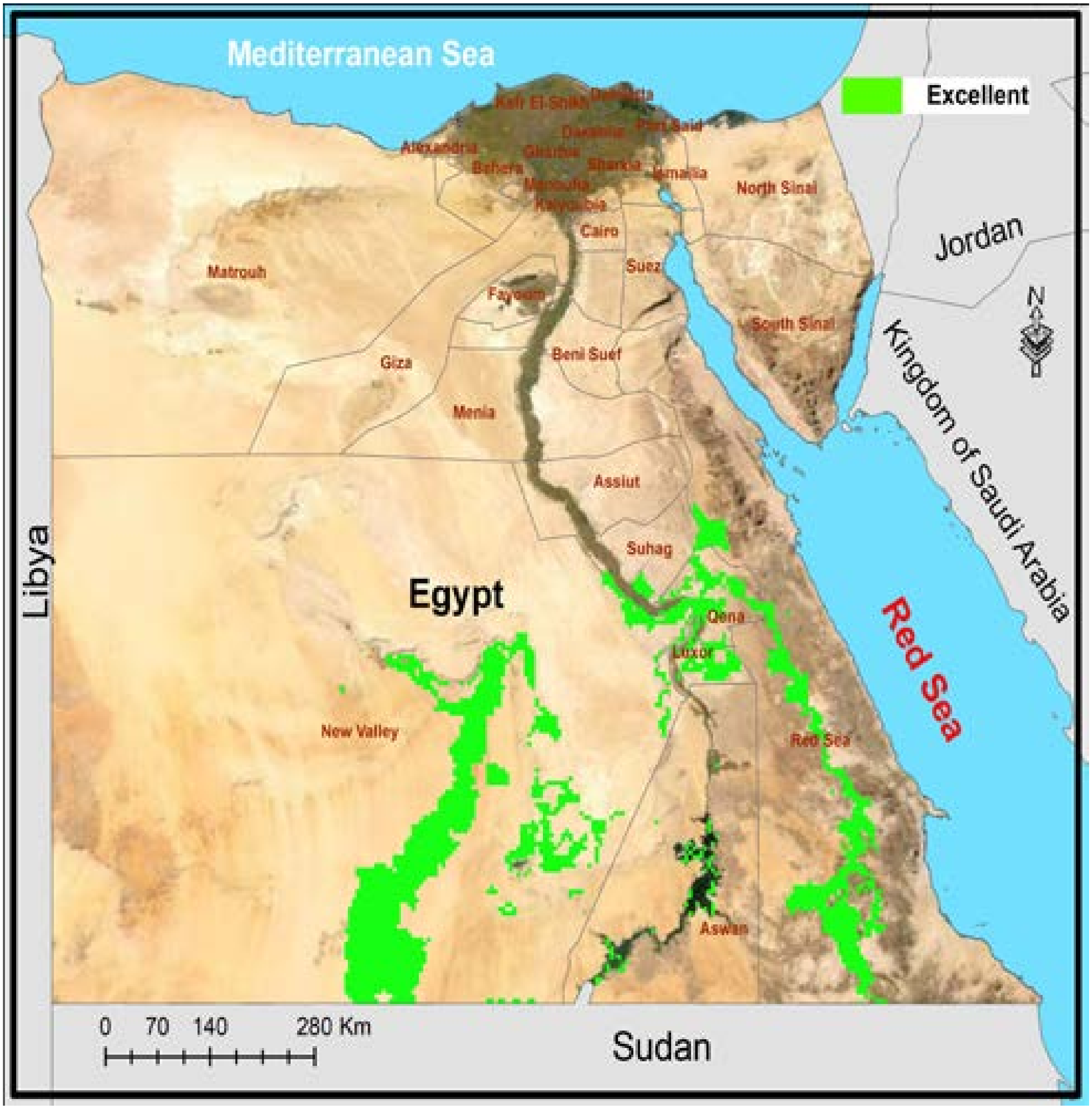
- The area of the Eastern Desert in the Red Sea Governorate starts from the areas opposite Assuit Governorate and extends southward to the Halayeb & Shalateen at the southern international borders of the Arab Republic of Egypt.

Aggregate agricultural areas

Referring to the climatic analyzes and the needs of the fruits for the different quality levels, and comparing the heat and moisture needs of the Saidi cultivar during the period of flowering, growth and ripening of the fruits from April to October with the heat units recorded for the same period in the Governorates, it was possible to determine the agricultural areas suitable for production Saidi cultivar in Egypt (Map 5-28) is as follows:

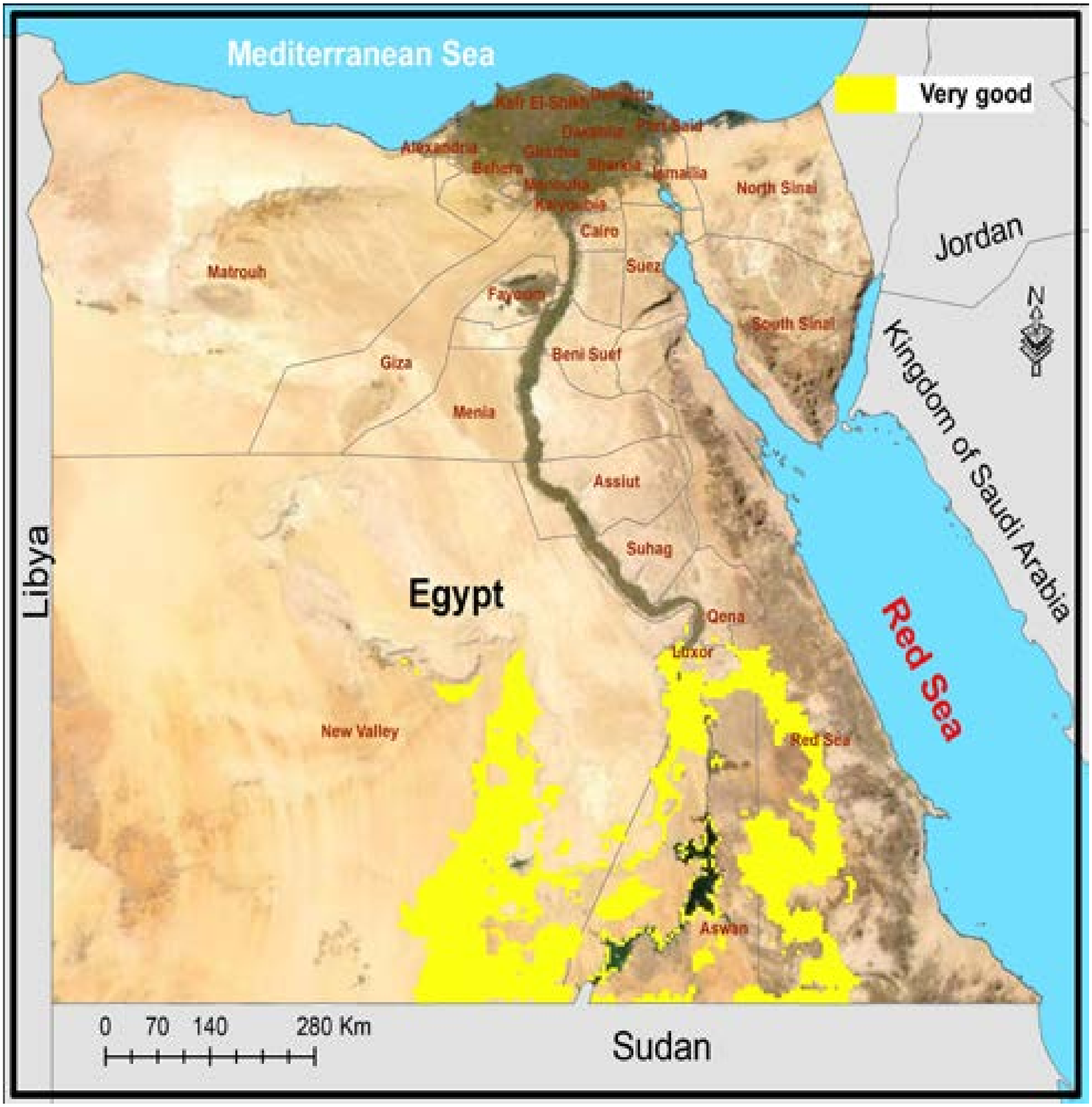
- The cultivation spreads south in New Valley (Oases of Dakhla, Kharga, Paris, Toshka & Owainat), Sohag, Luxor, Qena and Aswan Governorates, as well as the eastern desert of Red Sea Governorate.
- Taking into account the agricultural production standards that are concerned with good agricultural practices and the requirements for different agricultural activities inside the farm, the required quality can be obtained in the specified places for each appropriate quality grade.

Excellent quality degree



Map 5- 25: Spatial distribution of Saidi cultivar "Excellent Quality" Optimum temperature unites between 2600-2750°C and relative humidity of 19-30%

Very good quality degree

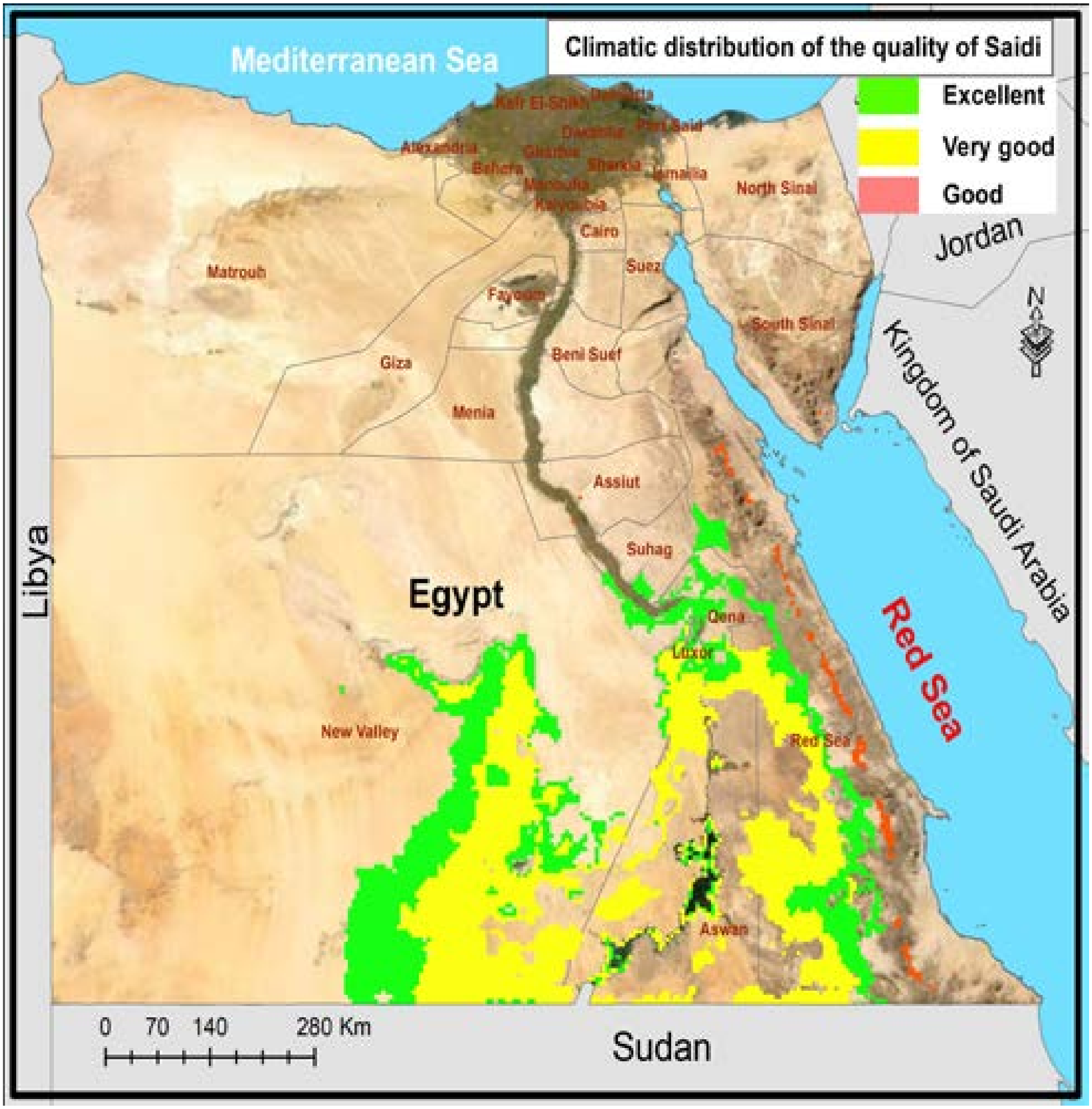


Map 5- 26: Spatial distribution of Saidi cultivar "Very good Quality" Optimum temperature unites between 2751-3000°C and relative humidity of 16-25%

Good quality degree

Map 5- 27: Spatial distribution of Saidi cultivar "Good Quality" Optimum temperature unites between 2400-2599°C and relative humidity of 31-33%

Aggregate agricultural areas



Map 5- 28: Spatial distribution of Saidi cultivar “three grade quality”

5.3.2 Amri

A. Fruits characteristics

Fruit data

Parameter	Character State	Score
Fruit length	(cm.)	4.96±0.54
Fruit width	(cm.)	2.54±0.10
Fruit weight	(gm.)	16.58±2.66
Fruit volume	(cm3)	16.66±2.68
Fruit shape	Elliptical	
Fruit apex	Blunt	
Fruit base	Truncate	
Fruit colour (khalal)	Yellowish red	
Fruit colour of the maturity	Brownish black	
Flesh thickness	(cm.)	0.75
Flesh colour	Whitish creamy	
Flesh texture	Firm	
Flavour	Good	
Flesh taste	Delicious	

B. Fruits production & storing

Fruits production & storing

Parameter	Character State	Score
Suitable environmental conditions		
Ideal heat unites	Unit	2200-2101
Ideal humidity	%	35-39
Current area of cultivation	El-Sharqiya & El-Gharbia Governorates	
Cultivated area	Fadden	7x7
Tree No.	Tree	85
Harvest Time	From Mid-September	
Harvest stage	Early Semi-dry stage	
Harvest period	Week	2-3
Harvest times	Times	3-2
Production quantity	Kg/tree	140 - 90
Production area	Ton/Fadden	11-7

Total Area, Yield and Production for Amri

Production (Ton)	Yield (K. G.\Palm)	Fruiting palm	Area (Fed.)
10748	159.625	67333	2

Source: Economic Affairs Sector (Average of 5y).(2016-2020)

Storage & distribution

Short term storage	week	3
Long term storage	week	12
Refrigerator temperature	°C	0-4
Storage ability	Week	24-52
Shelf time	Day	60-90

C. Fruits consumption & marketing

Sales & Marketing

Fruit stage for marketing	Semi-dry	
Fruit stage for export	Semi-dry	
Markets types	National & local	
Quality	Very good	
Future markets	Asia And China	
Marketing opportunities	Good	
Marketing time	September-October	
Marketing period	All the year	
Nature of the product	1.fresh, 2.de-seeded 3.dried 4.packaged 5.manufactured	
Price value/ Kg	Dollar	2 - 3
Consumption		
Consumption stage	Semi-dry (soft), semi-dry	
Fruit humidity	Semi-dry (soft) 24-23% Semi - dry 21-22%	

D. Current Agro-production map

Total Area, Yield and Production for Amri cultivar (Average 5Y) (2016-2020)

Governorates	**Amri**			
	Production	**Yield**	**F. Palm**	**Area**
	(Ton)	**(K. G.\ Palm)**	**(Palm)**	**(Fed.)**
Sharkia	10456	163.273	64040	1
Ismailia	117	81.704	1432	1
Port Said	175	94.035	1861	
Lower Egypt	10748	159.625	67333	2
Inside the valley	10748	159.625	67333	2
Total	10748	159.625	67333	2

Source : Economic Affairs Sector (Average of 5y).(2016-2020)

E. Agro-climate map

Excellent quality degree

Regarding the "excellent" quality degree of the Amri cultivar, the optimum heat units range between 2101° C and 2200° C and the relative humidity of 35-39% during the period of flowering, growth and ripening of fruits from April to October. The most suitable areas (Early harvest) for the cultivation of the Amri cultivar in Egypt (Map 5-29), are represented in the following areas:

- The area of the Baharia Oasis in Giza Governorate.
- East south area of Minya Governorate and the western desert of Minya includes the reclamation area of west-west Minya
- The far north-east area of New Valley Governorate adjacent to Assuit and Sohag Governorates.
- The area locates in the eastern desert of Assuit Governorate.
- Scattered spots in the Eastern Desert of the Red Sea Governorate specially the north sector.
- Scattered areas of desert of the South Sinai Governorate.

Very good quality degree

Regarding the "very good" quality degree of the Amri cultivar, the optimum heat units range between 1901° C and 2100° C and the relative humidity of 35-39% during the period of flowering, growth and ripening of fruits from April to October. The most suitable area (Intermediate harvest) for the cultivation of the Amri cultivar in Egypt (Map 5-30), are represented in the following areas:

- The area of south Qattara Depression and Qara Oasis in Matruh Governorate.
- The area locates in north of Baharia Oasis.
- The area of Beni Suef Governorate.
- The area of North Minya Governorate.
- Scattered spots of the east-south desert of Fayoum Governorate.
- The most south area of Giza and Suez Governorates adjacent to Beni Suef Governorate.
- The area of Eastern Desert in the Red Sea Governorate locates at the east of Beni Suef and Minya Governorates.
- The desert area of Abou Zneema and Abou Redees in South Sinai Governorates.

Good quality degree

Regarding the "good" quality degree of the Amri cultivar, the optimum heat units range between 1650° C and 1900° C and the relative humidity of 40-50% during the period of flowering, growth and ripening of fruits from April to October. The most suitable areas (Late harvest) for the cultivation of the Amri cultivar in Egypt (Map 5-31), are represented in the following areas:

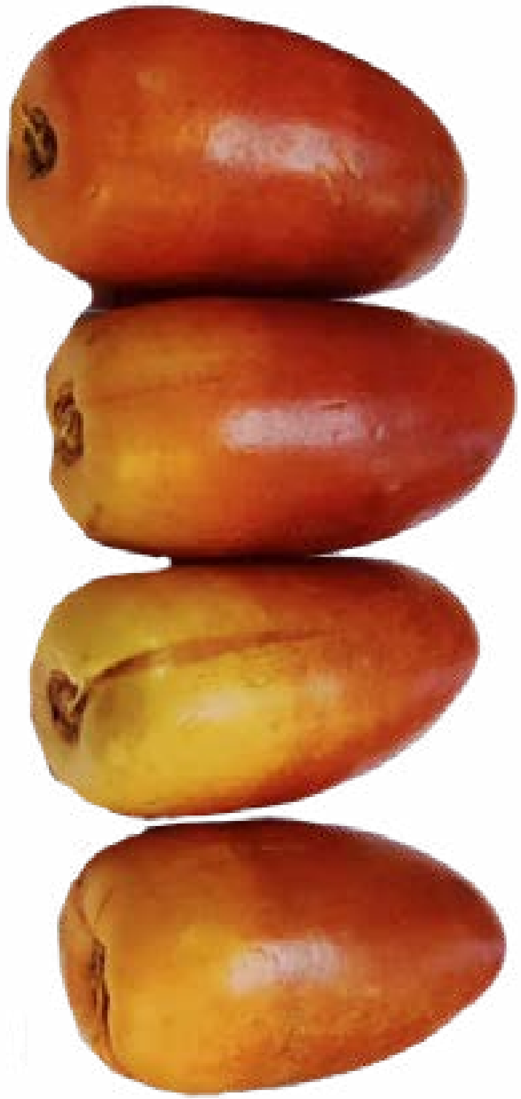
- The area of Qara Oasis and east Qattara Depression extends southward to Moghrah area in Matruh Governorate.
- The area locates in south-west Giza Governorate.
- The area of south sector of Beheira Governorate.
- The area of Qalyubia and Menoufia Governorate.
- Limited area of south Gharbia Governorate.
- The area of south Sharkia Governorate.
- The adjacent common area locates among the east of both Cairo and Giza Governorates and west of Suez Governorate
- Northern area of the Eastern Desert of the Red Sea Governorate.

- Most area of Ismailia Governorate.
- Desert area locates in South and North Sinai.

Aggregate agricultural areas

Referring to the climatic analyzes and the needs of the fruits for the different quality levels, and comparing the heat and moisture needs of the Amri cultivar during the period of flowering, growth and ripening of the fruits from April to October with the heat units recorded for the same period in the Governorates, it was possible to determine the agricultural areas suitable for production Amri cultivar in Egypt (Map 5-32) is as follows:

- The cultivation spreads in the middle sector extends from Qara Oasis to the east of Ismailia and Suez Governorates. Also, it extends south from Beni Suef Governorate to Assuit Governorate as well as the order of New Valley Governorate.
- Taking into account the agricultural production standards that are concerned with good agricultural practices and the requirements for different agricultural activities inside the farm, the required quality can be obtained in the specified places for each appropriate quality grade.



Excellent quality degree

Map 5- 29: Spatial distribution of Amri cultivar "Excellent Quality" Optimum temperature unites between 2101-2200°C and relative humidity of 30-34%

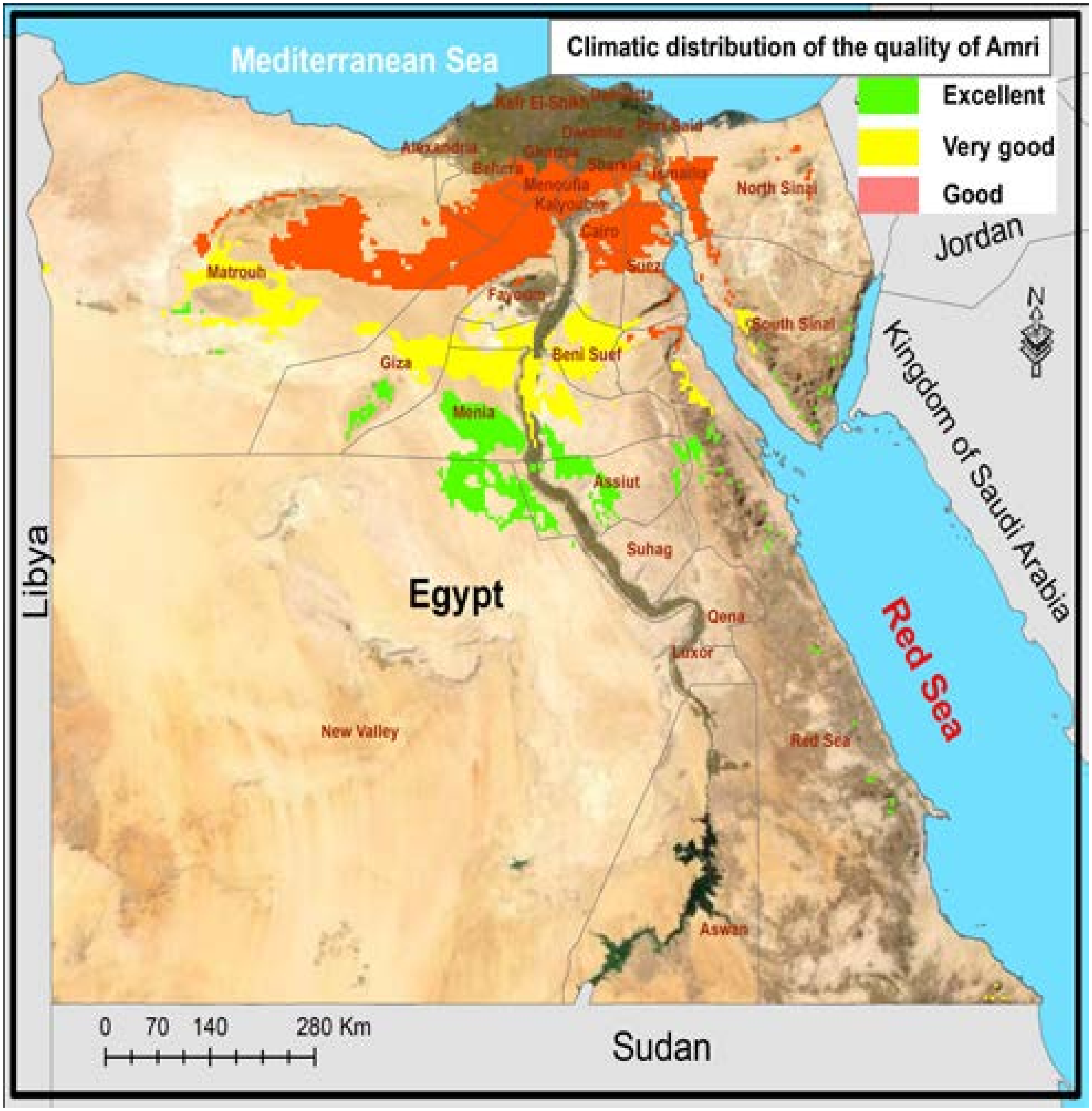
Very good quality degree

Map 5- 30: Spatial distribution of Amri cultivar "Very good Quality" Optimum temperature unites between 1901-2100°C and relative humidity of 35-39%

good quality degree

Map 5- 31: Spatial distribution of Amri cultivar "Good Quality" Optimum temperature unites between 1650-1900°C and relative humidity of 40-50%

Aggregate agricultural areas



Map 5- 32: Spatial distribution of Amri cultivar "three grade quality"

5.3.3 Tamr El Wadi

A. Fruits characteristics

Fruit data

Parameter	Character State	Score
Fruit length	(cm.)	4.26±0.29
Fruit width	(cm.)	2.14±0.04
Fruit weight	(gm.)	8.40±1.17
Fruit volume	(cm3)	7.00±0.91
Fruit shape	Ovate-elongate	
Fruit apex	Retuse	
Fruit base	Obtuse	
Fruit colour (khalal)	Yellow	
Fruit colour of the maturity	Pale brown	
Flesh thickness	(cm.)	0.38
Flesh colour	Cream	
Flesh texture	Dry	
Flavour	Poor	
Flesh taste	Palatable	

B. Fruits production & storing

Fruits production & storing

Parameter	Character State	Score
Suitable environmental conditions		
Ideal heat unites	Unit	2700-2900
Ideal humidity	%	24-30
Current area of cultivation	New Valley Governorate	
Cultivated area	Fadden	8x8
Tree No.	Tree	65
Harvest Time	September - October	
Harvest stage	Early Semi-dry stage	
Harvest period	Week	2
Harvest times	Times	1
Production quantity	Kg/tree	85-65
Production area	Ton/Fadden	4 - 5.5

Total Area, Yield and Production for Tamr El Wadi

Production (Ton)	Yield (K. G.\Palm)	Fruiting palm	Area (Fed.)
5242	79.998	65527	708

Source: Economic Affairs Sector (Average of 5y).(2016-2020)

Storage & distribution

Short term storage	week	4
Long term storage	week	12
Refrigerator temperature	°C	4-7
Storage ability	Week	52
Shelf time	Day	90

C. Fruits consumption & marketing

Sales & Marketing

Fruit stage for marketing	Semi-dry, Dry	
Fruit stage for export	Semi-dry	
Markets types	National & local	
Quality	Accepted	
Future markets	Asia, China and Neighbouring countries	
Marketing opportunities	Weak	
Marketing time	September-October	
Marketing period	All the year	
Nature of the product	1.fresh 2.de-seeded 3.dried 4.packaged 5.manufactured	
Price value/ Kg	Dollar	0.5
Consumption		Semi-dry, dry
Consumption stage	Semi-dry, dry	
Fruit humidity	Semi-dry) 20-22% 17-19%	

D. Current Agro-production map

Total Area, Yield and Production for Tamr El Wadi cultivar (Average 5Y) (2016-2020)

Governorates	**Tamr El Wadi**			
	Production	**Yield**	**F. Palm**	**Area**
	(Ton)	**(K. G.\Palm)**	**(Palm)**	**(Fed.)**
New Valley	5242	79.998	65527	708
Outside the valley	5242	79.998	65527	708
Total	5242	79.998	65527	708

Source : Economic Affairs Sector (Average of 5y). (2016-2020)

E. Agro-climate map

Excellent quality degree

Regarding the "excellent" quality degree of the Tamr El Wadi cultivar, the optimum heat units range between 2700° C and 2900° C and the relative humidity of 24-30% during the period of flowering, growth and ripening of fruits from April to October. The most suitable areas (Intermediate harvest) for the cultivation of the Tamr El Wadi cultivar in Egypt (Map 5-33), are represented in the following areas:

- Areas of Kharga Oasis of New Valley Governorate.
- The Far East area of New Valley Governorate adjacent to Qena and Luxor Governorates.
- El Balena and Gerga district of Sohag Governorate.
- The west and south area of Qena Governorate.
- East area of Qena Governorate extends southward to the western desert in Red Sea Governorate.
- The northern and eastern area of Luxor Governorate as well as Isna district.

The area of the eastern Desert locates in the Red Sea Governorate at the junction borders with Sohag and Qena Governorates.

Very good quality degree

Regarding the "very good" quality degree of the Tamr El Wadi cultivar, the optimum heat units range between 2901° C and 3000° C and the relative humidity of 21-25% during the period of flowering, growth and ripening of fruits from April to October. The most suitable areas (Early harvest) for the cultivation of the Tamr El Wadi cultivar in Egypt (Map 5-34), are represented in the following areas:

- The area of south of Kharga Oasis extends to the Paris Oasis in the New Valley Governorate.
- The Far East area of New Valley Governorate adjacent to Luxor and Aswan Governorates.
- The west –south area in Luxor Governorate.
- The area locates in north Aswan Governorate (Rodisa and Idfu) in addition to Koom Omboo district.
- The area of the eastern Desert of the Red Sea Governorate locates in the east of Luxor Governorate and extended southward to south border of Egypt (west of the first region of excellent quality).

Good quality degree

Regarding the "good" quality degree of the Tamr El Wadi

cultivar, the optimum heat units range between 2500° C and 2699° C and the relative humidity of 31-33% during the period of flowering, growth and ripening of fruits from April to October. The most suitable areas (Late harvest) for the cultivation of the Tame El Wadi cultivar in Egypt (Map 5-35), are represented in the following areas:

- Areas of the eastern Desert in the Red Sea Governorate start from the Qena and extend southward to south border of Egypt (east of the first region of excellent quality).
- Limited area of the western desert locates between Assuit Governorate and Ras Shouqeer in the Red Sea Governorate.

Aggregate agricultural areas

Referring to the climatic analyzes and the needs of the fruits for the different quality levels, and comparing the heat and moisture needs of the Tamr El Wadi cultivar during the period of flowering, growth and ripening of the fruits from April to October with the heat units recorded for the same period in the Governorates, it was possible to determine the agricultural areas suitable for production Tamr El Wadi cultivar in Egypt (Map 5-36) is as follows:

- The cultivation spreads in the Kharga Oasis and Paris Oasis of the New Valley Governorate. Also it cultivated in the agriculture land of Sohag, Qena, Luxor Governorates and north of Aswan Governorate.
- It could be cultivated in the eastern desert extends southward from Sohag and Qena Governorates.
- Taking into account the agricultural production standards that are concerned with good agricultural practices and the requirements for different agricultural activities inside the farm, the required quality can be obtained in the specified places for each appropriate quality grade.

Excellent quality degree

Map 5- 33: Spatial distribution of Tamr El Wadi cultivar "Excellent Quality" Optimum temperature unites between 2700-2900°C and relative humidity of 24-30%

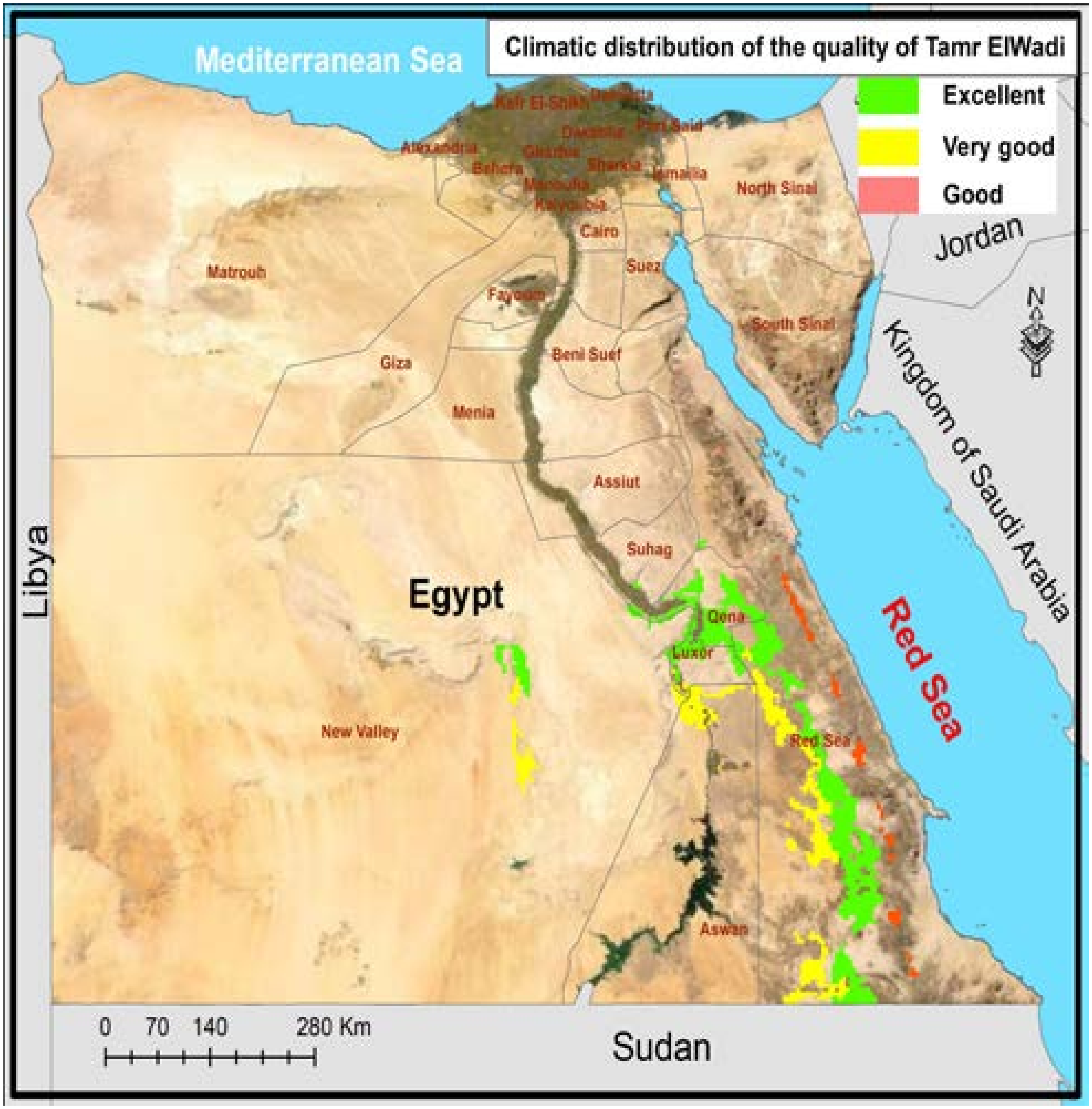
Very good quality degree

Map 5- 34: Spatial distribution of Tamr El Wadi cultivar “Very good Quality” Optimum temperature unites between 2901-3000°C and relative humidity of 21-25%

Good quality degree

Map 5- 35: Spatial distribution of Tamr El Wadi cultivar "Good Quality" Optimum temperature unites between 2500-2699°C and relative humidity of 31-33%

Aggregate agricultural areas



Map 5- 36: Spatial distribution of Tamr El Wadi cultivar “three grade quality”

5.3.4 Frahi

A. Fruits characteristics

Fruit data

Parameter	Character State	Score
Fruit length	(cm.)	4.00±0.44
Fruit width	(cm.)	2.00±0.08
Fruit weight	(gm.)	8.92±1.26
Fruit volume	(cm3)	8.80±1.24
Fruit shape	Falcoid -elongate	
Fruit apex	Obtuse	
Fruit base	Obtuse	
Fruit colour (khalal)	Yellow	
Fruit colour of the maturity	Pale brown	
Flesh thickness	(cm.)	0.56
Flesh colour	Whitish yellow	
Flesh texture	Dry	
Flavour	Good	
Flesh taste	Delicious	

B. Fruits production & storing

Fruits production & storing

Parameter	Character State	Score
Suitable environmental conditions		
Ideal heat unites	Unit	1801-2100
Ideal humidity	%	32.5-37
Current area of cultivation	Matruh Governorate, Siwa Oasis	
Cultivated area	Fadden	9x9
Tree No.	Tree	51
Harvest Time	Mid-September – end of October	
Harvest stage	Semi-dry stage	
Harvest period	Week	5-6
Harvest times	Times	1-2
Production quantity	Kg/tree	50-70
Production area	Ton/Fadden	2.5- 3.5

Total Area, Yield and Production for Frahi

Production (Ton)	Yield (K. G.\Palm)	Fruiting palm	Area (Fed.)
450	58.82	7650	150

Source: Economic Affairs Sector (Average of 5y).(2016-2020)

Table 5-22: Storage & distribution

Short term storage	week	4
Long term storage	week	12
Refrigerator temperature	°C	4-7
Storage ability	Week	52
Shelf time	Day	90

C. Fruits consumption & marketing

Sales & Marketing

Fruit stage for marketing	Dry stage	
Fruit stage for export	Dry (hard)	
Markets types	National & local	
Quality	Accepted	
Future markets	Asia, China and Neighbouring countries	
Marketing opportunities	Weak	
Marketing time	September-October	
Marketing period	All the year	
Nature of the product	1.fresh 2.de-seeded 3.dried 4.packaged 5.manufactured	
Price value/ Kg	Dollar	0.5
Consumption		
Consumption stage	Semi-dry, dry	
Fruit humidity	%19<	

D. Current Agro-production map

Total Area, Yield and Production for Frahi cultivar (Average 5Y) (2016-2020)

Governorates	Frehi			
	Production (Ton)	Yield (K. G.\Palm)	F. Palm (Palm)	Area (Fed.)
Matruh	450	58.82	7650	150
Outside the valley	450	58.82	7650	150
Total	450	58.82	7650	150

Source : measurements of the team at the cultivation area.

E. Agro-climate map

Excellent quality degree

Regarding the "excellent" quality degree of the Frahi cultivar, the optimum heat units range between 1801° C and 2100° C and the relative humidity of 32.5-37% during the period of flowering, growth and ripening of fruits from April to October. The most suitable areas (Late harvest) for the cultivation of the Frahi cultivar in Egypt (Map 5-37), are represented in the following areas:

- The middle sector from the western borders of the Arab Republic of Egypt in Siwa Oasis, including the reclamation areas outside the Oasis including Lakes of Numisa and Sitra and extends northward to the Qara Oasis as well as eastward passes Qattara Depression in Matruh Governorate.
- Areas of the Baharia Oasis region, includes Mandisha and Al-Bweiti in Giza Governorate, and their extension to the reclamation areas in west-west Minya.
- The eastern area of Minya Governorate.
- A limited area in the southwestern part of Beni Suef Governorate, as well as the southeastern region of the Governorate east of the Nile River.
- The middle north area of Assuit Governorate.
- A limited area in the southwest of Suez Governorate.
- The Eastern Desert region of the Red Sea Governorate, adjacent to Minya Governorate.
- Some areas scattered in the Governorate of South Sinai Governorate and a limited area west of Al-Hasana in North Sinai Governorate.

Very good quality degree

Regarding the "very good" quality degree of the Frahi cultivar, the optimum heat units range between 2101° C and 2200° C and the relative humidity of 30-32% during the period of flowering, growth and ripening of fruits from April to October. The most suitable areas (Early harvest) for the cultivation of the Frahi cultivar in Egypt (Map 5-38) are represented in the following areas:

- The area locates south of Al-Bweiti in Baharia Oasis of Giza Governorate.
- Limited areas in the south of Minya Governorate.
- The north-east regions in the New Valley Governorate next to the Assuit Governorate.
- The western sector (West of the Nile), the Middle (East of the Nile) and the far eastern region of Assuit Governorate.
- Scattered areas in the eastern desert in the Red Sea Governorate, especially opposite to Assuit Governorate.
- Scattered areas in South Sinai Governorate locate at the Gulf of Aqaba.

Good quality degree

Regarding the "good" quality degree of the Frahi cultivar, the optimum heat units range between 2201° C and 2300° C and the relative humidity of 33-35% during the period of flowering, growth and ripening of fruits From April to October. The most suitable areas (Intermediate harvest) for the cultivation of the Frahi cultivar in Egypt (Map 5-39) are represented in the following areas:

- The area locates in the middle Qattara Depression of Matruh Governorate.
- The agricultural land of south Minya Governorate and North Assuit Governorate.
- Limited scattered areas of the east desert in the Red Sea Governorate.
- Limited scattered areas of south Sinai Governorate.

Aggregate agricultural areas

Referring to the climatic analyzes and the needs of the fruits for the different quality levels, and comparing the heat and moisture needs of the Frehi cultivar during the period of flowering, growth and ripening of the fruits from April to October with the heat units recorded for the same period in the Governorates, it was possible to determine the agricultural areas suitable for production Frehi cultivar in Egypt (Map 5-40) is as follows:

- The cultivation spreads in the middle sector from Siwa Oasis and extends across Egypt to the red sea coastal area.
- It could be cultivated in the middle sector of Minya and Assuit Governorates.
- Taking into account the agricultural production standards that are concerned with good agricultural practices and the requirements for different agricultural activities inside the farm, the required quality can be obtained in the specified places for each appropriate quality grade.

Excellent quality degree

Map 5- 37: Spatial distribution of Frahi cultivar "Excellent Quality" Optimum temperature unites between 1801-2100°C and relative humidity of 32.5-37%

Very good quality degree

Map 5- 38: Spatial distribution of Frahi cultivar "Very good Quality" Optimum temperature unites between 2101-2200°C and relative humidity of 30-32%

good quality degree

Map 5- 39: Spatial distribution of Frahi cultivar "Good Quality" Optimum temperature unites between 2201-2300°C and relative humidity of 33-35%

Aggregate agricultural areas

Map 5- 40: Spatial distribution of Frahi cultivar “three grade quality”

5.3.5 Ambara

A. Fruits characteristics

Fruit data

Parameter	Character State	Score
Fruit length	(cm.)	4.80±0.51
Fruit width	(cm.)	2.44±0.08
Fruit weight	(gm.)	13.20±2.09
Fruit volume	(cm3)	18.00±2.92
Fruit shape	Falcoid -elongate	
Fruit apex	Obtuse	
Fruit base	Truncate	
Fruit colour (khalal)	Red	
Fruit colour of the maturity	Brown-red	
Flesh thickness	(cm.)	0.85
Flesh colour	White	
Flesh texture	Firm	
Flavour	Good	
Flesh taste	Delicious	

B. Fruits production & storing

Fruits production & storing

Parameter	Character State	Score
Suitable environmental conditions		
Ideal heat unites	Unit	2750-3500
Ideal humidity	%	16-19
Current area of cultivation	New valley Governorate, Baharia Oasis (Giza Governorate.	
Cultivated area	Fadden	7x7
Tree No.	Tree	85
Harvest Time	End of September – end of October	
Harvest stage	Semi-dry stage	
Harvest period	Week	4
Harvest times	Times	2-3
Production quantity	Kg/tree	80- 100
Production area	Ton/Fadden	6 - 8

Total Area, Yield and Production for Ambara

Production (Ton)	Yield (K. G.\Palm)	Fruiting palm	Area (Fed.)
525	88.235	5950	70

Source: Economic Affairs Sector (Average of 5y).(2016-2020)

Storage & distribution

Short term storage	week	4
Long term storage	week	12
Refrigerator temperature	°C	0-(-5)
Storage ability	Week	24-52
Shelf time	Day	60-90

C. Fruits consumption & marketing

Sales & Marketing

Fruit stage for marketing	Semi-dry stage	
Fruit stage for export	Semi-dry	
Markets types	National & local	
Quality	Accepted	
Future markets	Asia, China, Morocco, Europe.	
Marketing opportunities	Excellent	
Marketing time	End of September- end of October	
Marketing period	All the year	
Nature of the product	1.fresh 2.de-seeded 3.dried 4.packaged 5.manufactured	
Price value/ Kg	Dollar	3
Consumption		
Consumption stage	Semi-dry	
Fruit humidity	22-24 %	

D. Current Agro-production map

Total Area, Yield and Production for Ambara (Average 5Y) (2016-2020)

Governo rates	Ambara			
	Production (Ton)	Yield (K. G.\Palm)	F. Palm (Palm)	Area (Fed.)
New valley	337.5	88.235	3825	45
Giza	187.5	88.235	2125	25
Total	525	88.235	5950	70

Source : measurements of the team at the cultivation area.

E. Agro-climate map

Excellent quality degree

Regarding the "excellent" quality degree of the Ambara cultivar, the optimum heat units range between 2750° C and 3500° C and the relative humidity of 16-19% during the period of flowering, growth and ripening of fruits from April to October. The most suitable areas (Early harvest) for the cultivation of the Ambara cultivar in Egypt (Map 5-41), are represented in the following areas:

- The east and west area outside the old agricultural land in Aswan Governorate from south of Koom Omboo district extends to the Egyptian south border.
- The far south-east area of New Valley Governorate, south of Toshka Lake and the eastern area of Owainat.

Very good quality degree

Regarding the "very good" quality degree of the Ambara cultivar, the optimum heat units range between 2801° C and 2900° C and the relative humidity of 20-22% during the period of flowering, growth and ripening of fruits from April to October. The most suitable areas (Intermediate harvest) for the cultivation of the Ambara cultivar in Egypt (Map 5-42) are represented in the following areas:

- The area of eastern desert locates in the Red Sea Governorate east of Nasser Lake.
- Limited areas locate in the north of Aswan Governorate.
- Scattered areas locate at the border of east and west agriculture area of Aswan Governorate.
- The area locates between the meeting of the New Valley, Aswan and Luxor Governorates.
- The area locates around Toshka Lake and extends northward to Paris Oasis of New Valley Governorate.

Good quality degree

Regarding the "good" quality degree of the Ambara cultivar, the optimum heat units range between 2700° C and 2800° C and the relative humidity of 23-25% during the period of flowering, growth and ripening of fruits from April to October. The most suitable areas (Late harvest) for the cultivation of the Ambara cultivar in Egypt (Map 5-43) are represented in the following areas:

- Areas locate east and west of Kharga Oasis extend to Balat district in Dakhla Oasis of New Valley Governorate.
- Limited areas east of New Valley Governorate near to Qena and Luxor Governorate.
- Limited area south of Qena Governorate.
- Areas locate in Luxor Governorate.
- The area of eastern desert in Red Sea Governorate locates east of Luxor and Aswan Governorates.

Aggregate agricultural areas

Referring to the climatic analyzes and the needs of the fruits for the different quality levels, and comparing the heat and moisture needs of the Ambara cultivar during the period of flowering, growth and ripening of the fruits from April to October with the heat units recorded for the same period in the Governorates, it was possible to determine the agricultural areas suitable for production Ambara cultivar in Egypt (Map 5-44) is as follows:

- The cultivation spreads in the south of Egypt from Balat district of New Valley Governorate extends east and south to Toshka Lake as well as the eastern area of Owainat.
- The suitable area locates in Aswan Governorate with some extension to eastern desert and north to Qena and Luxor Governorate.
- Taking into account the agricultural production standards that are concerned with good agricultural practices and the requirements for different agricultural activities inside the farm, the required quality can be obtained in the specified places for each appropriate quality grade.

Excellent quality degree

Map 5- 41: Spatial distribution of Ambara cultivar "Excellent Quality" Optimum temperature unites between 2750-3500°C and relative humidity of 16-19%

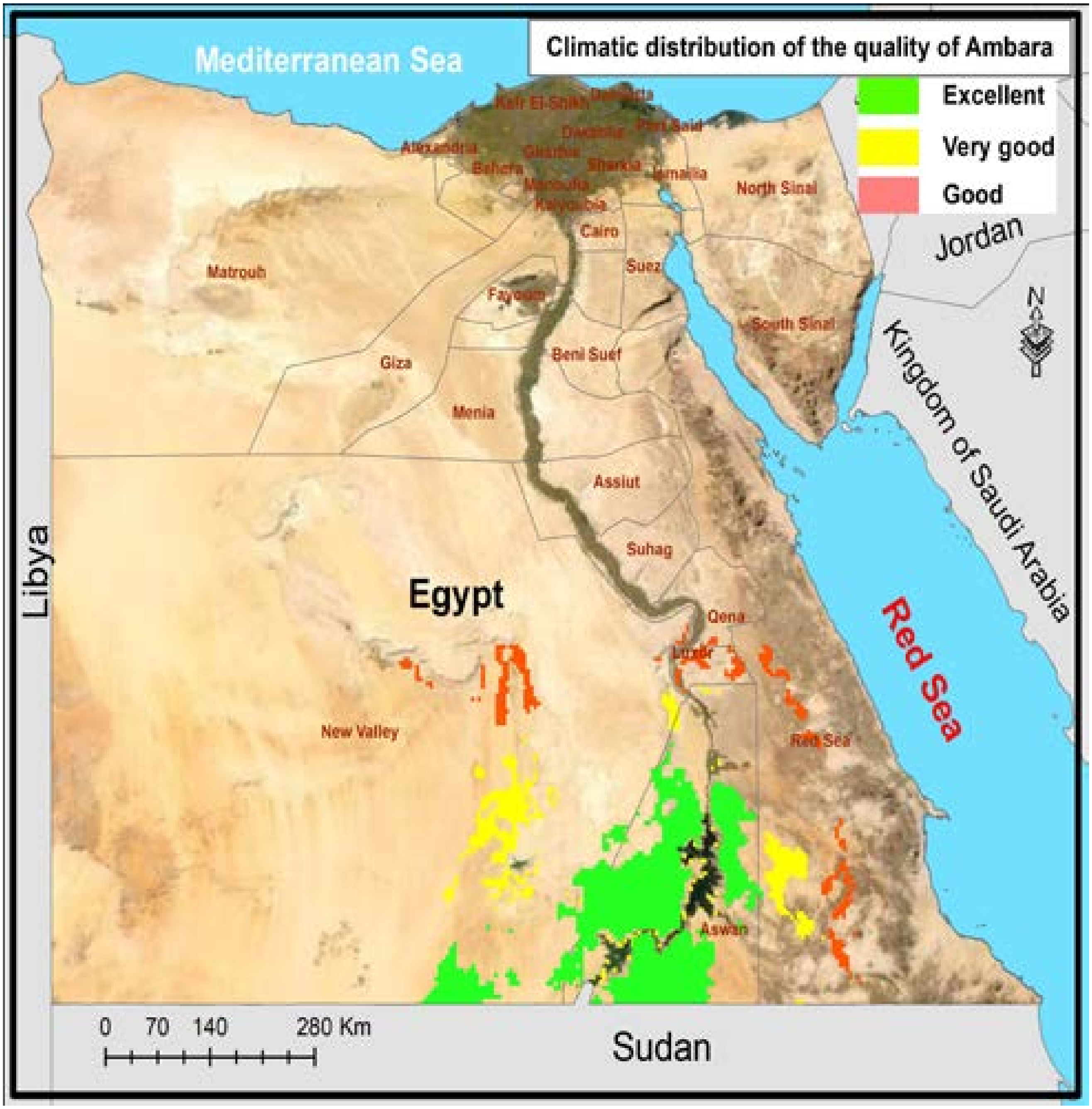
Very good quality degree

Map 5- 42: Spatial distribution of Ambara cultivar "Very good Quality" Optimum temperature unites between 2801-2900°C and relative humidity of 20-22%

Good quality degree

Map 5- 43: Spatial distribution of Ambara cultivar "Good Quality" Optimum temperature unites between 2700-2800°C and relative humidity of 23-25%

Aggregate agricultural areas



Map 5- 44: Spatial distribution of Ambara cultivar “three grade quality”

5.3.6 Khedri

A. Fruits characteristics

Fruit data

Parameter	Character State	Score
Fruit length	(cm.)	4.68±0.49
Fruit width	(cm.)	2.18±0.04
Fruit weight	(gm.)	16.20±2.61
Fruit volume	(cm3)	18.20±2.97
Fruit shape	Cylindrical	
Fruit apex	Blunt	
Fruit base	Obtuse	
Fruit colour (khalal)	Pale yellow	
Fruit colour of the maturity	Brownish black	
Flesh thickness	(cm.)	0.72
Flesh colour	Whitish creamy	
Flesh texture	Soft	
Flavour	Good	
Flesh taste	Delicious	

B. Fruits production & storing

Fruits production & storing

Parameter	Character State	Score
Suitable environmental conditions		
Ideal heat unites	Unit	2550-2750
Ideal humidity	%	24-28
Current area of cultivation	New valley Governorate, Baharia Oasis (Giza Governorate.	
Cultivated area	Fadden	7x7
Tree No.	Tree	85
Harvest Time	End of September – end of October	
Harvest stage	Semi-dry stage	
Harvest period	Week	2-3

Harvest times	Times	2-3
Production quantity	Kg/tree	80- 100
Production area	Ton/Fadden	6 - 8

Total Area, Yield and Production for khedri

Production (Ton)	Yield (K. G.\Palm)	Fruiting palm	Area (Fed.)
658	82.35	7990	94

Source: Economic Affairs Sector (Average of 5y).(2016-2020)

Storage & distribution

Short term storage	week	4
Long term storage	week	12
Refrigerator temperature	°C	0-(-5)
Storage ability	Week	24-52
Shelf time	Day	60-75

C. Fruits consumption & marketing

Sales & Marketing

Fruit stage for marketing	Semi-dry stage	
Fruit stage for export	Semi-dry	
Markets types	National & local	
Quality	Accepted	
Future markets	Asia, China, Morocco, Europe.	
Marketing opportunities	Excellent	
Marketing time	End of September- end of October	
Marketing period	All the year	
Nature of the product	1.fresh 2.de-seeded	
Price value/ Kg	Dollar	3
Consumption		
Consumption stage	Semi-dry	
Fruit humidity	22-24 %	

D. Current Agro-production map

Total Area, Yield and Production for khedri (Average 5Y) (2016-2020)

Governorates	khedri			
	Production	**Yield**	**F. Palm**	**Area**
	(Ton)	**(K. G.\Palm)**	**(Palm)**	**(Fed.)**
Giza	294	82.35	3570	42
New valley	364	82.35	4420	52
Total	658	82.35	7990	94

Source : measurements of the team at the cultivation area.

E. Agro-climate map

Excellent quality degree

Regarding the "excellent" quality degree of the Khedri cultivar, the optimum heat units range between 2550° C and 2750° C and the relative humidity of 24-28% during the period of flowering, growth and ripening of fruits from April to October. The most suitable areas (Intermediate harvest) for the cultivation of the Khedri cultivar in Egypt (Map 5-45), are represented in the following areas:

- Areas of Kharga and Dakhla Oasis.
- The Far East areas of the New Valley Governorate at the border of Sohag and Qena Governorate.

- The south-west area at border of old agriculture land of Sohag Governorate.
- Areas locate outside the old agriculture land of Qena Governorate.
- The north area of Luxor Governorate.
- Areas of eastern desert locate in Red Sea Governorate facing to Sohag Governorate southward to Egyptian border.

Very good quality degree

Regarding the "very good" quality degree of the khedri cultivar, the optimum heat units range between 2751° C and 2850° C and the relative humidity of 17-23% during the period of flowering, growth and ripening of fruits from April to October. The most suitable areas (Early harvest) for the cultivation of the khedri cultivar in Egypt (Map 5-46) are represented in the following areas:

- The area extends from the west of the Kharga Oasis to the east of the Dakhla Oasis in the New Valley Governorate.
- Paris Oasis area in the New Valley Governorate and extending to the eastern area of Owainat, Area of Toshka lake and the area of Egyptian south border.
- The eastern region of the New Valley Governorate

facing Luxor Governorate and north Aswan Governorate.

- The common area locates between the south of Luxor Governorate and the north of Aswan Governorate. Limited and scattered areas in Aswan Governorate.

- The area of the eastern desert locates in the Red Sea Governorate, opposite Aswan Governorate.

Good quality degree

Regarding the “good” quality degree of the Khedri cultivar, the optimum heat units range between 2450° C and 2549° C and the relative humidity of 29-31% during the period of flowering, growth and ripening of fruits from April to October. The most suitable areas (Late harvest) for the cultivation of the Khedri cultivar in Egypt (Map 5-47) are represented in the following areas:

- Limited area in the Middle Eastern desert as well as limited area in the south of Assuit Governorate.

- The area of the west and east of Sohag Governorate.

- Limited area locates between Nagaa Hamady and Deshna of Qena Governorate.

- Scattered areas locate in the eastern desert of Red Sea Governorate opposite to Sohag, Qena, Luxor and Aswan Governorates.

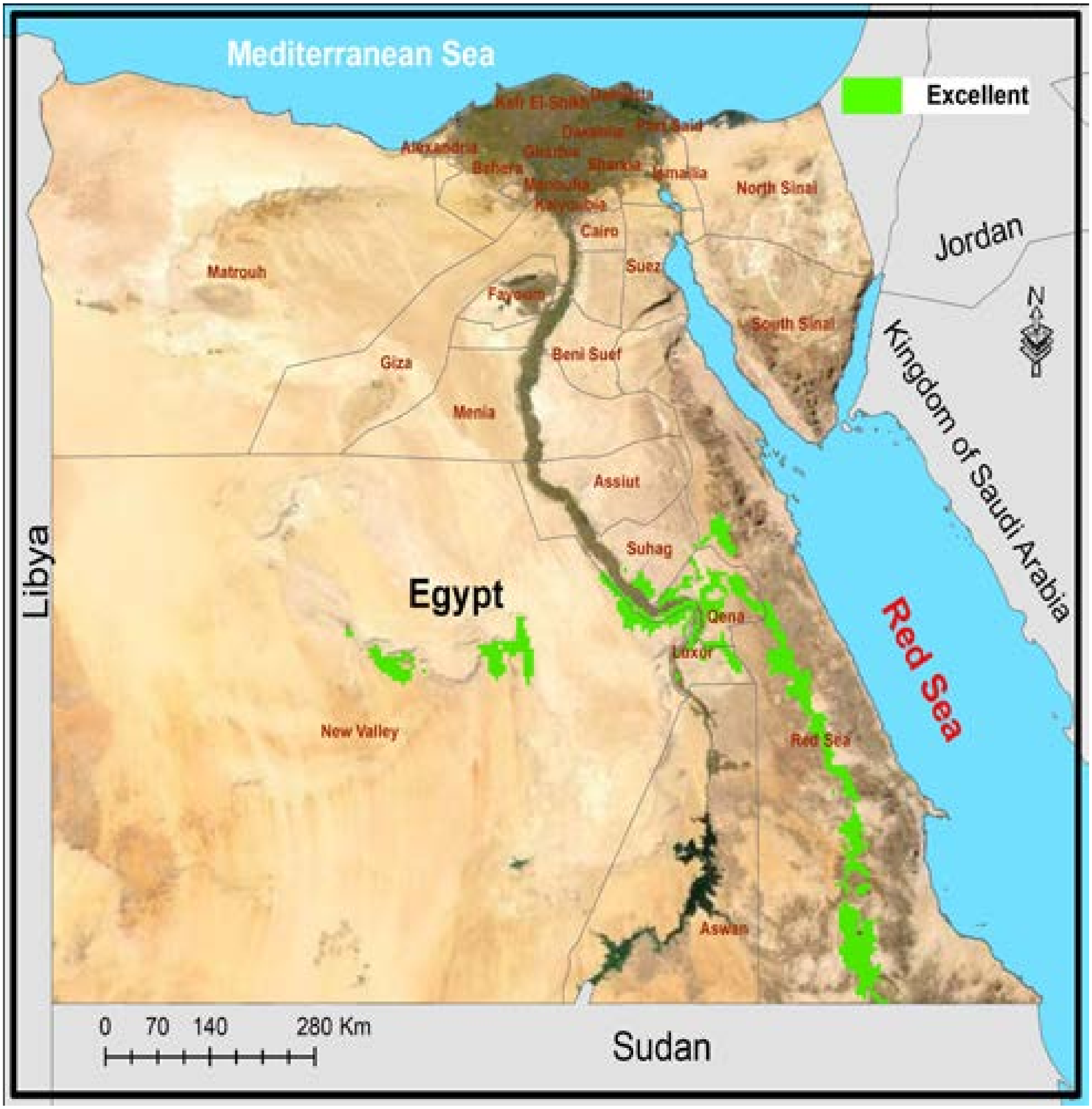
Aggregate agricultural areas

Referring to the climatic analyzes and the needs of the fruits for the different quality levels, and comparing the heat and moisture needs of the Khedri cultivar during the period of flowering, growth and ripening of the fruits from April to October with the heat units recorded for the same period in the Governorates, it was possible to determine the agricultural areas suitable for production Khedri cultivar in Egypt (Map 5-48) is as follows:

- The cultivation extends in the Oases of the New Valley Governorate, as well as separated areas starting from Assuit Governorate to the north of Aswan Governorate. The Khedri cultivar could also be cultivated in the eastern desert opposite Sohag Governorate and extends southward to the southern borders of the Arab Republic of Egypt as well as the eastern reclamation area of Owainat.

- Taking into account the agricultural production standards that are concerned with good agricultural practices and the requirements for different agricultural activities inside the farm, the required quality can be obtained in the specified places for each appropriate quality grade.

Excellent quality degree



Map 5- 45: Spatial distribution of Khedri cultivar "Excellent Quality" Optimum temperature unites between 2550-2750°C and relative humidity of 24-28%

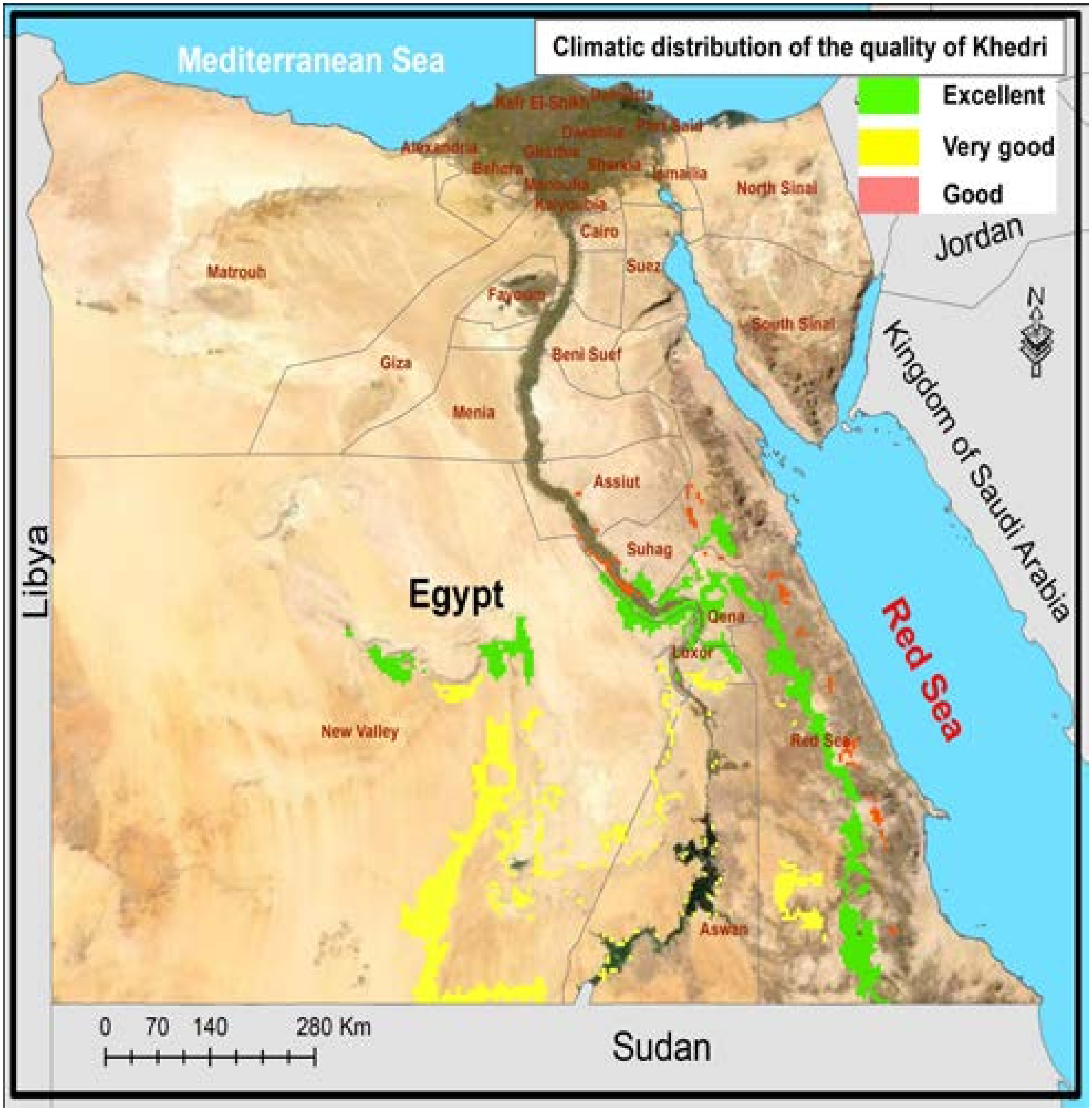
Very good quality degree

Map 5- 46: Spatial distribution of Khedri cultivar "Very good Quality" Optimum temperature unites between 2751-2850°C and relative humidity of 17-23%

good quality degree

Map 5- 47: Spatial distribution of Khedri cultivar "Good Quality" Optimum temperature unites between 2549-2450°C and relative humidity of 31-29%

Aggregate agricultural areas



Map 5- 48: Spatial distribution of Khedri cultivar “three grade quality”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5.3.7 Mejhoul (Medjool)

A. Fruits characteristics

Fruit data

Parameter	Character State	Score
Fruit length	(cm.)	5.88±0.89
Fruit width	(cm.)	3.44±0.45
Fruit weight	(gm.)	22.46±5.32
Fruit volume	(cm3)	16.60±4.37
Fruit shape	Ovate-elongate	
Fruit apex	Blunt	
Fruit base	Truncate	
Fruit colour (khalal)	Yellow	
Fruit colour of the maturity	Pale brown	
Flesh thickness	(cm.)	1.4
Flesh colour	White	
Flesh texture	Firm	
Flavour	Excellent	
Flesh taste	Delicious-sweet	

B. Fruits production & storing

Fruits production & storing

Parameter	Character State	Score
Suitable environmental conditions		
Ideal heat unites	Unit	2000-2400
Ideal humidity	%	27-41
Current area of cultivation	From Fayoum to Aswan and New Valley Governorates	
Cultivated area	Fadden	7x7
Tree No.	Tree	85
Harvest Time	Mid of August – Mid of October	
Harvest stage	From the end of soft stage	
Harvest period	Week	2-3
Harvest times	Times	2-4
Production quantity	Kg/tree	40-70
Production area	Ton/Fadden	3 - 5.5

Total Area, Yield and Production for Mejhoul (Medjool)

Production (Ton)	Yield (K. G.\Palm)	Fruiting palm	Area (Fed.)
6,867	41.18	166,770	1,962

Source: Economic Affairs Sector (Average of 5y).(2016-2020)

Storage & distribution

Short term storage	week	1
Long term storage	week	2
Refrigerator temperature	°C	-18
Storage ability	Week	< 52
Shelf time	Day	>15

C. Fruits consumption & marketing

Sales & Marketing

Fruit stage for marketing	Semi-dry (soft) stage, Semi-dry	
Fruit stage for export	Semi-dry (soft)	
Markets types	National, local, Europe	
Quality	Excellent	
Future markets	Asia, China, Canada, Europe, UAS, Gulf area, Japan.	
Marketing opportunities	Excellent	
Marketing time	September- October	
Marketing period	All the year	
Nature of the product	1.fresh, 2.de-seeded 3.dried 4.packaged 5.manufactured	
Price value/ Kg	Dollar	5-10
Consumption		
Consumption stage	Semi-dry	
Fruit humidity	19 - 28 %	

D. Current Agro-production map

Total Area, Yield and Production for Mejhoul (Medjool) (Average 5Y) (2016-2020)

Governorates	Mejhoul (Medjool)			
	Production	Yield	F. Palm	Area
	(Ton)	(K. G.\Palm)	(Palm)	(Fed.)
Giza	8,041	47,06	170,850	2,621
New valley	959,8	45,17	21,250	250
Luxor	201,3	43,08	4,675	55
Aswan	535,001	40,70	13,185	202,27
Total	9,737	44,003	209,820	3,128

Source : measurements of the team at the cultivation area.

E. Agro-climate map

Excellent quality degree

Regarding the "excellent" quality degree of the Mejhoul (Medjool) cultivars, the optimum heat units range between 2000° C and 2400° C and the relative humidity of 27-41% during the period of flowering, growth and ripening of fruits from April to October. The most suitable areas (Late harvest) for the cultivation of the Mejhoul (Medjool) cultivars in Egypt (Map 5-49), are represented in the following areas:

- Areas of east Qara Oasis and Qattara Depression (west of Moghrah) of Matrouh Governorate.
- The area locates east Mandisha at Baharia Oasis in Giza Governorate and Menia Governorate
- Assiut Governorate, Suhag Governorate and Farafra City.
- Areas of long middle sector of Beni Suef Governorate.
- Most areas in Fayoum Governorate.
- Areas of the south-middle sector in Giza Governorate.
- The area of south Suez Governorate.
- Areas of east sector at eastern desert in Red Sea Governorate.
- Areas locate in the Suez and Aqaba gulf in South Sinai Governorate.

Very good quality degree

Regarding the "very good" quality degree of the Mejhoul (Medjool) cultivars, the optimum heat units range between 2401° C and 2500° C and the relative humidity of 25-30% during the period of flowering, growth and ripening of fruits from April to October. The most suitable areas (Intermediate harvest) for the cultivation of the Mejhoul (Medjool) cultivars in Egypt (Map 5-50) are represented in the following areas:

- Areas of east sector of eastern desert in Red Sea Governorate (west of the excellent quality area).
- Limited scattered area of Suhagand Assiut Governorates.
- Dakhla and North Kharga in the New Valley.
- Limited area locates in the south of South Sinai Governorate..

Good quality degree

Regarding the "good" quality degree of the Mejhoul (Medjool) cultivars, the optimum heat units range between 2501° C and 2600° C and the relative humidity of 23-27% during the period of flowering, growth and ripening of fruits from April to October. The most suitable areas (Early harvest) for the cultivation of the Mejhoul (Medjool) cultivars in Egypt (Map 5-51) are represented in the following areas :

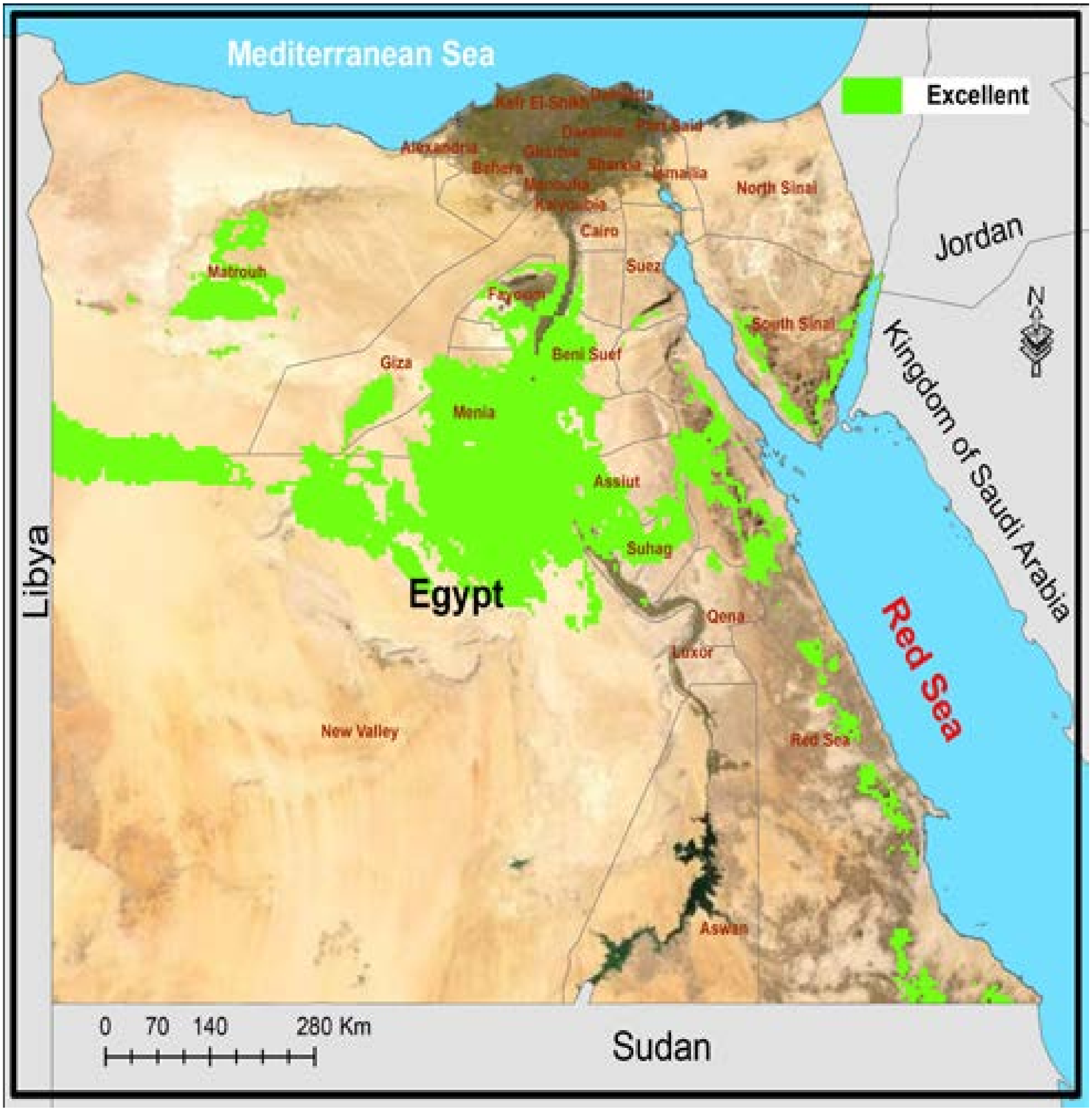
- Areas of longitude sector of eastern desert in Red Sea Governorate (east of the very good quality area).
- Scattered areas locate in Suhag and Qena Governorates.
- The area locates in the east border of New Valley Governorate opposite Suhag, Qena Governorates and The beginning of Luxor Governorate.
- The areas of east Kharga Oasis and areas of Mutte, El-Qassr and Bedakhlu of Dakhla Oasis in New valley Governorate.

Aggregate agricultural areas

Referring to the climatic analyzes and the needs of the fruits for the different quality levels, and comparing the heat and moisture needs of the Mejhoul (Medjool) cultivar during the period of flowering, growth and ripening of the fruits from April to October with the heat units recorded for the same period in the Governorates, it was possible to determine the agricultural areas suitable for production Mejhoul (Medjool) cultivar in Egypt (Map 5-52) is as follows:

- The cultivation in Qattara Depression and middle of Egypt as well as eastern desert and area of south Sinai.
- Taking into account the agricultural production standards that are concerned with good agricultural practices and the requirements for different agricultural activities inside the farm, the required quality can be obtained in the specified places for each appropriate quality grade.

Excellent quality degree



Map 5- 49: Spatial distribution of MedMejhoul (Medjool)ool cultivar "Excellent Quality" Optimum temperature unites between 2000-2400°C and relative humidity of 27-41%

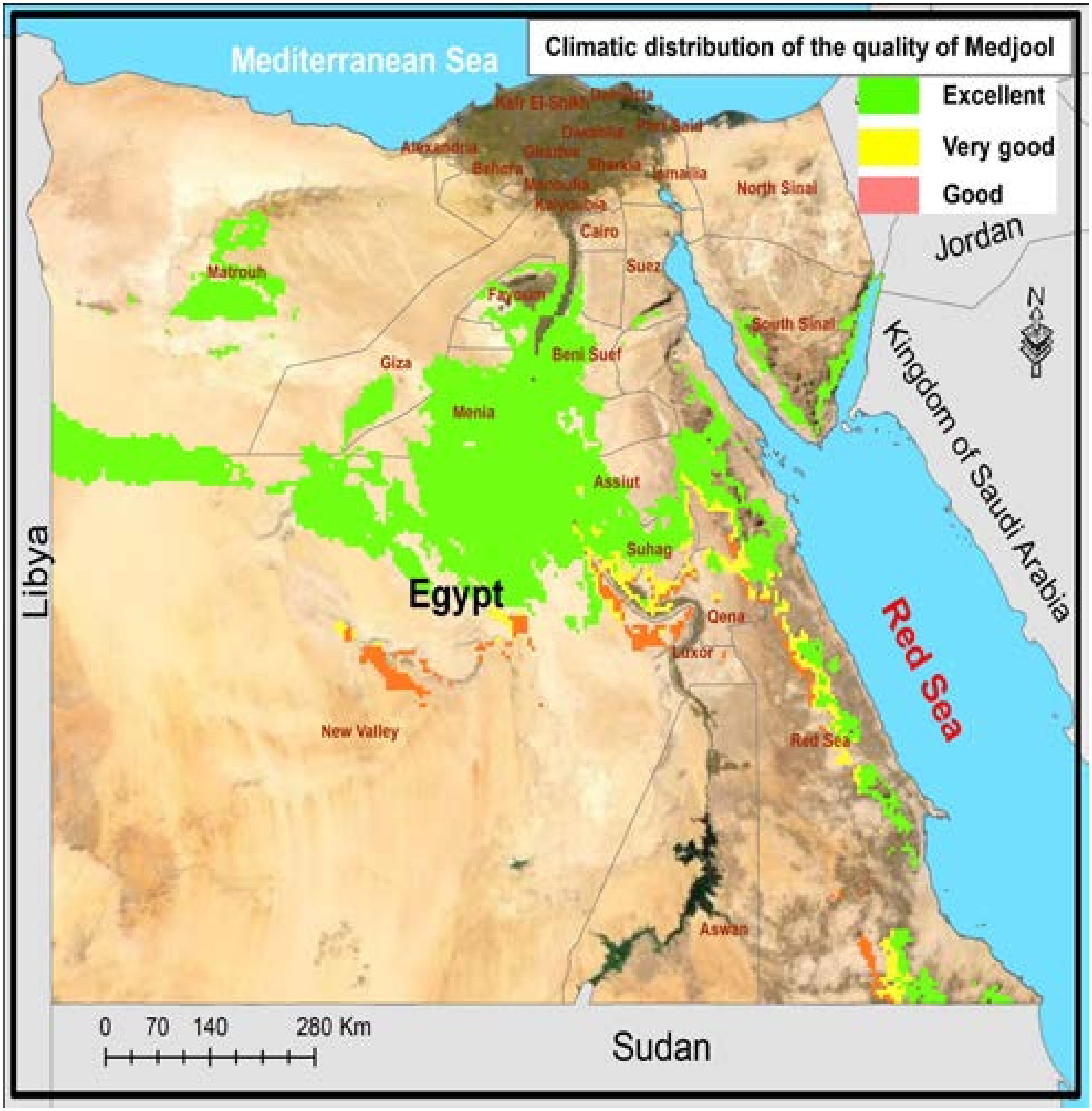
Very good quality degree

Map 5- 50: Spatial distribution of Mejhoul (Medjool) cultivar "Very good Quality" Optimum temperature unites between 2401-2500°C and relative humidity of 25-30%

Good quality degree

Map 5- 51: Spatial distribution of Mejhoul (Medjool) cultivar "Good Quality" Optimum temperature unites between 2501-2600°C and relative humidity of 23-27%

Aggregate agricultural areas



Map 5- 52: Spatial distribution of Mejhoul (Medjool) cultivar "three grade quality"

5.3.8 Sakaai

A. Fruits characteristics

Fruit data

Parameter	Character State	Score
Fruit length	(cm.)	6.14±0.76
Fruit width	(cm.)	2.74±0.15
Fruit weight	(gm.)	18.10±2.95
Fruit volume	(cm3)	18.70±3.05
Fruit shape	Falcoid-elongate	
Fruit apex	Blunt	
Fruit base	Truncate	
Fruit colour (khalal)	Yellow	
Fruit colour of the maturity	Brown-red	
Flesh thickness	(cm.)	0.95
Flesh colour	White	
Flesh texture	Firm	
Flavour	Excellent	
Flesh taste	Delicious-sweet	

B. Fruits production & storing

Fruits production & storing

Parameter	Character State	Score
Suitable environmental conditions		
Ideal heat unites	Unit	2500-3100
Ideal humidity	%	17-26
Current area of cultivation	Middle and Upper Egypt	
Cultivated area	Fadden	7x7
Tree No.	Tree	85
Harvest Time	September - October	
Harvest stage	Semi-dry	
Harvest period	Week	2-3
Harvest times	Times	2-3

Production quantity	Kg/tree	60-80
Production area	Ton/Fadden	5 - 6.5

Total Area, Yield and Production for Sakaai

Production (Ton)	Yield (K. G.\Palm)	Fruiting palm	Area (Fed.)
407	64.71	6290	74

Source: Economic Affairs Sector (Average of 5y).(2016-2020)

Storage & distribution

Short term storage	week	4
Long term storage	week	12
Refrigerator temperature	°C	4-7
Storage ability	Week	< 52
Shelf time	Day	90

C. Fruits consumption & marketing

Sales & Marketing

Fruit stage for marketing	Semi-dry stage
Fruit stage for export	Semi-dry (hard)
Markets types	National & local
Quality	Excellent
Future markets	Asia, China, Canada, Europe, UAS.
Marketing opportunities	Excellent
Marketing time	Mid- September
Marketing period	All the year
Nature of the product	1.fresh, 2.de-seeded 3.dried 4.packaged 5.manufactured

Price value/ Kg	Dollar	3-4
Consumption		
Consumption stage	Semi-dry	
Fruit humidity	19 - 24 %	

D. Current Agro-production map

Total Area, Yield and Production for Sakaai (Average 5Y) (2016-2020)

Governorates	Sakaai			
	Production	Yield	F. Palm	Area
	(Ton)	(K. G.\Palm)	(Palm)	(Fed.)
Giza	82.5	64.71	1275	15
New Valley	121	64.71	1870	22
Luxor	99	64.71	1530	18
Qena	38.5	64.71	595	7
Aswan	66	64.71	1020	12
Total	407	64.71	6290	74

Source : measurements of the team at the cultivation area.

E. Agro-climate map

Excellent quality degree

Regarding the "excellent" quality degree of the Sakaai cultivar, the optimum heat units range between 2500° C and 3100° C and the relative humidity of 16-26% during the period of flowering, growth and ripening of fruits from April to October. The most suitable areas (Early harvest) or the cultivation of the Sakaai cultivar in Egypt (Map 5-53), are represented in the following areas:

- The south-east of New Valley Governorate locates at the south border of Egypt includes Owainat and Toshka area and extends northward through Paris and Kharga Oases. The area extended from Kharga Oasis to Mutte district of Dakhla Oasis.
- The area locates Far East of the New Valley Governorate adjacent to south-west of Sohag Governorate, Qena Governorate, west of Luxor Governorate and North West of Aswan Governorate.
- Limited area of Sohag Governorate.
- The area of south Qena Governorate.
- Most areas of Luxor and Aswan Governorate.'
- The area of east desert locates in Red Sea Governorate south of Qena Governorate and extends southward to the south border of Egypt.

Very good quality degree

Regarding the "very good" quality degree of the Sakaai cultivar, the optimum heat units range between 2400° C and 2599° C and the relative humidity of 25-28% during the period of flowering, growth and ripening of fruits from April to October. The most suitable areas (Intermediate harvest) for the cultivation of the Sakaai cultivar in Egypt (Map 5-54) are represented in the following areas:

- The northern areas of the Kharga Oasis, as well as area of the Dakhla Oasis, from Mutte district Al-Qassr and Bedakhlu in the New Valley Governorate.
- The eastern areas of the New Valley Governorate, adjacent to the Governorates of Sohag and Qena.
- Areas scattered in the eastern desert of Sohag and Qena Governorates.
- The eastern desert regions in the Red Sea Governorate, locates at the west of the Governorates of Sohag, Qena, Luxor and Aswan.

Good quality degree

Regarding the "good" quality degree of the Sakaai cultivar, the optimum heat units range between 2300° C and 2499° C and the relative humidity of 29-31% during the period of flowering, growth and ripening of fruits from April to October. The most suitable areas (Late harvest) for the cultivation of the Sakaai cultivar in Egypt (Map 5-55) are represented in the following areas:

- Limited areas east and west of the old agricultural lands of the south-west sector of Assuit Governorate.
- Areas of the middle longitudinal sector of Sohag Governorate.
- Some limited areas east of Assuit and Sohag Governorates
- Some limited places in the north and east of Qena Governorate.
- The areas east of the Eastern Desert locate in the Red Sea Governorate opposite the Governorates of Assuit, Sohag, Qena, Luxor and Aswan.

Aggregate agricultural areas

Referring to the climatic analyzes and the needs of the fruits for the different quality levels, and comparing the heat and moisture needs of the Sakaai cultivar during the period of flowering, growth and ripening of the fruits from April to October with the heat units recorded for the same period in the Governorates, it was possible to determine the agricultural areas suitable for production Sakaai cultivar in Egypt (Map 5-56) is as follows:

- The good cultivation starts from the latitude of 27° and extends to the south border of Egypt at latitude of 22°. The cultivation extends eastward from the longitude 27.50°.
- Taking into account the agricultural production standards that are concerned with good agricultural practices and the requirements for different agricultural activities inside the farm, the required quality can be obtained in the specified places for each appropriate quality grade.

Excellent quality degree

Map 5- 53: Spatial distribution of Sakaai cultivar "Excellent Quality" Optimum temperature unites between 2500-3100°C and relative humidity of 17-25%

Very good quality degree

Map 5- 54: Spatial distribution of Sakaai cultivar “Very good Quality” Optimum temperature unites between 2400-2599°C and relative humidity of 25-30%

good quality degree

Map 5- 55: Spatial distribution of Sakaai cultivar "Good Quality" Optimum temperature unites between 2300-2499°C and relative humidity of 29-31%

Aggregate agricultural areas

Map 5- 56: Spatial distribution of Sakaai cultivar “three grade quality”

5.3.9 Agwet El Madinah

A. Fruits characteristics

Fruit data

Parameter	Character State	Score
Fruit length	(cm.)	3.22±0.23
Fruit width	(cm.)	1.52±0.09
Fruit weight	(gm.)	11.40±1.72
Fruit volume	(cm3)	12.80±1.97
Fruit shape	Ovoid	
Fruit apex	Obtuse	
Fruit base	Truncate	
Fruit colour (khalal)	Dark red	
Fruit colour of the maturity	Black	
Flesh thickness	(cm.)	0.95
Flesh colour	Whitish - brown	
Flesh texture	Firm	
Flavour	Good	
Flesh taste	Delicious	

B. Fruits production & storing

Fruits production & storing

Parameter	Character State	Score
Suitable environmental conditions		
Ideal heat unites	Unit	2900-3500
Ideal humidity	%	16-19
Current area of cultivation	Giza (Baharia Oasis), New valley & Aswan Governorates	
Cultivated area	Fadden	8x8
Tree No.	Tree	65
Harvest Time	Mid-September - end of October	
Harvest stage	Semi-dry	
Harvest period	Week	2-3
Harvest times	Times	2
Production quantity	Kg/tree	40-70
Production area	Ton/Fadden	2.5 - 4

Total Area, Yield and Production for Agwet El Madinah

Production (Ton)	Yield (K. G.\Palm)	Fruiting palm	Area (Fed.)
63	46.15	1365	21

Source: Economic Affairs Sector (Average of 5y).(2016-2020)

Storage & distribution

Short term storage	week	2
Long term storage	week	10
Refrigerator temperature	°C	0 - (- 5)
Storage ability	Week	24
Shelf time	Day	45

C. Fruits consumption & marketing

Sales & Marketing

Fruit stage for marketing	Semi-dry stage	
Fruit stage for export	Semi-dry	
Markets types	National & local	
Quality	Good	
Future markets	Asia, China, Morocco, Muslim people at Europe.	
Marketing opportunities	Good	
Marketing time	End – September I October	
Marketing period	6 months	
Nature of the product	1.fresh, 2.de-seeded 3.dried 4.packaged 5.manufactured	
Price value/ Kg	Dollar	3
Consumption		
Consumption stage	Semi-dry	
Fruit humidity	22 - 24 %	

D. Current Agro-production map

Total Area, Yield and Production for Agwet El Madinah (Average 5Y) (2016-2020)

Governorates	Agwet El Madinah			
	Production	Yield	F. Palm	Area
	(Ton)	(K. G.\Palm)	(Palm)	(Fed.)
Giza	15	46.15	325	5
New Valley	36	46.15	780	12
Aswan	12	46.15	260	4
Total	63	46.15	1365	21

Source : measurements of the team at the cultivation area.

E. Agro-climate map

Excellent quality degree

Regarding the "excellent" quality degree of the Agwet El Madinah cultivar, the optimum heat units range between 2750° C and 3500° C and the relative humidity of 16-18% during the period of flowering, growth and ripening of fruits from April to October. The most suitable areas (Early harvest) for the cultivation of the Agwet El Madinah cultivar in Egypt (Map 5-57), are represented in the following areas:

- The east and west area outside the old agriculture land of Aswan Governorate in south of Koom Omboo district to the Egyptian south border.
- The far south-east area of New Valley Governorate, south of Toshka Lake and the eastern area of Owainat.

Very good quality degree

Regarding the "very good" quality degree of the Agwet El Madinah cultivar, the optimum heat units range between 2800° C and 2900° C and the relative humidity of 20-22% during the period of flowering, growth and ripening of fruits from April to October. The most suitable areas (Intermediate harvest) for the cultivation of the Agwet El Madinah cultivar in Egypt (Map 5-58) are represented in the following areas:

- The area of eastern desert locates in the Red Sea Governorate east of Nasser Lake.
- Limited areas locate in the north of Aswan Governorate.
- Scattered areas locate at the border of east and west agriculture area of Aswan Governorate.
- The area locates between the meeting of the New Valley, Aswan and Luxor Governorates.
- The area locates around Toshka Lake and extended northward to Paris Oasis of New Valley Governorate.

Good quality degree

Regarding the "good" quality degree of the Agwet El Madinah cultivar, the optimum heat units range between 2700° C and 2801° C and the relative humidity of 23-25% during the period of flowering, growth and ripening of fruits from April to October. The most suitable areas (Late harvest) for the cultivation of the Agwet El Madinah cultivar in Egypt (Map 5-59) are represented in the following areas:

- Areas locate east and west of Kharga Oasis extend to Balat district in Dakhla Oasis of New Valley Governorate.
- Limited areas east of New Valley Governorate near to Qena and Luxor Governorate.
- Limited area south of Qena Governorate.
- Areas locate in Luxor Governorate.
- The area of eastern desert locates in Red Sea Governorate east of Luxor and Aswan Governorates.

Aggregate agricultural areas

Referring to the climatic analyzes and the needs of the fruits for the different quality levels, and comparing the heat and moisture needs of the Agwet El Madinah cultivar during the period of flowering, growth and ripening of the fruits from April to October with the heat units recorded for the same period in the Governorates, it was possible to determine the agricultural areas suitable for production Agwet El Madinah cultivar in Egypt (Map 5-60) is as follows:

- The cultivation spreads in the south of Egypt from Balat district of New Valley Governorate extends east and south to Owainat and Toshka.
- The suitable area locates in Aswan Governorate with some extension to eastern desert and north to Qena and Luxor Governorate.
- Taking into account the agricultural production standards that are concerned with good agricultural practices and the requirements for different agricultural activities inside the farm, the required quality can be obtained in the specified places for each appropriate quality grade.

Excellent quality degree

Map 5- 57: Spatial distribution of Agwet El Madinah cultivar "Excellent Quality" Optimum temperature unites between 2750-3500°C and relative humidity of 16-19%

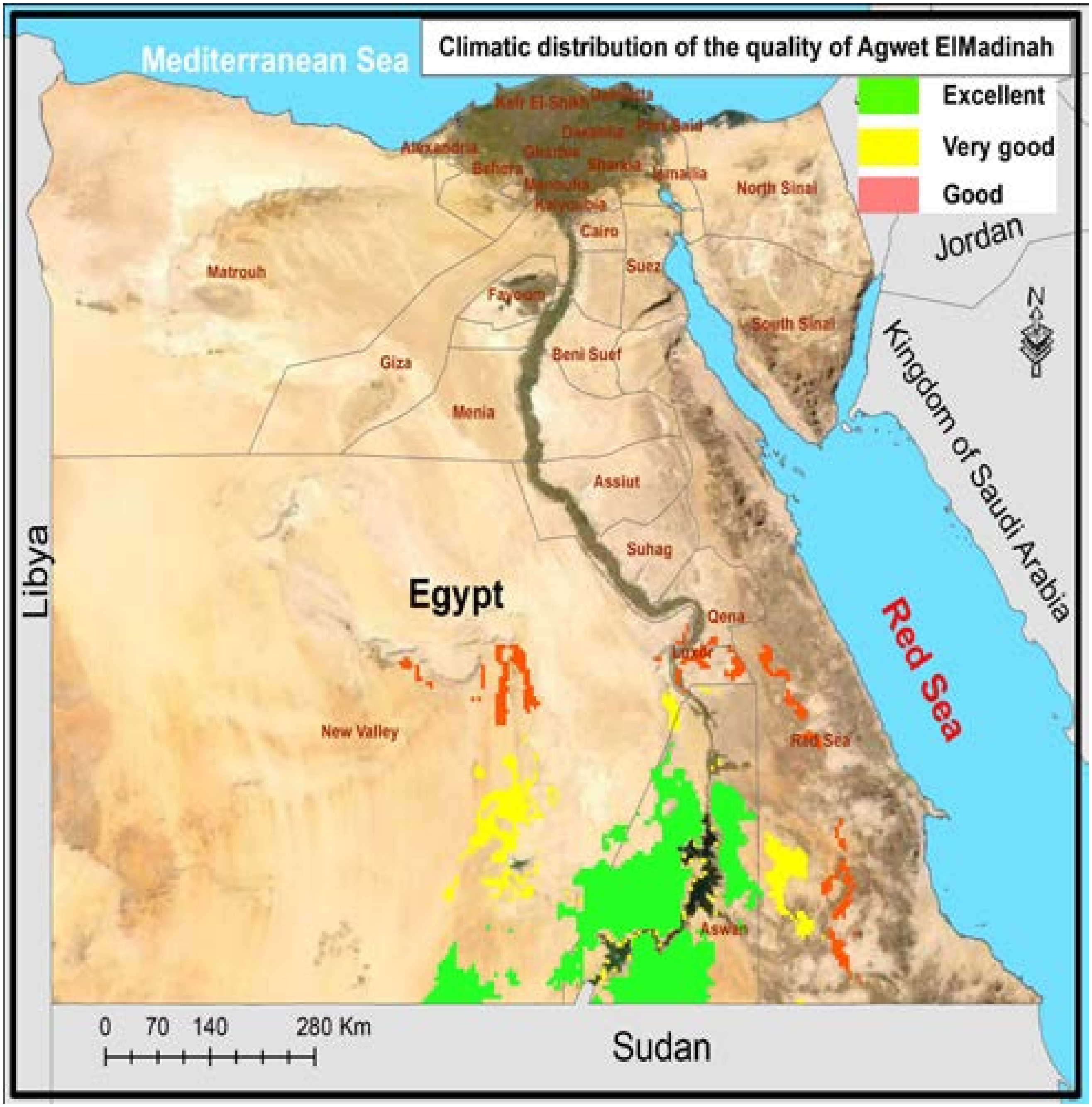
Very good quality degree

Map 5- 58: Spatial distribution of Agwet El Madinah cultivar "Very good Quality" Optimum temperature unites between 2801-2900°C and relative humidity of 20-22%

good quality degree

Map 5- 59: Spatial distribution of Agwet El Madinah cultivar "Good Quality" Optimum temperature unites between 2700-2800°C and relative humidity of 23-25%

Aggregate agricultural areas



Map 5- 60: Spatial distribution of Agwet El Madinah cultivar "three grade quality"

5.4

Cultivars that market at dry stage

5.4.1 Gondila

A. Fruits characteristics

Fruit data

Parameter	Character State	Score
Fruit length	(cm.)	4.50±0.64
Fruit width	(cm.)	2.24±0.06
Fruit weight	(gm.)	14.42±2.27
Fruit volume	(cm3)	21.60±3.58
Fruit shape	Ovoid	
Fruit apex	Obtuse	
Fruit base	Truncate	
Fruit colour (khalal)	Dark red	
Fruit colour of the maturity	Black	
Flesh thickness	(cm.)	0.81
Flesh colour	White	
Flesh texture	Dry	
Flavour	Good	
Flesh taste	Delicious	

B. Fruits production & storing

Fruits production & storing

Parameter	Character State	Score
Suitable environmental conditions		
Ideal heat unites	Unit	3100-3500
Ideal humidity	%	22-17
Current area of cultivation	Qena, Luxor & Aswan Governorates	
Cultivated area	Fadden	7x7
Tree No.	Tree	85
Harvest Time	Mid-September - end of October	
Harvest stage	Semi-dry	
Harvest period	Week	2
Harvest times	Times	1
Production quantity	Kg/tree	50-70
Production area	Ton/Fadden	4 - 5.5

Total Area, Yield and Production for Gondila

Production (Ton)	Yield (K. G.\Palm)	Fruiting palm	Area (Fed.)
3018	89.982	33540	629

Source: Economic Affairs Sector (Average of 5y).(2016-2020)

Storage & distribution

Short term storage	week	4
Long term storage	week	12
Refrigerator temperature	°C	4 - 7
Storage ability	Week	52
Shelf time	Day	90

C. Fruits consumption & marketing

Sales & Marketing

Fruit stage for marketing	Semi-dry & Dry stage,	
Fruit stage for export	Semi-dry	
Markets types	National & local	
Quality	Good	
Future markets	Asia, China, Morocco	
Marketing opportunities	Good	
Marketing time	October - November	
Marketing period	All the year	
Nature of the product	1.fresh, 2.de-seeded 3.dried 4.packaged 5.manufactured	
Price value/ Kg	Dollar	1.5-2
Consumption		
Consumption stage	Semi-dry, dry	
Fruit humidity	13-22 %	

D. Current Agro-production map

Total Area, Yield and Production for Gondila (Average 5Y) (2016-2020)

Governorates	Gondila			
	Production	Yield	F. Palm	Area
	(Ton)	(K. G.\Palm)	(Palm)	(Fed.)
Aswan	3018	89.982	33540	629
Upper Egypt	3018	89.982	33540	629
Inside the valley	3018	89.982	33540	629
Total	3018	89.982	33540	629

Source : Economic Affairs Sector (Average of 5y).(2016-2020)

E. Agro-climate map

Excellent quality degree

Regarding the "excellent" quality degree of the Gondila cultivar, the optimum heat units range between 3100° C and 3500° C and the relative humidity of 17-22% during the period of flowering, growth and ripening of fruits from April to October. The most suitable areas (Early harvest) for the cultivation of the Gondila cultivar in Egypt (Map 5-61), are represented in the following areas:

- The area of east-south New Valley Governorate locates between latitude 22.80 & 23.60.
- Areas of middle sector and east of Aswan Governorate.
- Areas of the eastern desert locate in Red Sea Governorate in the east of Aswan Governorate.

Very good quality degree

Regarding the "very good" quality degree of the Gondila cultivar, the optimum heat units range between 2900° C and 3099° C and the relative humidity of 17-23% during the period of flowering, growth and ripening of fruits from April to October. The most suitable areas (Intermediate harvest) for the cultivation of the Gondila cultivar in Egypt (Map 5-62) are represented in the following areas:

- The area of east-south New Valley Governorate locates north the latitude 22.33 and extends northward to Dungul, Nakhila & Paris Oasis.
- Areas locate outside the area of excellent quality degree of Aswan Governorate.
- Areas of the eastern desert locate in Red Sea Governorate in the east of area of excellent quality degree.

Good quality degree

Regarding the "good" quality degree of the Gondila cultivar, the optimum heat units range between 2800° C and 2999° C and the relative humidity of 26-28% during the period of flowering, growth and ripening of fruits from April to October.

The most suitable areas (Late harvest) for the cultivation of the Gondola cultivar in Egypt (Map 5-63) are represented in the following areas:

- Scattered areas locate in the eastern desert of Qena Governorate.
- Limited area locates in the eastern desert of Red Sea Governorate east of Aswan Governorates.

Aggregate agricultural areas

Referring to the climatic analyzes and the needs of the fruits for the different quality levels, and comparing the heat and moisture needs of the Gondila cultivar during the period of flowering, growth and ripening of the fruits from April to October with the heat units recorded for the same period in the Governorates, it was possible to determine the agricultural areas suitable for production Gondila cultivar in Egypt (Map 5-64) is as follows:

- The cultivation spreads in the south of Egypt mainly in Aswan Governorate and extends east and west including areas of Dungul, Nakhila & Paris Oasis.
- Taking into account the agricultural production standards that are concerned with good agricultural practices and the requirements for different agricultural activities inside the farm, the required quality can be obtained in the specified places for each appropriate quality grade.

Excellent quality degree

Map 5- 61: Spatial distribution of Gondila cultivar "Excellent Quality" Optimum temperature unites between 3100-3500°C and relative humidity of 17-22%

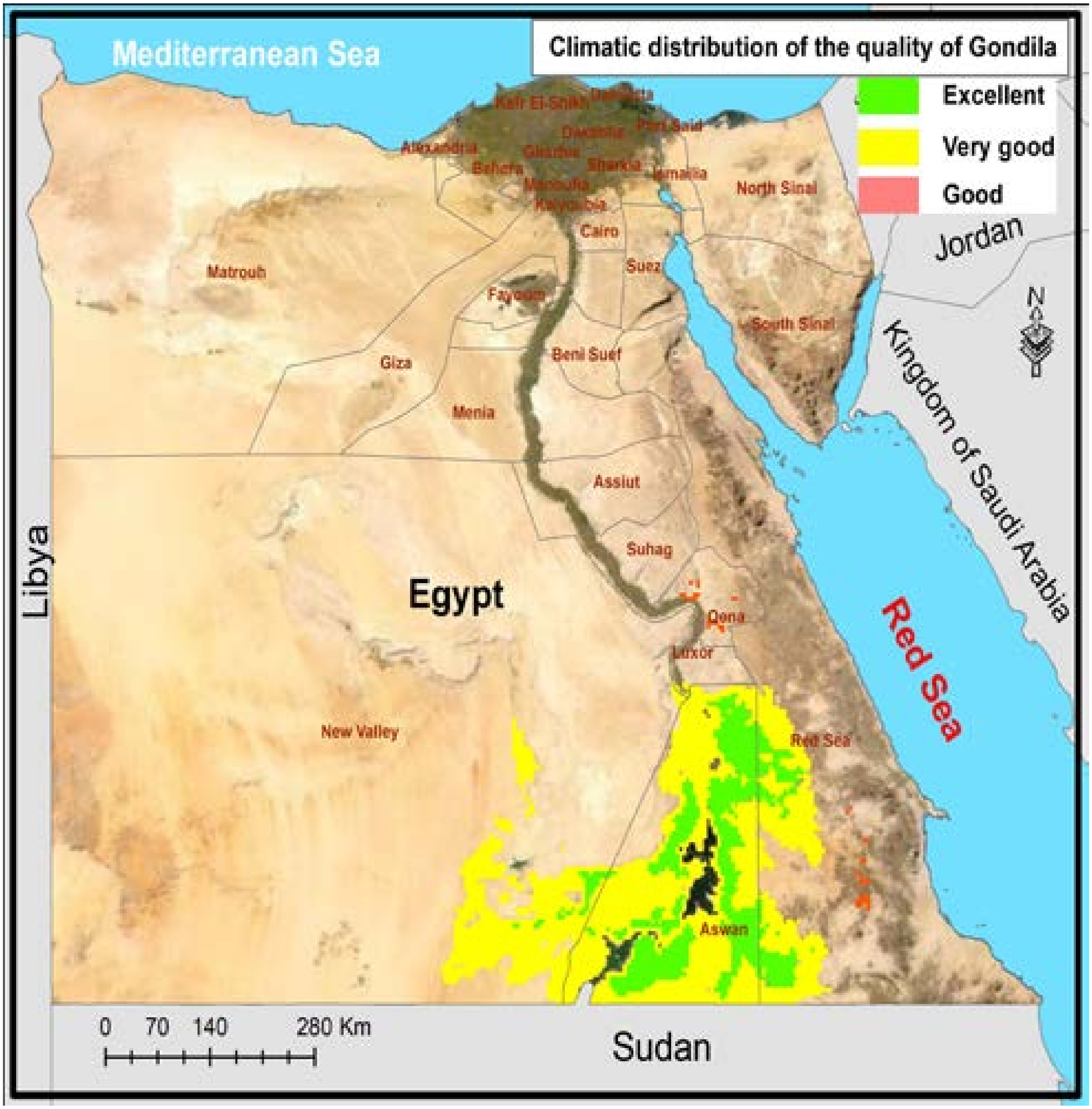
Very good quality degree

Map 5- 62: Spatial distribution of Gondila cultivar "Very good Quality" Optimum temperature unites between 2900-3099°C and relative humidity of 17-23%

Good quality degree

Map 5- 63: Spatial distribution of Gondila cultivar "Good Quality" Optimum temperature unites between 2800-2999°C and relative humidity of 26-28%

Aggregate agricultural areas



Map 5- 64: Spatial distribution of Gondila cultivar “three grade quality”

5.4.2 Sakkoti

A. Fruits characteristics

Fruit data

Parameter	Character State	Score
Fruit length	(cm.)	4.70±0.64
Fruit width	(cm.)	2.96±0.04
Fruit weight	(gm.)	9.70±1.41
Fruit volume	(cm3)	10.00±1.46
Fruit shape	Falcoid-elongate	
Fruit apex	Retuse	
Fruit base	Obtuse	
Fruit colour (khalal)	Yellow	
Fruit colour of the maturity	Brown-yellow	
Flesh thickness	(cm.)	0.40
Flesh colour	Cream	
Flesh texture	Dry	
Flavour	Good	
Flesh taste	Delicious	

B. Fruits production & storing

Fruits production & storing

Parameter	Character State	Score
Suitable environmental conditions		
Ideal heat unites	Unit	3100-3500
Ideal humidity	%	17-22
Current area of cultivation	Qena, Luxor & Aswan Governorates	
Cultivated area	Fadden	7x7
Tree No.	Tree	85
Harvest Time	Mid-September - end of October	
Harvest stage	Semi-dry	
Harvest period	Week	2
Harvest times	Times	1
Production quantity	Kg/tree	40-65
Production area	Ton/Fadden	3.5- 5

Total Area, Yield and Production for Sakkoti

Production (Ton)	Yield (K. G.\Palm)	Fruiting palm	Area (Fed.)
13679	89.227	153305	1097

Source: Economic Affairs Sector (Average of 5y).(2016-2020)

Storage & distribution

Short term storage	week	4
Long term storage	week	12
Refrigerator temperature	°C	4 - 7
Storage ability	Week	52
Shelf time	Day	90

C. Fruits consumption & marketing

Sales & Marketing

Fruit stage for marketing	Dry stage,	
Fruit stage for export	End of Semi-dry	
Markets types	National & local	
Quality	Good	
Future markets	Asia, China and neighbouring counties	
Marketing opportunities	Weak	
Marketing time	October - November	
Marketing period	All the year	
Nature of the product	1.fresh 2.de-seeded 3.dried 4.packaged 5.manufactured	
Price value/ Kg	Dollar	1.5-2
Consumption		
Consumption stage	Semi-dry, dry	
Fruit humidity	11-16 %	

D. Current Agro-production map

Total Area, Yield and Production for Sakkoti (Average 5Y) (2016-2020)

Governorates	Sakkoti			
	Production	Yield	F. Palm	Area
	(Ton)	(K. G.\Palm)	(Palm)	(Fed.)
Luxor	309	65.094	4747	89
Aswan	13370	89.999	148558	1008
Upper Egypt	13679	89.227	153305	1097
Inside the valley	13679	89.227	153305	1097
Total	13679	89.227	153305	1097

Source : Economic Affairs Sector (Average of 5y).(2016-2020)

E. Agro-climate map

Excellent quality degree

Regarding the "excellent" quality degree of the Sakkoti cultivar, the optimum heat units range between 3100° C and 3500° C and the relative humidity of 17-22% during the period of flowering, growth and ripening of fruits from April to October. The most suitable areas (Early harvest) for the cultivation of the Sakkoti cultivar in Egypt (Map 5-65), are represented in the following areas:

- The area of east-south New Valley Governorate locates between latitude 22.80 & 23.60.
- Areas of middle sector and east of Aswan Governorate.
- Areas of the eastern desert locate in Red Sea Governorate in the east of Aswan Governorate.

Very good quality degree

Regarding the "very good" quality degree of the Sakkoti cultivar, the optimum heat units range between 2900° C and

3099° C and the relative humidity of 17-23% during the period of flowering, growth and ripening of fruits from April to October. The most suitable areas (Intermediate harvest) for the cultivation of the Sakkoti cultivar in Egypt (Map 5-65) are represented in the following areas:

- The area of east-south New Valley Governorate locates north the latitude 22.33 and extends northward to Dungul, Nakhila & Paris Oasis.
- Areas locate outside the area of excellent quality degree of Aswan Governorate.
- Areas of the eastern desert locate in Red Sea Governorate in the east of area of excellent quality degree.

Good quality degree

Regarding the "good" quality degree of the Sakkoti cultivar, the optimum heat units range between 2800° C and 2999° C and the relative humidity of 26-28% during the period of flowering, growth and ripening of fruits from April to October. The most suitable areas (Late harvest) for the cultivation of the Sakkoti cultivar in Egypt (Map 5-67) are represented in the following areas:

- Scattered areas locate in the eastern desert of Qena Governorate.
- Limited area locates in the eastern desert of Red Sea Governorate east of Aswan Governorates.

Aggregate agricultural areas

Referring to the climatic analyzes and the needs of the fruits for the different quality levels, and comparing the heat and moisture needs of the Sakkoti cultivar during the period of flowering, growth and ripening of the fruits from April to October with the heat units recorded for the same period in the Governorates, it was possible to determine the agricultural areas suitable for production Sakkoti cultivar in Egypt (Map 5-68) is as follows:

- The cultivation spreads in the south of Egypt mainly in Aswan Governorate and extends east and west including areas of Dungul, Nakhila & Paris Oasis.
- Taking into account the agricultural production standards that are concerned with good agricultural practices and the requirements for different agricultural activities inside the farm, the required quality can be obtained in the specified places for each appropriate quality grade.

Excellent quality degree

Map 5- 65: Spatial distribution of Sakkoti cultivar "Excellent Quality" Optimum temperature unites between 3100-3500°C and relative humidity of 17-22%

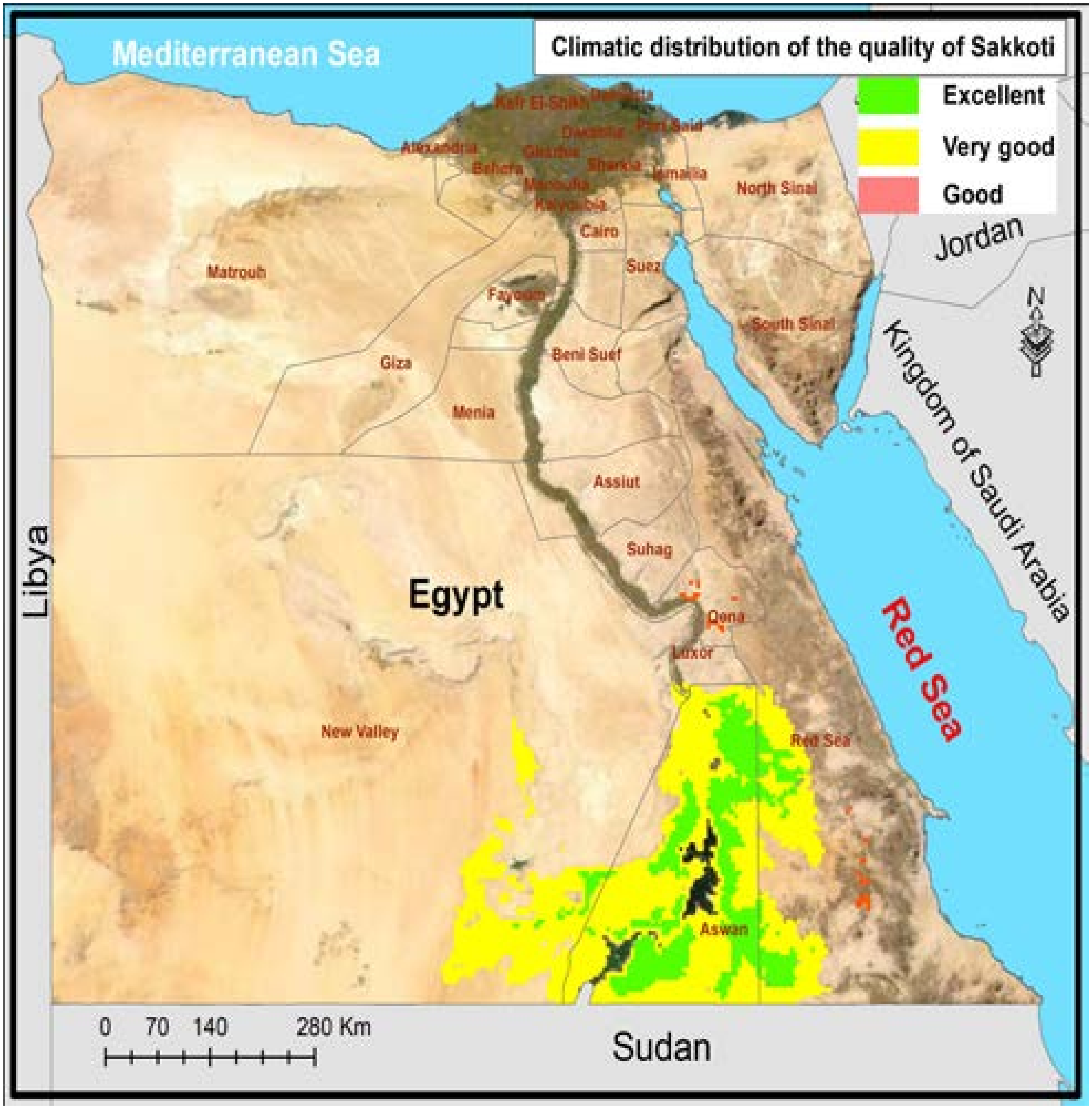
Very good quality degree

Map 5- 66: Spatial distribution of Sakkoti cultivar "Very good Quality" Optimum temperature unites between 2900-3099°C and relative humidity of 17-23%

Good quality degree

Map 5- 67: Spatial distribution of Sakkoti cultivar "Good Quality" Optimum temperature unites between 2800-2999°C and relative humidity of 26-28%

Aggregate agricultural areas



Map 5- 68: Spatial distribution of Sakkoti cultivar “three grade quality”

5.4.3 Shamia

A. Fruits characteristics

Fruit data

Parameter	Character State	Score
Fruit length	(cm.)	4.80±0.52
Fruit width	(cm.)	2.04±0.09
Fruit weight	(gm.)	13.40±2.08
Fruit volume	(cm3)	13.30±2.06
Fruit shape	Falcoid-elongate	
Fruit apex	Obtuse	
Fruit base	Truncate	
Fruit colour (khalal)	Pale yellow	
Fruit colour of the maturity	Brown	
Flesh thickness	(cm.)	0.50
Flesh colour	Whitish creamy	
Flesh texture	Dry	
Flavour	Excellent	
Flesh taste	Delicious-sweet	

B. Fruits production & storing

Fruits production & storing

Parameter	Character State	Score
Suitable environmental conditions		
Ideal heat unites	Unit	3100-3500
Ideal humidity	%	17-22
Current area of cultivation	Qena, Luxor & Aswan Governorates	
Cultivated area	Fadden	7x7
Tree No.	Tree	85
Harvest Time	Mid-September - end of October	
Harvest stage	Semi-dry	
Harvest period	Week	2
Harvest times	Times	1
Production quantity	Kg/tree	60-75
Production area	Ton/Fadden	4-6

Total Area, Yield and Production for Shamia

Production (Ton)	Yield (K. G.\Palm)	Fruiting palm	Area (Fed.)
4695	62.500	75120	939

Source: Economic Affairs Sector (Average of 5y).(2016-2020)

Storage & distribution

Short term storage	week	4
Long term storage	week	12
Refrigerator temperature	°C	4-7
Storage ability	Week	52
Shelf time	Day	90

C. Fruits consumption & marketing

Sales & Marketing

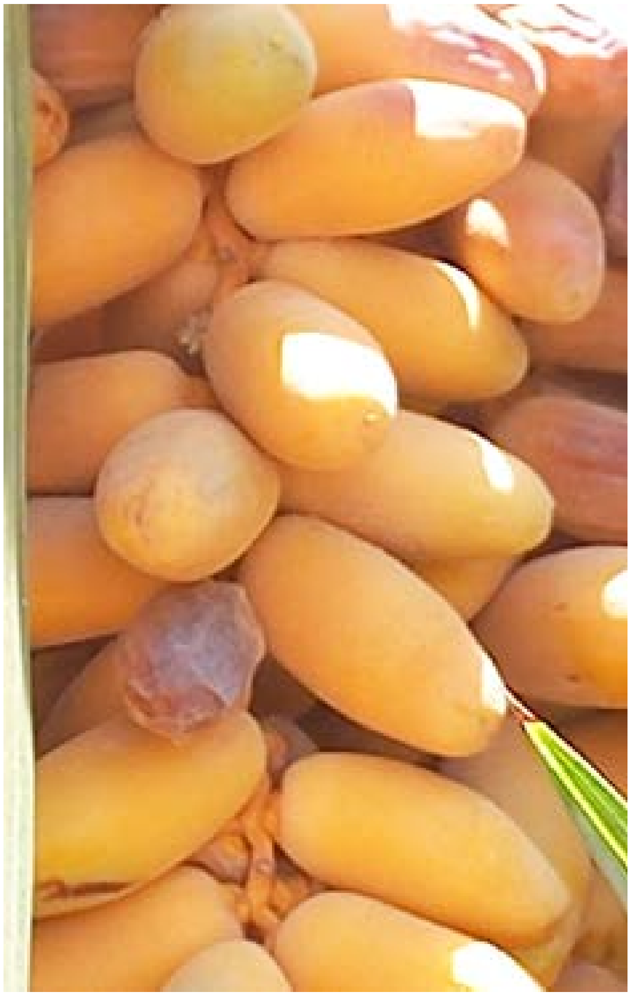
Fruit stage for marketing	Dry stage,	
Fruit stage for export	End of Semi-dry	
Markets types	National & local	
Quality	Good	
Future markets	Asia & China	
Marketing opportunities	Weak	
Marketing time	End – September I October	
Marketing period	October - November	
Nature of the product	1.fresh, 2.de-seeded 3.dried 4.packaged 5.manufactured	
Price value/ Kg	Dollar	1-1.5
Consumption		
Consumption stage	Dry	
Fruit humidity	11 -16 %	

D. Current Agro-production map

Table : Total Area, Yield and Production for Shamia (Average 5Y) (2016-2020)

Governorates	Sakaai			
	Production	Yield	F. Palm	Area
	(Ton)	(K. G.\Palm)	(Palm)	(Fed.)
Luxor	445	62.500	7120	89
Aswan	4250	62.500	68000	850
Upper Egypt	4695	62.500	75120	939
Inside the valley	4695	62.500	75120	939
Total	4695	62.500	75120	939

Source : measurements of the team at the cultivation area.



E. Agro-climate map

Excellent quality degree

Regarding the "excellent" quality degree of the Shamia cultivar, the optimum heat units range between 3100° C and 3500° C and the relative humidity of 17-22% during the period of flowering, growth and ripening of fruits from April to October. The most suitable areas (Early harvest) for the cultivation of the Shamia cultivar in Egypt (Map 5-69), are represented in the following areas:

- The area of east-south New Valley Governorate locates between latitude 22.80 & 23.60.
- Areas of middle sector and east of Aswan Governorate.
- Areas of the eastern desert locate in Red Sea Governorate in the east of Aswan Governorate.

Very good quality degree

Regarding the “very good” quality degree of the Shamia cultivar, the optimum heat units range between 2900° C and 3099° C and the relative humidity of 17-23% during the period of flowering, growth and ripening of fruits from April to October. The most suitable areas (Intermediate harvest) for the cultivation of the Shamia cultivar in Egypt (Map 5-70) are represented in the following areas:

- The area of east-south New Valley Governorate locates north the latitude 22.33 and extends northward to Dungul, Nakhila & Paris Oasis.
- Areas of outside the area of excellent quality degree of Aswan Governorate.
- Areas of the eastern desert locate in Red Sea Governorate in the east of area of excellent quality degree.

Good quality degree

Regarding the “good” quality degree of the Shamia cultivar, the optimum heat units range between 2800° C and 2999° C and the relative humidity of 26-28% during the period of flowering, growth and ripening of fruits from April to October. The most suitable areas (Late harvest) for the cultivation of the Shamia cultivar in Egypt (Map 5-71) are represented in the following areas:

- Scattered areas locate in the eastern desert of Qena Governorate.
- Limited area locates in the eastern desert of Red Sea Governorate east of Aswan Governorates.

Aggregate agricultural areas

Referring to the climatic analyzes and the needs of the fruits for the different quality levels, and comparing the heat and moisture needs of the Shamia cultivar during the period of flowering, growth and ripening of the fruits from April to October with the heat units recorded for the same period in the Governorates, it was possible to determine the agricultural areas suitable for production Shamia cultivar in Egypt (Map 5-72) is as follows:

- The cultivation spreads in the south of Egypt mainly in Aswan Governorate and extends east and west including areas of Dungul, Nakhila & Paris Oasis.
- Taking into account the agricultural production standards that are concerned with good agricultural practices and the requirements for different agricultural activities inside the farm, the required quality can be obtained in the specified places for each appropriate quality grade.

Excellent quality degree

Map 5- 69: Spatial distribution of Shamia cultivar "Excellent Quality" Optimum temperature unites between 3100-3500°C and relative humidity of 17-22%

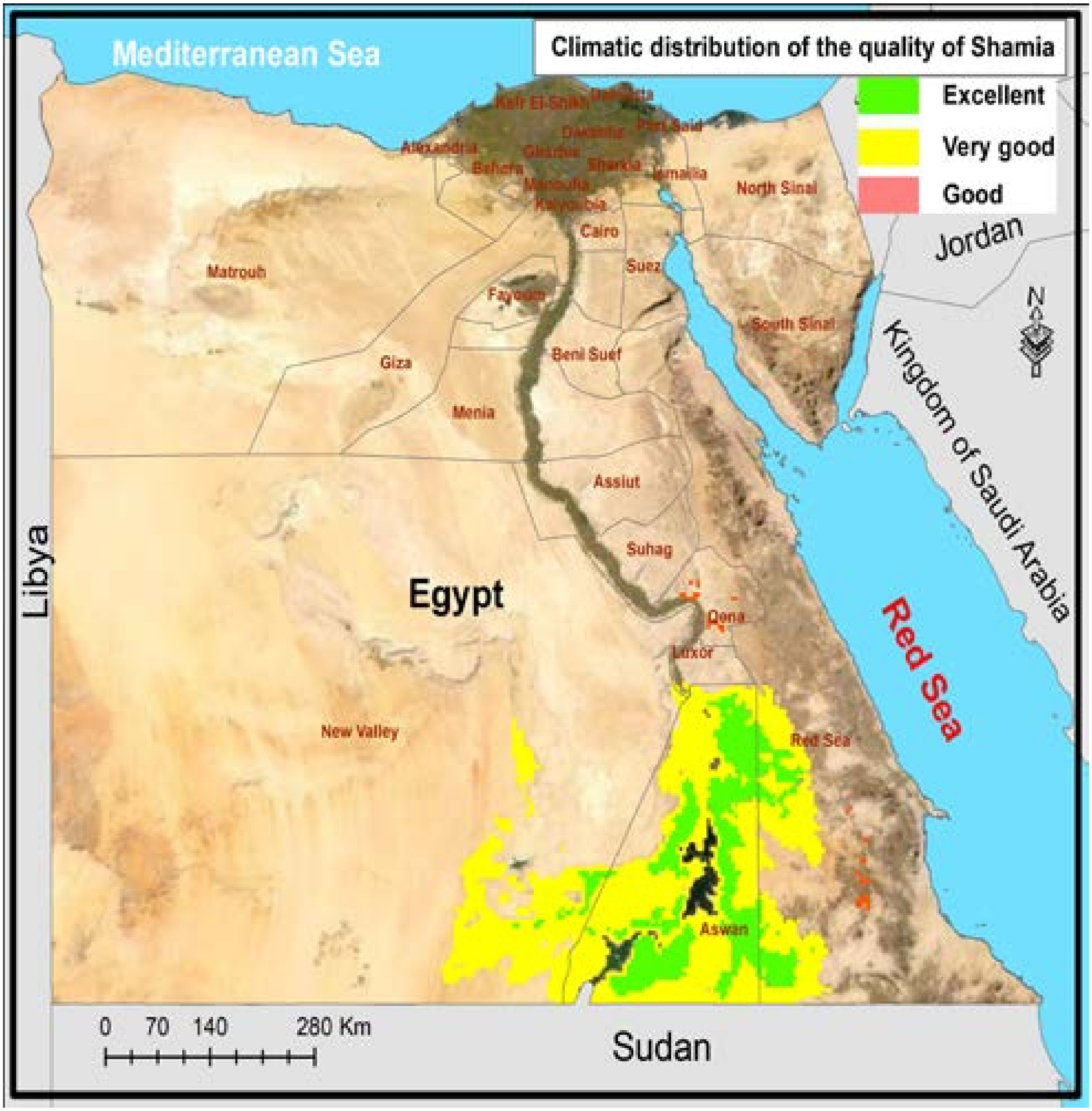
Very good quality degree

Map 5- 70: Spatial distribution of Shamia cultivar "Very good Quality" Optimum temperature unites between 2900-3099°C and relative humidity of 17-23%

Good quality degree

Map 5- 71: Spatial distribution of Shamia cultivar "Good Quality" Optimum temperature unites between 2800-2999°C and relative humidity of 26-28%

Aggregate agricultural areas



Map 5- 72: Spatial distribution of Shamia cultivar “three grade quality”

5.4.4 Bartamouda Aswan ecotype

A. Fruits characteristics

Fruit data

Parameter	Character State	Score
Fruit length	(cm.)	6.54±0.46
Fruit width	(cm.)	2.00±0.05
Fruit weight	(gm.)	8.32±0.97
Fruit volume	(cm3)	8.52±1.01
Fruit shape	Cylindrical	
Fruit apex	Obtuse	
Fruit base	Obtuse	
Fruit colour (khalal)	Orange-yellow	
Fruit colour of the maturity	Brown-red	
Flesh thickness	(cm.)	0.83
Flesh colour	Cream	
Flesh texture	Fibrous	
Flavour	Good	
Flesh taste	Delicious	

B. Fruits production & storing

Fruits production & storing

Parameter	Character State	Score
Suitable environmental conditions		
Ideal heat unites	Unit	3100-3500
Ideal humidity	%	17-22
Current area of cultivation	Qena, Luxor & Aswan Governorates	
Cultivated area	Fadden	6.5x6.5
Tree No.	Tree	100
Harvest Time	Mid-September - end of October	
Harvest stage	Semi-dry	
Harvest period	Week	2
Harvest times	Times	1
Production quantity	Kg/tree	40-60
Production area	Ton/Fadden	4-6

Total Area, Yield and Production for Bartamouda Aswan

Production (Ton)	Yield (K. G.\Palm)	Fruiting palm	Area (Fed.)
1620	89.970	18006	1001

Source: Economic Affairs Sector (Average of 5y).(2016-2020)

Storage & distribution

Short term storage	week	4
Long term storage	week	12
Refrigerator temperature	°C	4-7
Storage ability	Week	52
Shelf time	Day	60-90

C. Fruits consumption & marketing

Sales & Marketing

Fruit stage for marketing	Dry stage,	
Fruit stage for export	End of Semi-dry	
Markets types	National & local	
Quality	Acceptable	
Future markets	Asia & China	
Marketing opportunities	Very weak	
Marketing time	End – September I October	
Marketing period	October - November	
Nature of the product	1.fresh, 2.dried 2.packaged 4.manufactured	
Price value/ Kg	Dollar	0.75-1
Consumption		
Consumption stage	Dry	
Fruit humidity	12 -16 %	

D. Current Agro-production map

Total Area, Yield and Production for Bartamouda Aswan (Average 5Y) (2016-2020)

Governorates	**Bartamouda Aswan**			
	Production	**Yield**	**F. Palm**	**Area**
	(Ton)	**(K. G.\Palm)**	**(Palm)**	**(Fed.)**
Aswan	1620	89.970	18006	1001
Total	4695	62.500	75120	939

Source : measurements of the team at the cultivation area.

E. Agro-climate map

Excellent quality degree

Regarding the "excellent" quality degree of the Bartamouda Aswan cultivar, the optimum heat units range between 3100° C and 3500° C and the relative humidity of 17-22% during the period of flowering, growth and ripening of fruits from April to October. The most suitable areas (Early harvest) for the cultivation of the Bartamouda Aswan cultivar in Egypt (Map 5-73), are represented in the following areas:

- The area of east-south New Valley Governorate locates between latitude 22.80 & 23.60.
- Areas of middle sector and east of Aswan Governorate.
- Areas of the eastern desert locate in Red Sea Governorate in the east of Aswan Governorate.

Very good quality degree

Regarding the “very good” quality degree of the Bartamouda Aswan cultivar, the optimum heat units range between 2900° C and 3099° C and the relative humidity of 17-23% during the period of flowering, growth and ripening of fruits from April to October. The most suitable areas (Intermediate harvest) for the cultivation of the Bartamouda Aswan cultivar in Egypt (Map 5-74) are represented in the following areas:

- The area of east-south New Valley Governorate locates north the latitude 22.33 and extends northward to Dungul, Nakhila & Paris Oasis.
- Areas of outside the area of excellent quality degree of Aswan Governorate.
- Areas of the eastern desert locate in Red Sea Governorate in the east of area of excellent quality degree.

Good quality degree

Regarding the “good” quality degree of the Bartamouda Aswan cultivar, the optimum heat units range between 2800° C and 2999° C and the relative humidity of 26-28% during the period of flowering, growth and ripening of fruits from April to October. The most suitable areas (Late harvest) for the cultivation of the Bartamouda Aswan cultivar in Egypt (Map 5-75) are represented in the following areas:

- Scattered areas locate in the eastern desert of Qena Governorate.
- Limited area locates in the eastern desert of Red Sea Governorate east of Aswan Governorates.

Aggregate agricultural areas

Referring to the climatic analyzes and the needs of the fruits for the different quality levels, and comparing the heat and moisture needs of the Bartamouda Aswan cultivar during the period of flowering, growth and ripening of the fruits from April to October with the heat units recorded for the same period in the Governorates, it was possible to determine the agricultural areas suitable for production Bartamouda Aswan cultivar in Egypt (Map 5-76) is as follows:

- The cultivation spreads in the south of Egypt mainly in Aswan Governorate and extends east and west including areas of Dungul, Nakhila & Paris Oasis.
- Taking into account the agricultural production standards that are concerned with good agricultural practices and the requirements for different agricultural activities inside the farm, the required quality can be obtained in the specified places for each appropriate quality grade.

Excellent quality degree

Map 5- 73: Spatial distribution of Bartamouda "Aswan ecotype" cultivar "Excellent Quality" Optimum temperature unites between 3100-3500°C and relative humidity of 17-22%

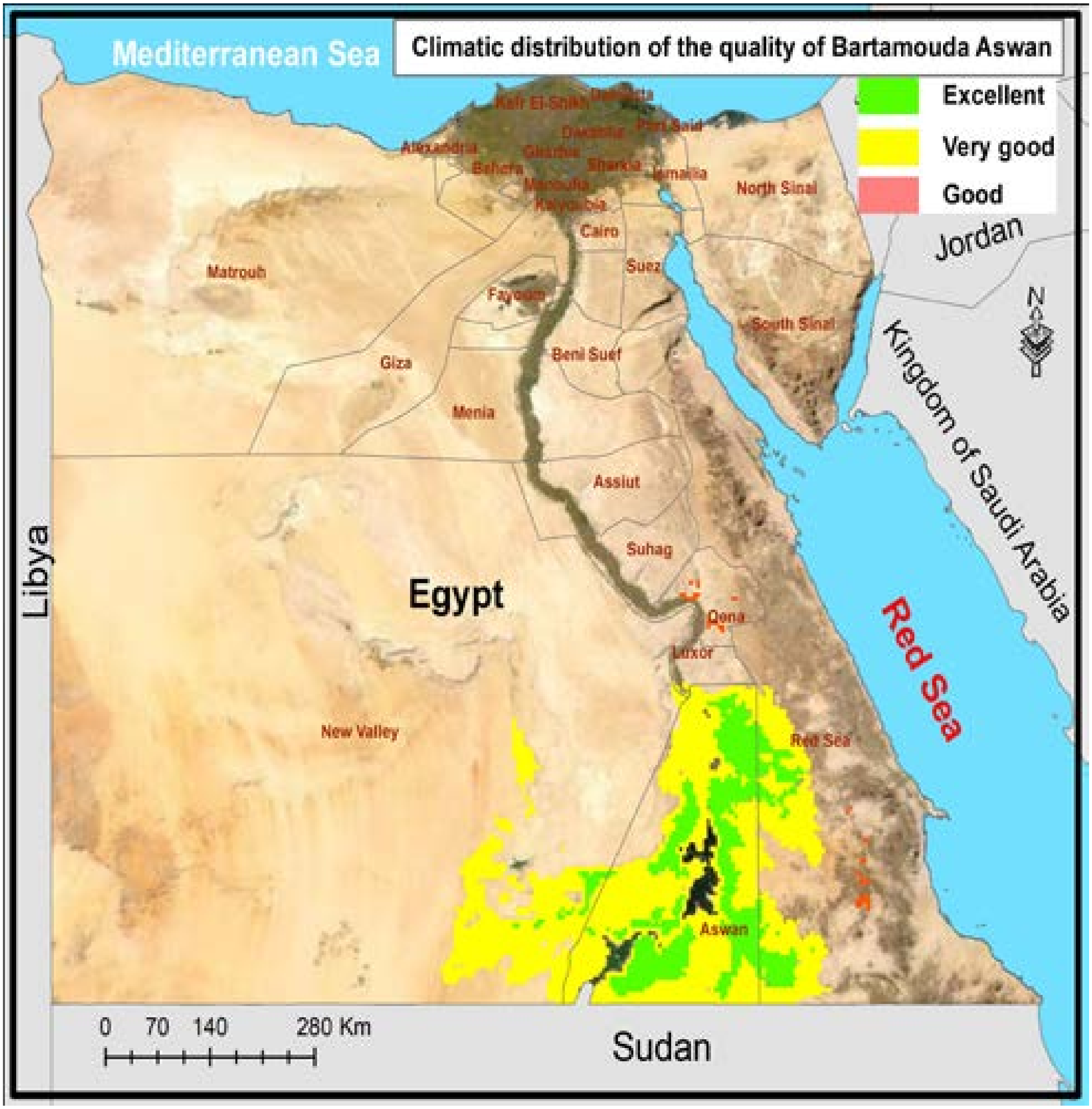
Very good quality degree

Map 5- 74: Spatial distribution of Bartamouda “Aswan ecotype” cultivar “Very good Quality” Optimum temperature unites between 2900-3099°C and relative humidity of 17-23%

Good quality degree

Map 5- 75: Spatial distribution of Bartamouda "Aswan ecotype" cultivar "Good Quality" Optimum temperature unites between 2800-2999°C and relative humidity of 26-28%

Aggregate agricultural areas



Map 5- 76: Spatial distribution of Bartamouda “Aswan ecotype” cultivar “three grade quality”

5.5

Cultivars dual marketing

5.5.1 Soft and semi-dry

5.5.1.1 Sewi

A. Fruits characteristics

Fruit data

Parameter	Character State	Score
Fruit length	(cm.)	5.08±0.38
Fruit width	(cm.)	2.80±0.10
Fruit weight	(gm.)	16.24±2.05
Fruit volume	(cm3)	16.70±2.68
Fruit shape	Obviate-elongate	
Fruit apex	Blunt	
Fruit base	Truncate	
Fruit colour (khalal)	Pale brown	
Fruit colour of the maturity	Pale brown	
Flesh thickness	(cm.)	0.77
Flesh colour	Cream-brown	
Flesh texture	Firm	
Flavour	Good	
Flesh taste	Delicious-sweet	

B. Fruits production & storing

Fruits production & storing

Parameter	Character State	Score
Suitable environmental conditions		
Ideal heat unites	Unit	1801-2200
Ideal humidity	%	30-40
Current area of cultivation	Siwa Oasis in Matruh Governorate –Baharia Oasis & south area of Giza Governorate – Areas of Faiyum Governorate.	
Cultivated area	Fadden	8×8
Tree No.	Tree	65
Harvest Time	First -September - end of October	
Harvest stage	Semi-dry	
Harvest period	Week	2
Harvest times	Times	1-2
Production quantity	Kg/tree	80-120
Production area	Ton/Fadden	4.5- 7

Total Area, Yield and Production for Sewi

Production (Ton)	Yield (K. G.\Palm)	Fruiting palm (Palm)	Area (Fed.)
262623	118.737	2211801	26828

Source : Economic Affairs Sector (Average of 5y (2016-2020)

Storage & distribution

Short term storage	week	4
Long term storage	week	12
Refrigerator temperature	°C	0- (-5)
Storage ability	Week	24-52
Shelf time	Day	60

C. Fruits consumption & marketing

Sales & Marketing

Fruit stage for marketing	Dry stage,	
Fruit stage for export	End of Semi-dry	
Markets types	Local, National, Morocco, Southeast Asia, Arab communities in Europe	
Quality	Acceptable	
Future markets	Asia, China, Canada and Arab countries	
Marketing opportunities	Very weak	
Marketing time	October - November	
Marketing period	All the year	
Nature of the product	1.fresh, 2.de-seeded 3.dried, 4.packaged 5.manufactured	
Price value/ Kg	Dollar	1.5-3
Consumption		
Consumption stage	Dry	
Fruit humidity	%	Semi-dry 30-40 Dry 22- 24

D. Current Agro-production map

Total Area, Yield and Production for Sewi (Average 5Y) (2016-2020)

Governorates	Sewi			
	Production (Ton)	Yield (K. G.\ Palm)	F. Palm (Palm)	Area (Fed.)
Beheira	1	66.667	15	1
Sharkia	39	111.429	350	
Ismailia	7	159.091	44	
Suez	2	80.000	25	
Menoufia	15	94.340	159	
Cairo	65	66.667	975	1
Lower Egypt	129	82.270	1568	2
Giza	202720	131.000	1547478	17828
Beni Suef	3180	85.002	37411	19
Fayoum	14423	129.999	110947	471
Middle Egypt	220323	129.920	1695836	18318
Inside the valley	220452	212	1697404	18320
Matruh	42171	81.981	514397	8508
Outside the valley	42171	82	514397	8508
Total	262623	118.737	2211801	26828

Source : Economic Affairs Sector (Average of 5y).(2016-2020)

E. Agro-climate map

Excellent quality degree

Regarding the “excellent” quality degree of the Sewi cultivar, the optimum heat units range between 1800° C and 2200° C and the relative humidity of 30-40% during the period of flowering, growth and ripening of fruits from April to October. The most suitable areas (Late harvest) for the cultivation of the Sewi cultivar in Egypt (Map 5-77), are represented in the following areas:

- The areas of Matruh Governorate from the west border of Egypt include Siwa Oasis and the reclamation area south Siwa and Qara Oases eastward to Qattara Depression.
- Areas of Baharia Oasis extend eastward to the reclamation area of west-west Minya and most of Minya Governorate, Beni Suef Governorate and south Faiyum Governorate.
- The area of east-north New Valley Governorate locates between the meeting of Minya and Assuit Governorates.
- Areas of south both Giza and Suez Governorates.
- Desert areas locate in Assuit Governorate.
- Areas of the eastern desert locate in Red Sea Governorate in the east of Beni Suef, Assuit, Sohag and Aswan Governorates.
- Gulf areas of South Sinai Governorate.

Very good quality degree

Regarding the “very good” quality degree of the Sewi cultivar, the optimum heat units range between 2201° C and 2300° C and the relative humidity of 27-29% during the period of flowering, growth and ripening of fruits from April to October. The most suitable areas (Early harvest) for the cultivation of the Sewi cultivar in Egypt (Map 5-78) are represented in the following areas:

- The area of Farafra Oasis and limited area locates eastward to the east border of New Valley Governorate.
- The area of the middle sector of Sohag Governorate.
- Limited areas of the eastern desert locate in Red Sea Governorate in the east of Sohag, Qena, Luxor and Aswan Governorates.

Good quality degree

Regarding the “good” quality degree of the Sewi cultivar, the optimum heat units range between 2301° C and 2400° C and the relative humidity of 30-33% during the period of flowering, growth and ripening of fruits from April to October. The most suitable areas (Intermediate harvest) for the cultivation of the Sewi cultivar in Egypt (Map 5-79) are represented in the following areas:

- The Area of south Qattara Depression extends to Sitrra and Gerba lakes of Matruh Governorate.
- Areas of the middle longitudinal sector of Assuit and Sohag Governorates.
- Limited areas of the east of Assuit and Sohag Governorates.
- Limited areas of the east of the eastern desert locate in Red Sea Governorate in the east of Sohag, Qena, Luxor and Aswan Governorates.

Aggregate agricultural areas

Referring to the climatic analyzes and the needs of the fruits for the different quality levels, and comparing the heat and moisture needs of the Sewi cultivar during the period of flowering, growth and ripening of the fruits from April to October with the heat units recorded for the same period in the Governorates, it was possible to determine the agricultural areas suitable for production Sewi cultivar in Egypt (Map 5-80) is as follows:

The cultivation spreads from the west Egyptian border in Siwa Oasis and extends eastward to the Red Sea. It also includes the reclamation areas of the Middle Egypt.

Taking into account the agricultural production standards that are concerned with good agricultural practices and the requirements for different agricultural activities inside the farm, the required quality can be obtained in the specified places for each appropriate quality grade.

Excellent quality degree

Map 5- 77: Spatial distribution of Sewi cultivar "Excellent Quality" Optimum temperature unites between 1801-2200°C and relative humidity of 30-40%

Very good quality degree

Map 5- 78: Spatial distribution of Sewi cultivar "Very good Quality" Optimum temperature unites between 2201-2300°C and relative humidity of 27-29%

good quality degree

Map 5- 79: Spatial distribution of Sewi cultivar "Good Quality" Optimum temperature unites between 2301-2400°C and relative humidity of 30-33%

Aggregate agricultural areas

Map 5- 80: Spatial distribution of Sewi cultivar "three grade quality"

5.5.2 Semi-dry & Dry

5.5.2.1 Malakabi

A. Fruits characteristics

Fruit data

Parameter	Character State	Score
Fruit length	(cm.)	5.42±0.68
Fruit width	(cm.)	2.38±0.15
Fruit weight	(gm.)	20.90±3.45
Fruit volume	(cm3)	25.00±4.20
Fruit shape	Ovate-elongate	
Fruit apex	Obtuse	
Fruit base	Obtuse	
Fruit colour (khalal)	Shiny red	
Fruit colour of the maturity	Brown-red	
Flesh thickness	(cm.)	0.76
Flesh colour	Cream	
Flesh texture	Fibrous	
Flavour	Poor	
Flesh taste	Delicious	

B. Fruits production & storing

Fruits production & storing

Parameter	Character State	Score
Suitable environmental conditions		
Ideal heat unites	Unit	2600-2900
Ideal humidity	%	25-28
Current area of cultivation	Qena, Luxor &Aswan Governorates	
Cultivated area	Fadden	6.5×6.5
Tree No.	Tree	100
Harvest Time	Mid-September - end of October	
Harvest stage	Semi-dry, Dry	
Harvest period	Week	2
Harvest times	Times	1-2
Production quantity	Kg/tree	40-65
Production area	Ton/Fadden	4-6

Total Area, Yield and Production for Malakabi

Production (Ton)	Yield (K. G.\Palm)	Fruiting palm (Palm)	Area (Fed.)
1888	86.837	21742	270

Source : Economic Affairs Sector (Average of 5y (2016-2020)

Storage & distribution

Short term storage	week	4
Long term storage	week	12
Refrigerator temperature	°C	0
Storage ability	Week	52
Shelf time	Day	60-90

C. Fruits consumption & marketing

Sales & Marketing

Fruit stage for marketing	Semi-dry, dry stages,	
Fruit stage for export	Semi-dry	
Markets types	National & local	
Quality	Very good	
Future markets	Asia, China, Morocco, Turkey, Canada, Europe.	
Marketing opportunities	Very weak	
Marketing time	October - November	
Marketing period	All the year	
Nature of the product	1.fresh, 2.de-seeded 3.dried, 4.packaged 5.manufactured	
Price value/ Kg	Dollar	3-5
Consumption		
Consumption stage	Semi-dry, dry	
Fruit humidity	%	Semi-dry 20 -24 Dry 19 <

D. Current Agro-production map

Total Area, Yield and Production for Malakabi (Average 5Y) (2016-2020)

Governorates	Malakabi			
	Production	Yield	F. Palm	Area
	(Ton)	(K. G.\ Palm)	(Palm)	(Fed.)
Luxor	238	69.897	3405	47
Aswan	1650	89.982	18337	223
Upper Egypt	1888	86.837	21742	270
Inside the valley	1888	86.837	21742	270
Total	1888	86.837	21742	270

Source : Economic Affairs Sector (Average of 5y).(2016-2020)

E. Agro-climate map

Excellent quality degree

Regarding the "excellent" quality degree of the Malakabi cultivar, the optimum heat units range between 2600° C and 2900° C and the relative humidity of 26-28% during the period of flowering, growth and ripening of fruits from April to October. The most suitable areas (Late harvest) for the cultivation of the Malakabi cultivar in Egypt (Map 5-81), are represented in the following areas:

- Area of west-south of Sohag Governorate.
- Most area of Qena Governorate.
- Desert areas of North Luxor Governorate.
- East area of Kharga Oasis and the area in the eastern border of the New Valley Governorate opposite to Sohag and Qena Governorates.
- Areas of the middle sector of the eastern desert in Red Sea Governorate locate east of Sohag, Qena, Luxor and Aswan Governorates.

very Good quality degree

Regarding the "very good" quality degree of the Malakabi cultivar, the optimum heat units range between 2500° C and 2599° C and the relative humidity of 27-30% during the period of flowering, growth and ripening of fruits from April to October. The most suitable areas (Intermediate harvest) for the cultivation of the Malakabi cultivar in Egypt (Map 5-82) are represented in the following areas:

- Scattered areas in the Governorates of Sohag and Qena.
- Limited areas in the middle of the eastern desert of Red Sea Governorate east of Sohag, Qena, Luxor and Aswan Governorates.

Good quality degree

Regarding the "good" quality degree of the Malakabi cultivar, the optimum heat units range between 2400° C and 2499° C and the relative humidity of 31-33% during the period of flowering, growth and ripening of fruits from April to October. The most suitable areas (Early harvest) for the cultivation of the Malakabi cultivar in Egypt (Map 5-83) are represented in the following areas:

- Limited area locates in the desert of Assuit Governorate.
- Limited areas in the eastern desert of Red Sea Governorate locate east of Assuit, Sohag, Qena, Luxor and Aswan Governorates.

Aggregate agricultural areas

Referring to the climatic analyzes and the needs of the fruits for the different quality levels, and comparing the heat and moisture needs of the Malakabi cultivar during the period of flowering, growth and ripening of the fruits from April to October with the heat units recorded for the same period in the Governorates, it was possible to determine the agricultural areas suitable for production Malakabi cultivar in Egypt (Map 5-84) is as follows:

- The cultivation extended southward in Upper Egypt from the latitude 27.20 in Sohag, Qena and Luxor Governorates as well as the eastern desert of Red Sea Governorate.
- Taking into account the agricultural production standards that are concerned with good agricultural practices and the requirements for different agricultural activities inside the farm, the required quality can be obtained in the specified places for each appropriate quality grade.

Excellent quality degree

Map 5- 81: Spatial distribution of Malakabi cultivar "Excellent Quality" Optimum temperature unites between 2600-2900°C and relative humidity of 26-28%

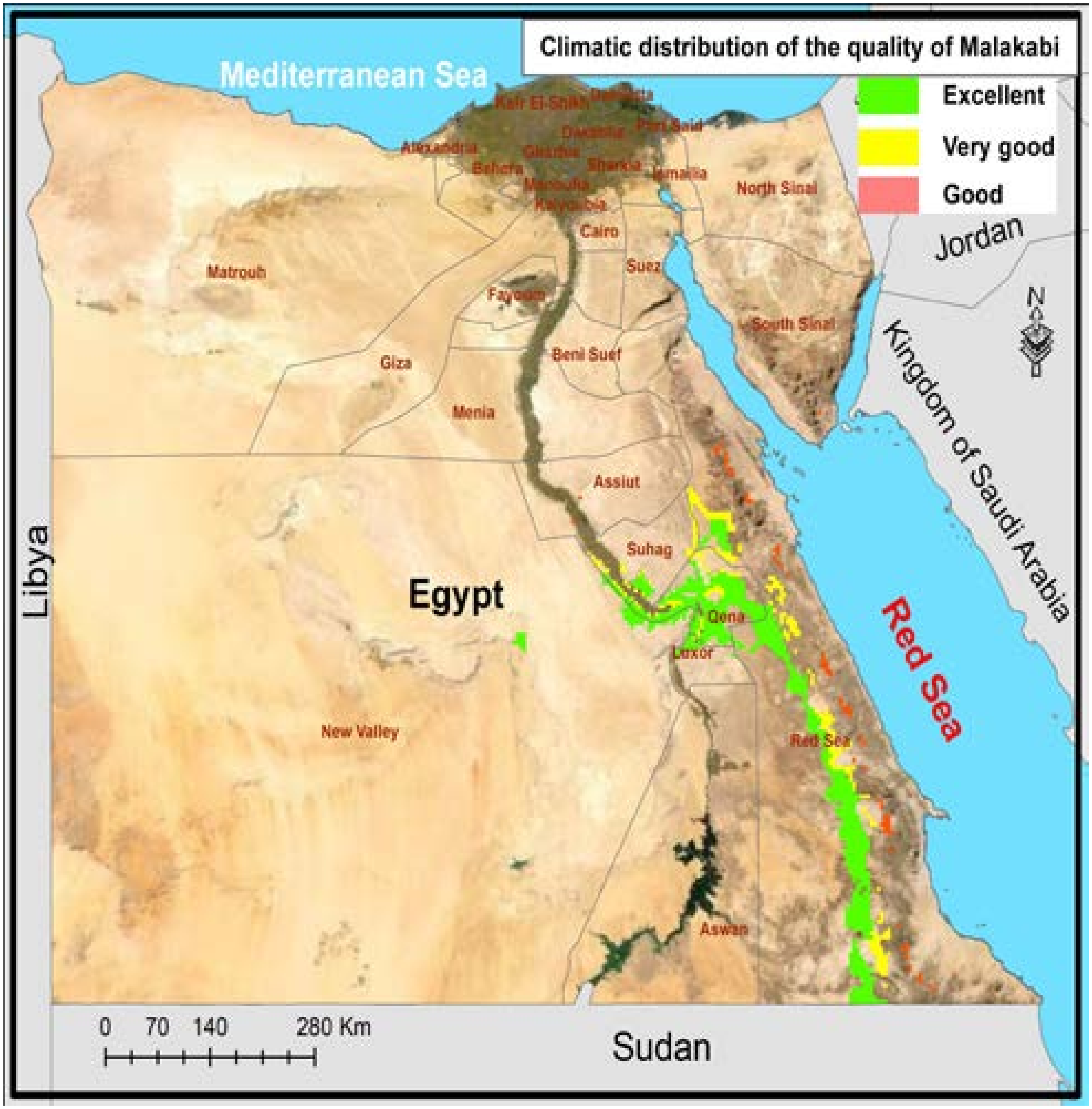
Very good quality degree

Map 5- 82: Spatial distribution of Malakabi cultivar "Very good Quality" Optimum temperature unites between 2500-2599°C and relative humidity of 27-30%

Good quality degree

Map 5- 83: Spatial distribution of Malakabi cultivar "Good Quality" Optimum temperature unites between 2400-2499°C and relative humidity of 31-33%

Aggregate agricultural areas



Map 5- 84: Spatial distribution of Malakabi cultivar “three grade quality”

5.5.2.2 Bartamouda Luxor ecotype

A. Fruits characteristics

Fruit data

Parameter	Character State	Score
Fruit length	(cm.)	7. 43±0.24
Fruit width	(cm.)	2.10±0.07
Fruit weight	(gm.)	8.32±0.97
Fruit volume	(cm3)	8.52±1.01
Fruit shape	Cylindrical	
Fruit apex	Obtuse	
Fruit base	Obtuse	
Fruit colour (khalal)	Yellow orange	
Fruit colour of the maturity	Dark brown-red	
Flesh thickness	(cm.)	0.83
Flesh colour	Cream	
Flesh texture	Fibrous	
Flavour	Good	
Flesh taste	Delicious	

B. Fruits production & storing

Fruits production & storing

Parameter	Character State	Score
Suitable environmental conditions		
Ideal heat unites	Unit	2600-2900
Ideal humidity	%	25-28
Current area of cultivation	Qena & Luxor Governorates	
Cultivated area	Fadden	6.5×6.5
Tree No.	Tree	100
Harvest Time	Mid-September - end of October	
Harvest stage	Semi-dry, dry	
Harvest period	Week	2
Harvest times	Times	1-2
Production quantity	Kg/tree	40-70
Production area	Ton/Fadden	3.5-6.5

Total Area, Yield and Production for Bartamouda Luxor

Production (Ton)	Yield (K. G.\Palm)	Fruiting palm (Palm)	Area (Fed.)
644	69.992	9201	131

Source : Economic Affairs Sector (Average of 5y).(2016-2020)

Storage & distribution

Short term storage	week	4
Long term storage	week	12
Refrigerator temperature	°C	0-4
Storage ability	Week	24-52
Shelf time	Day	60-90

C. Fruits consumption & marketing

Sales & Marketing

Fruit stage for marketing	Semidry, Dry stages		
Fruit stage for export	Semi-dry		
Markets types	National & local		
Quality	Good		
Future markets	Asia , China & Morocco		
Marketing opportunities	Good		
Marketing time	October - November		
Marketing period	All the year		
Nature of the product	1.fresh, 2.de-seeded 3.dried, 4.packaged 5.manufactured		
Price value/ Kg	Dollar	1-2	
Consumption			
Consumption stage	Semi-dry, Dry		
Fruit humidity	%	Semi-dry Dry	19-22 16<

D. Current Agro-production map

Total Area, Yield and Production for Bartamouda Luxor (Average 5Y) (2016-2020)

Governorates	Bartamouda Luxor			
	Production	Yield	F. Palm	Area
	(Ton)	(K. G.\ Palm)	(Palm)	(Fed.)
Luxor	1620	89.970	18006	1001
Total	4695	62.500	75120	939

Source: measurements of the team in the cultivation area.

E. Agro-climate map

Excellent quality degree

Regarding the "excellent" quality degree of the Bartamouda Luxor cultivar, the optimum heat units range between 2600° C and 2900° C and the relative humidity of 25-28% during the period of flowering, growth and ripening of fruits from April to October. The most suitable areas (Late harvest) for the cultivation of the Bartamouda Luxor cultivar in Egypt (Map 5-85), are represented in the following areas:

- Area of west-south Sohag Governorate.
- Most area of Qena Governorate.
- Desert areas of North Luxor Governorate.
- East area of Kharga Oasis and the area at the eastern

border of the New Valley Governorate opposite to Sohag and Qena Governorates.

- Areas of the middle sector of the eastern desert of Red Sea Governorate east of Sohag, Qena, Luxor and Aswan Governorates.

Very good quality degree

Regarding the “very good” quality degree of the Bartamouda Luxor cultivar, the optimum heat units range between 2500° C and 2599° C and the relative humidity of 27-30% during the period of flowering, growth and ripening of fruits from April to October. The most suitable areas (Intermediate harvest) for the cultivation of the Bartamouda Luxor cultivar in Egypt (Map 5-86) are represented in the following areas:

- Scattered areas in the Governorates of Sohag and Qena.
- Limited areas locate at the middle of the eastern desert in Red Sea Governorate east of Sohag, Qena, Luxor and Aswan Governorates.

Good quality degree

Regarding the “good” quality degree of the Bartamouda Luxor cultivar, the optimum heat units range between 2400° C and 2499° C and the relative humidity of 31-33% during the period of flowering, growth and ripening of fruits from April to October. The most suitable areas (Early harvest) for the cultivation of the Bartamouda Luxor cultivar in Egypt (Map 5-87) are represented in the following areas:

- Limited area locates in the desert of Assuit Governorate.
- Limited areas in the eastern desert of Red Sea Governorate locate east of Assuit, Sohag, Qena, Luxor and Aswan Governorates.

Aggregate agricultural areas

Referring to the climatic analyzes and the needs of the fruits for the different quality levels, and comparing the heat and moisture needs of the Bartamouda Luxor cultivar during the period of flowering, growth and ripening of the fruits from April to October with the heat units recorded for the same period in the Governorates, it was possible to determine the agricultural areas suitable for production Bartamouda Luxor cultivar in Egypt (Map 5-88) is as follows:

- The cultivation extended southward in Upper Egypt from the latitude 27.20 in Sohag, Qena and Luxor Governorates as well as the eastern desert of Red Sea Governorate.
- Taking into account the agricultural production standards that are concerned with good agricultural practices and the requirements for different agricultural activities inside the farm, the required quality can be obtained in the specified places for each appropriate quality grade.

Excellent quality degree

Map 5- 85: Spatial distribution of Bartamouda "Luxor ecotype" cultivar "Excellent Quality" Optimum temperature unites between 2600-2900°C and relative humidity of 25-28%

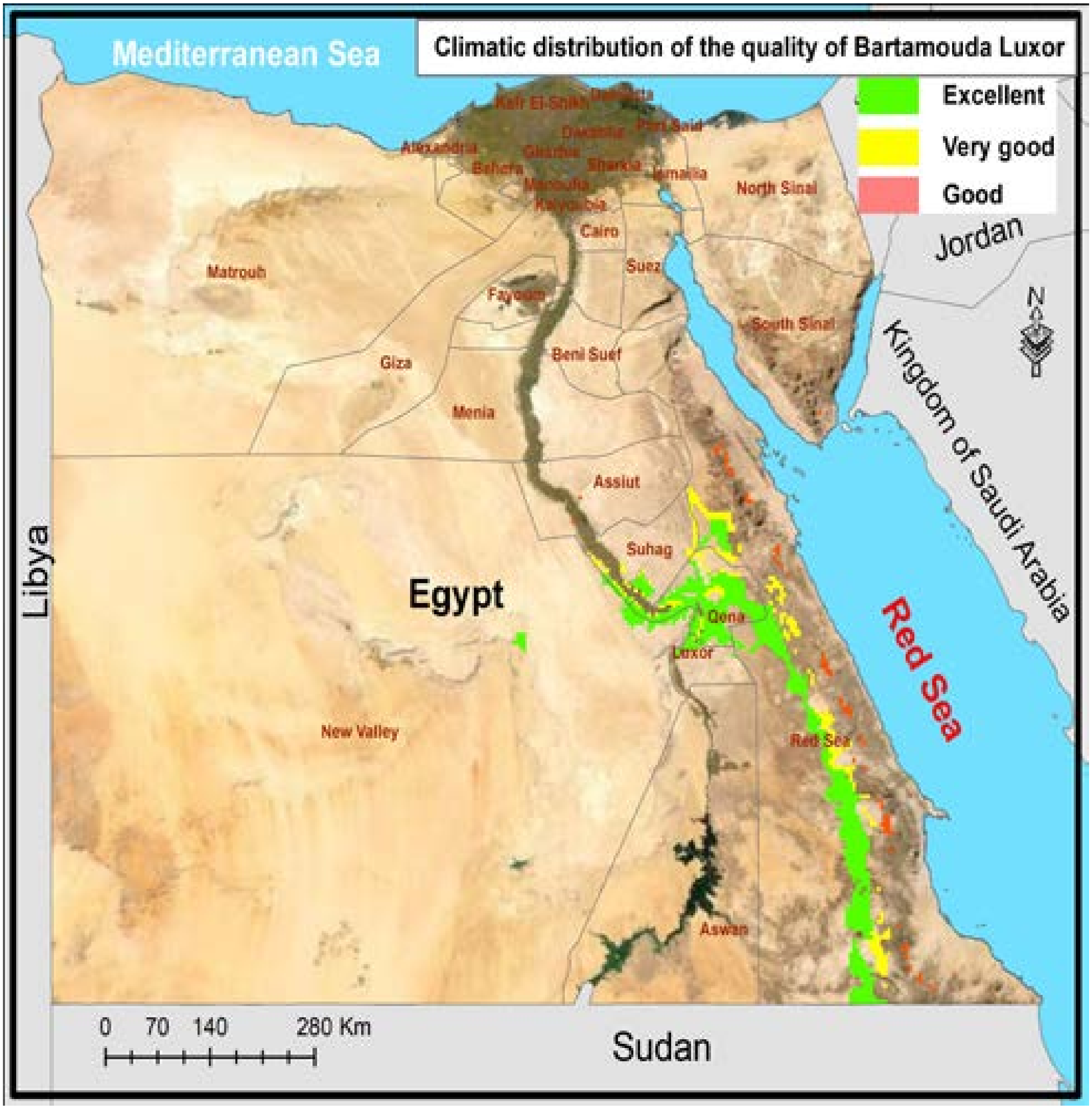
Very good quality degree

Map 5- 86: Spatial distribution of Bartamouda "Luxor ecotype" cultivar "Very good Quality" Optimum temperature unites between 2500-2599°C and relative humidity of 27-30%

Good quality degree

Map 5- 87: Spatial distribution of Bartamouda "Luxor ecotype" cultivar "Good Quality" Optimum temperature unites between 2400-2499°C and relative humidity of 31-33%

Aggregate agricultural areas



Map 5- 88: Spatial distribution of Bartamouda "Luxor ecotype" cultivar "three grade quality"

5.5.2.3 Sukari

A. Fruits characteristics

Fruit data

Parameter	Character State	Score
Fruit length	(cm.)	3.72±0.68
Fruit width	(cm.)	2.58±0.15
Fruit weight	(gm.)	13.90±3.45
Fruit volume	(cm3)	18.00±4.20
Fruit shape	Ovate-elongate	
Fruit apex	Obtuse	
Fruit base	Truncate	
Fruit colour (khalal)	Yellow	
Fruit colour of the maturity	Pale brown	
Flesh thickness	(cm.)	0.76
Flesh colour	Cream	
Flesh texture	Fibrous	
Flavour	Good	
Flesh taste	Delicious	

B. Fruits production & storing

Fruits production & storing

Parameter	Character State	Score
Suitable environmental conditions		
Ideal heat unites	Unit	2750-3200
Ideal humidity	%	18-25
Current area of cultivation	Aswan Governorate	
Cultivated area	Fadden	8×8
Tree No.	Tree	65
Harvest Time	Mid-August, September	
Harvest stage	Semi-dry (soft), semi-dry, semi-dry (hard)	
Harvest period	Week	2-3
Harvest times	Times	3-4
Production quantity	Kg/tree	40-60
Production area	Ton/Fadden	5 - 8

Total Area, Yield and Production for Sukari

Production (Ton)	Yield (K. G.\Palm)	Fruiting palm (Palm)	Area (Fed.)
882	92.31	9555	147

Source: measurements of the team in the cultivation area.

Storage & distribution

Short term storage	week	1
Long term storage	week	8
Refrigerator temperature	°C	(-5),4,0
Storage ability	Week	24-52
Shelf time	Day	soft 15 Semi-dry 60 Dry 90

C. Fruits consumption & marketing

Sales & Marketing

Fruit stage for marketing	Semi-dry (soft), semi-dry, semi-dry (hard)	
Fruit stage for export	Semi-dry	
Markets types	Local & National	
Quality	Excellent	
Future markets	Asia, China, Morocco, Turkey, Europe, Gulf area	
Marketing opportunities	Very good	
Marketing time	October	
Marketing period	All the year	
Nature of the product	1.fresh, 2.de-seeded 3.dried, 4.packaged 5.manufactured	
Price value/ Kg	Dollar	3-5
Consumption		
Consumption stage	Khalal, soft, Semi-dry, Dry	
Fruit humidity	%	soft 30-35 Semi-dry 22-24 Dry 17-19

D. Current Agro-production map

Total Area, Yield and Production for **Sukari** (Average 5Y) (2016-2020)

Governorates	**Sukari**			
	Production	**Yield**	**F. Palm**	**Area**
	(Ton)	**(K. G.\ Palm)**	**(Palm)**	**(Fed.)**
Giza (Baharia Oasis)	120	92.31	1300	20
Aswan	222	92.31	2405	37
New Valley	120	92.31	1300	20
Total	462	92.31	4005	147

Source: measurements of the team in the cultivation area.

E. Agro-climate map

Excellent quality degree

Regarding the excellent quality degree of the Sukari cultivar, the optimum heat units range between 2700° C and 3200° C and the relative humidity of 17-25% during the period of flowering, growth and ripening of fruits from April to October. The most suitable areas (Early harvest) for the cultivation of the Sukari cultivar in Egypt (Map 5-89), are represented in the following areas:

- The far south of New Valley Governorate locates in the south border of Egypt includes Toshka, Owainat areas and extends northward through Paris and Kharga Oases. The area extends from Kharga Oasis to Mutte district of Dakhla Oasis.
- The area of far east of the New Valley Governorate adjacent to south-west of Qena Governorate, west of Luxor Governorate and north west of Aswan Governorate.
- Most areas of Aswan Governorate.'
- West and south of Luxor Governorate.
- Limited area locates south of Qena Governorate.
- The area of east desert in Red Sea Governorate locates east of Luxor and Aswan Governorates.

Very good quality degree

Regarding the "very good" quality degree of the Sukari cultivar, the optimum heat units range between 2600° C and 2700° C and the relative humidity of 25-28% during the

period of flowering, growth and ripening of fruits from April to October. The most suitable areas (Intermediate harvest) for the cultivation of the Sukari cultivar in Egypt (Map 5-90) are represented in the following areas:

- Areas of reclamation locate in south Sohag Governorate.
- Desert areas of Qena Governorate.
- Limited area in North of Luxor Governorate.
- Limited areas locate in the east of New Valley Governorate adjacent to Sohag and Qena Governorates.
- The area of eastern desert in the Red Sea Governorate locates east of Sohag, Qena, Luxor and Aswan Governorates..

Good quality degree

Regarding the “good” quality degree of the Sukari cultivar, the optimum heat units range between 2500° C and 2599° C and the relative humidity of 30-29% during the period of flowering, growth and ripening of fruits from April to October. The most suitable areas (Late harvest) for the cultivation of the Sukari cultivar in Egypt (Map 5-91) are represented in the following areas:

- Areas of eastern desert in Red Sea Governorate locate east of Sohag, Qena and Aswan Governorates.
- Limited areas locate in Sohag Governorate.

Aggregate agricultural areas

Referring to the climatic analyzes and the needs of the fruits for the different quality levels, and comparing the heat and moisture needs of the Sukari cultivar during the period of flowering, growth and ripening of the fruits from April to October with the heat units recorded for the same period in the Governorates, it was possible to determine the agricultural areas suitable for production Sukari cultivar in Egypt (Map 5-92) is as follows:

- The cultivation at the south latitude of 27° and extends to the south border of Egypt at latitude of 22°. The cultivation extends eastward from the longitude 27.5°.
- Taking into account the agricultural production standards that are concerned with good agricultural practices and the requirements for different agricultural activities inside the farm, the required quality can be obtained in the specified places for each appropriate quality grade.

Excellent quality degree

Map 5- 89: Spatial distribution of Sukari cultivar "Excellent Quality" Optimum temperature unites between 2701-3200°C and relative humidity of 17-25%

Very good quality degree

Map 5- 90: Spatial distribution of Sukari cultivar “Very good Quality” Optimum temperature unites between 2600-2700°C and relative humidity of 25-28%

Good quality degree

Map 5- 91: Spatial distribution of Sukari cultivar "Good Quality" Optimum temperature unites between 2500-2599°C and relative humidity of 29-30%

Aggregate agricultural areas

Map 5- 92: Spatial distribution of Sukari cultivar “three grade quality”

5.5.3 Khalal - soft

5.5.3.1 Samani

A. Fruits characteristics

Fruit data

Parameter	Character State	Score
Fruit length	(cm.)	5.50±0.70
Fruit width	(cm.)	3.08±0.26
Fruit weight	(gm.)	29.00±4.99
Fruit volume	(cm3)	29.90±5.13
Fruit shape	Obviate-elongate	
Fruit apex	Blunt	
Fruit base	Truncate	
Fruit colour (khalal)	Orange	
Fruit colour of the maturity	Yellow-orange mottled pale red	
Flesh thickness	(cm.)	0.95
Flesh colour	White	
Flesh texture	Firm	
Flavour	Poor	
Flesh taste	Delicious-sweet	

B. Fruits production & storing

Fruits production & storing

Parameter	Character State	Score
Suitable environmental conditions		
Ideal heat unites	Unit	1500-1800
Ideal humidity	%	50-65
Current area of cultivation	Lower Egypt Governorates	
Cultivated area	Fadden	8×8
Tree No.	Tree	65
Harvest Time	First September –mid-October	
Harvest stage	Khalal stages	
Harvest period	Week	2-4
Harvest times	Times	1
Production quantity	Kg/tree	85-300
Production area	Kg/tree	5 -15

Total Area, Yield and Production for Samani

Production (Ton)	Yield (K. G.\Palm)	Fruiting palm (Palm)	Area (Fed.)
89673	129.062	694808	6079

Source: Economic Affairs Sector (Average of 5y).(2016-2020

Storage & distribution

Short term storage	week	1
Long term storage	week	2
Refrigerator temperature	°C	(-5) - 0
Storage ability	Week	12-16
Shelf time	Day	4-7

C. Fruits consumption & marketing

Sales & Marketing

Fruit stage for marketing	Khalal, Soft,	
Fruit stage for export	Khalal	
Markets types	National, local and Gulf countries	
Quality	Good	
Future markets	Asia, China, neighbouring countries.	
Marketing opportunities	Good	
Marketing time	September & October	
Marketing period	Three months	
Nature of the product	fresh	
Price value/ Kg	Dollar	2-3
Consumption		
Consumption stage	Khalal, Soft,	
Fruit humidity	%	Khalal 50-60 Soft 35-45

D. Current Agro-production map

Total Area, Yield and Production for Samani (Average 5Y) (2016-2020)

Governorates	Samani			
	Production	Yield	F. Palm	Area
	(Ton)	(K. G.\ Palm)	(Palm)	(Fed.)
Alexandria	537	114.475	4691	19
Beheira	39896	132.000	302242	4200
Gharbia	547	129.345	4229	20
Kafr-El Sheikh	6184	157.022	39383	326
Dakahlia	220	87.475	2515	25
Damietta	482	150.156	3210	
Sharkia	13168	161.954	81307	54
Ismailia	4467	184.969	24150	152
Suez	225	101.351	2220	6
Menoufia	4398	123.595	35584	9
Qalyoubia	523	122.943	4254	11
Cairo	12	59.406	202	22
Lower Egypt	70659	140.200	503987	4844
Giza	1846	124.983	14770	117
Beni Suef	46	89.320	515	
Middle Egypt	1892	123.781	15285	117
Assuit	863	89.971	9592	124
Luxor	91	42.306	2151	40
Upper Egypt	954	81.240	11743	164
Inside the valley	73505	138.424	531015	5125
Red Sea	213	50.118	4250	863
Noubaria	15955	100.004	159543	91
Outside the valley	16168	98.710	163793	954
Total	89673	129.062	694808	6079

Source: Economic Affairs Sector (Average of 5y).(2016-2020

E. Agro-climate map

Excellent quality degree

Regarding the excellent quality degree of the Samani cultivar, the optimum heat units range between 1500° C and 1800° C and the relative humidity of 50-65% during the period of flowering, growth and ripening of fruits from April to October. The most suitable areas (Late harvest) for the cultivation of the Samani cultivar in Egypt (Map 5-93), are represented in the following areas:

- The north coastal area in North Sinai Governorate.
- East Delta region locates in Port Said, Sharkia and Damietta Governorates.
- Areas locate in north of Ismailia Governorate and some limited areas around the Bitter Lakes in Ismailia Governorate.
- Limited areas locate in the Suez Gulf of South Sinai Governorate.
- Most areas in the middle of Nile Delta in Kafr El Sheikh, Damietta, Dakahlia and Gharbia Governorate.
- West Delta area of most Alexandria Governorate and the northern area of Beheira Governorate extend to some area of Matruh Governorate extends between Wadi al-Natrun (west of the Beheira Governorate) to Moghrah area.

Very good quality degree

Regarding the very good quality degree of the Samani cultivar, the optimum heat units range between 1901° C and 2000° C and the relative humidity of 45-49% during the period of flowering, growth and ripening of fruits from April to October. The most suitable areas (Intermediate harvest) for the cultivation of the Samani cultivar in Egypt (Map 5-94), are represented in the following areas:

- The area locates in the north of Qattara Depression including the west of Moghrah area of Matruh Governorate.
- Areas of Badr district in Beheira Governorate including some limited area in the south and extend to Tahrir and Sadat areas of Menoufia Governorate.
- South areas and limited area of middle Menoufia Governorate.
- South of Qalyubia Governorate and Benha district as well as the reclamation area west of El-Obour (Orabi).
- Limited area of north Giza Governorate.
- South of Sharkia Governorate and most area of Ismailia Governorate extended southward to Suez Governorate and the location around Suez Gulf in Suez and South Sinai Governorates.

Good quality degree

Regarding the "good" quality degree of the Samani cultivar, the optimum heat units range between 2001° C and 2100° C and the relative humidity of 40-44% during the period of flowering, growth and ripening of fruits from April to October. The most suitable areas (Early harvest) for the cultivation of the Samani cultivar in Egypt (Map 5-95), are represented in the following areas:

- Area around Qattara Depression of Matruh Governorate.
- Limited areas locate North Cairo Governorate extends to south-east area of Qalyubia Governorate as well as the west longitudinal sector of Cairo Governorate.
- Most areas of Giza, Fayoum and some limited north areas Beni Suef Governorate.
- The areas locate south of Suez Governorate and the northern eastern areas of the Red Sea Governorate (corresponding to Minya Governorate).
- Some areas locate on the Gulf of Suez of South Sinai Governorate.

Aggregate agricultural areas

Referring to the climatic analyzes and the needs of the fruits for the different quality levels, and comparing the heat and moisture needs of the Samani cultivar during the period of flowering, growth and ripening of the fruits from April to October with the heat units recorded for the same period in the Governorates, it was possible to determine the agricultural areas suitable for production Samani cultivar in Egypt (Map 5-96) is as follows:

- It could be cultivated in the northern coastal area of north Sinai Governorate extends to Nile Delta and Moghrah and Qattara Depression. Also could be cultivated in east delta region and Suez Canal & gulf area.
- Taking into account the agricultural production standards that are concerned with good agricultural practices and the requirements for different agricultural activities inside the farm, the required quality can be obtained in the specified places for each appropriate quality grade.

Excellent quality degree

Map 5- 93: Spatial distribution of Samani cultivar "Excellent Quality" Optimum temperature unites between 1500-1800°C and relative humidity of 50-65%

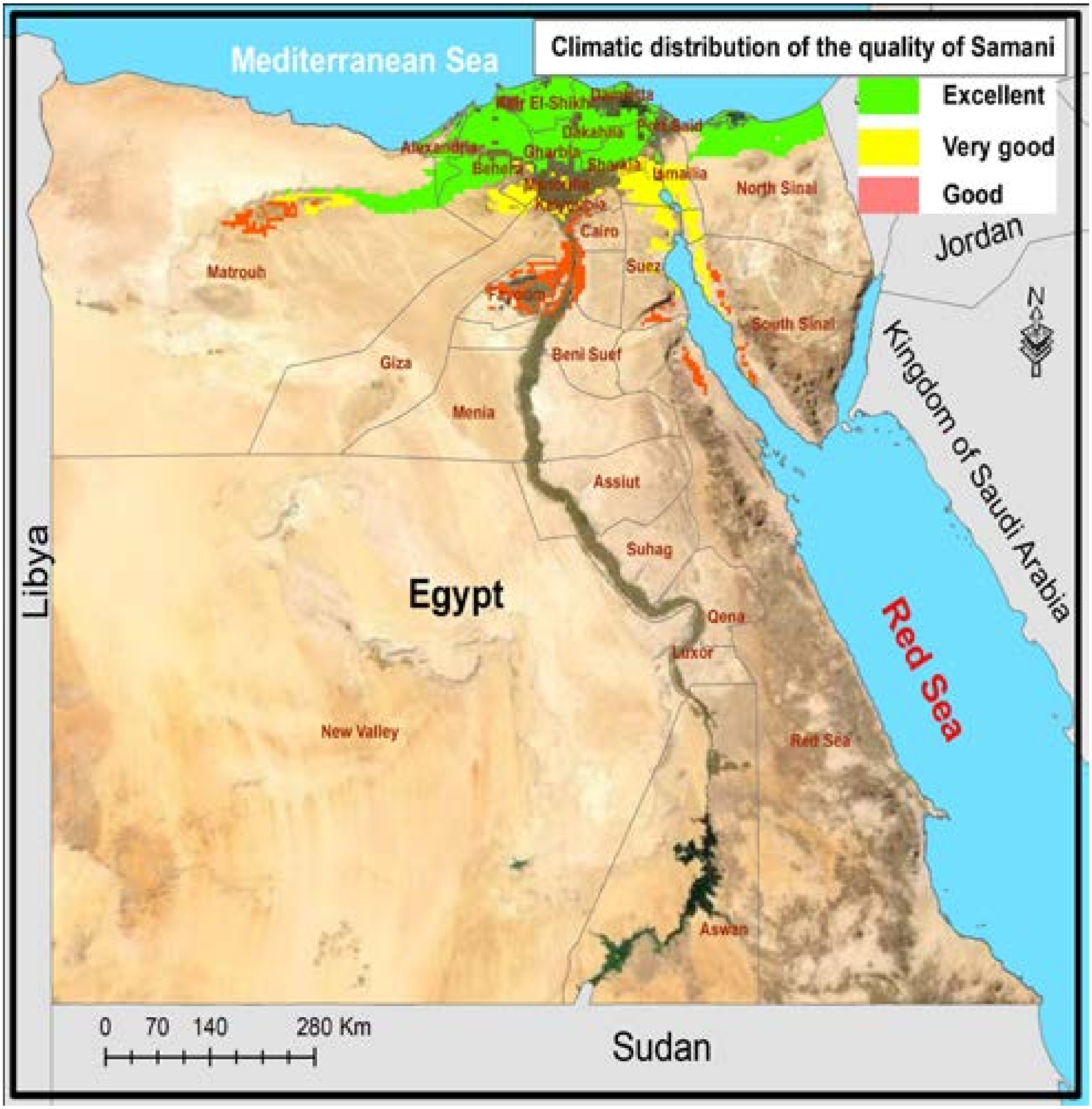
Very good quality degree

Map 5- 94: Spatial distribution of Samani cultivar "Very good Quality" Optimum temperature unites between 1801-2000°C and relative humidity of 45-49%

good quality degree

Map 5- 95: Spatial distribution of Samani cultivar "Good Quality" Optimum temperature unites between 2001-2100°C and relative humidity of 40-44%

Aggregate agricultural areas



Map 5- 96: Spatial distribution of Samani cultivar "three grade quality"

5.6

Triple marketing Cultivars

5.6.1 Khalal, soft and semi-dry

5.6.1.1 Barhi

A. Fruits characteristics

Fruit data

Parameter	Character State	Score
Fruit length	(cm.)	3.80±0.35
Fruit width	(cm.)	2.84±0.16
Fruit weight	(gm.)	15.56±2.48
Fruit volume	(cm3)	15.00±2.37
Fruit shape	Ovate	
Fruit apex	Obtuse	
Fruit base	Retuse	
Fruit colour (khalal)	Yellow	
Fruit colour of the maturity	Orange-yellow	
Flesh thickness	(cm.)	0.8
Flesh colour	White	
Flesh texture	Fibrous	
Flavour	Good	
Flesh taste	Delicious-sweet	

B. Fruits production & storing

Fruits production & storing

Parameter	Character State	Score
Suitable environmental conditions		
Ideal heat unites	Unit	1500-1900
Ideal humidity	%	50-65
Current area of cultivation	All Egypt Governorates	
Cultivated area	Fadden	9×9
Tree No.	Tree	52
Harvest Time	From August to October	
Harvest stage	Early Khalal stage	
Harvest period	Week	1-2
Harvest times	Times	1
Production quantity	Kg/tree	100-250
Production area	Ton/Fadden	5- 12

Total Area, Yield and Production for Barhi

Production (Ton)	Yield (K. G.\Palm)	Fruiting palm (Palm)	Area (Fed.)
46,984	123.08	381,745	5,873

Source: measurements of the team at the cultivation area.

Storage & distribution

Short term storage	week	1
Long term storage	week	2
Refrigerator temperature	°C	0-4
Storage ability	soft semi-dry	6 24
Shelf time	Khalal soft semi-dry	10 > 5 60

C. Fruits consumption & marketing

Sales & Marketing

Fruit stage for marketing	Khalal, Soft, Semi-dry	
Fruit stage for export	Khalal	
Markets types	Local, National & Adjacent countries	
Quality	Excellent	
Future markets	Asia, China, Europe, Turkey	
Marketing opportunities	Excellent	
Marketing time	September -October	
Marketing period	September -October	
Nature of the product	1.fresh 2.de-seeded 3.dried 4.packaged 5.manufactured	
Price value/ Kg	Dollar	3-5
Consumption		
Consumption stage	Khalal, Soft, Semi-dry	
Fruit humidity	%	Khalal 50-60 Soft 40-45 Semi-dry 22-24

D. Current Agro-production map

Total Area, Yield and Production for Barhi cultivar

Governorates	Barhi			
	Production (Ton)	Yield (K. G.\ Palm)	F. Palm (Palm)	Area (Fed.)
Alexandria	2,800	123.08	22,750	350
Beheira	9,600	123.08	78,000	1,200
Kafr-El Sheikh	1,240	123.08	10,075	155
Dakahlia	1,600	123.08	13,000	200
Sharkia	3,600	123.08	29,250	450
Ismailia	2,984	123.08	24,245	373
Lower Egypt	21,824	123.08	177,320	2,728
Giza	1,000	123.08	8,125	125
Middle Egypt	1,000	123.08	8,125	125
Luxor	960	123.08	7,800	120
Aswan	1,600	123.08	13,000	200
Upper Egypt	2,560	123.08	20,800	320
Inside the valley	25,384	123.08	206,245	3,173
Noubaria	6,000	123.08	48,750	750
New Valley	15,600	123.08	126,750	1,950
Outside the valley	21,600	123.08	175,500	2,700
Total	46,984	123.08	381,745	5,873

Source: measurements of the team at the cultivation area.

E. Agro-climate map

Excellent quality degree

Regarding the "excellent" quality degree of the Barhi cultivar, the optimum heat units range between 1500° C and 2000° C and the relative humidity of 40-65% during the period of flowering, growth and ripening of fruits from April to October. The most suitable areas (Late harvest) for the cultivation of the Barhi cultivar in Egypt (Map 5-97) are represented in the following areas:

- The North and west areas in North Sinai Governorate.
- The west-north area in the South Sinai Governorate.
- The west Delta area and Suez Canal area include Governorates of Port Said, Ismailia, Sharkia, Sues and the North and middle areas of Suez Governorate.
- The northern area locates in Red Sea Governorate.
- All Governorates of the Nile Delta include Qalyubia and Cairo Governorates as well as the North of both Giza and Beni Suef Governorates and Fayoum Governorate.
- Areas of Beheira and Alexandria Governorates.
- Areas of Moghrah, north of Qattara Depression, Qara Oasis and the far north area of Siwa Oasis in Matruh Governorate.

Very good quality degree

Regarding the “very good” quality degree of the Barhi cultivar, the optimum heat units range between 2001° C and 2300° C and the relative humidity of 34-39% during the period of flowering, growth and ripening of fruits from April to October. The most suitable areas (Intermediate harvest) for the cultivation of the Barhi cultivar in Egypt (Map 5-98) are represented in the following areas:

- Area of Qattara Depression locates in Matruh Governorate.
- Area of North and middle sector of Minya Governorate include the reclamation area of west-west Minya as well as the extending to east Mandisha of Baharia Oasis.
- Desert areas in the middle sector of Beni Suef Governorate.
- Limited scattered area in both south Fayoum Governorate and south Suez Governorate.
- Scattered areas locate along the east of eastern desert in Red Sea Governorate.
- Areas of Abou Redies, Wadi Ferran and other scattered areas in the coastal desert of South Sinai Governorate.

Good quality degree

Regarding the “good” quality degree of the Barhi cultivar, the optimum heat units range between 2001° C and 2200° C and the relative humidity of 35-39% during the period of flowering, growth and ripening of fruits from April to October. The most suitable areas (Early harvest) for the cultivation of the Barhi cultivar in Egypt (Map 5-99) are represented in the following areas:

- The middle area of the Qattara Depression in Matruh Governorate.
- The Farafra Oasis and its extension southward to the north of the Dakhla and Kharga Oasis, including the district of Mutte and Balat.
- Some scattered areas east and west north of latitude 26.44 of New Valley Governorate.
- The middle southern sector of Minya Governorate and its extension to the Governorates of Assuit, Sohag and Qena.
- The areas locate in the Eastern Desert of the Red Sea Governorate, east of the Governorates of Assuit, Sohag, Qena, Luxor and Aswan.
- Limited areas locate in South Sinai Governorate, on the edge of the Gulf of Aqaba desert.

Aggregate agricultural areas

Referring to the climatic analyzes and the needs of the fruits for the different quality levels, and comparing the heat and moisture needs of the Barhi cultivar during the period of flowering, growth and ripening of the fruits from April to October with the heat units recorded for the same period in the Governorates, it was possible to determine the agricultural areas suitable for production Barhi cultivar in Egypt (Map 5-100) is as follows:

- The cultivation extends in the delta region and north sector of Sinai as well as the extending to the reclamation area of Matruh Governorate, the middle Egypt, Farafra Oasis and eastern desert.
- Taking into account the agricultural production standards that are concerned with good agricultural practices and the requirements for different agricultural activities inside the farm, the required quality can be obtained in the specified places for each appropriate quality grade.

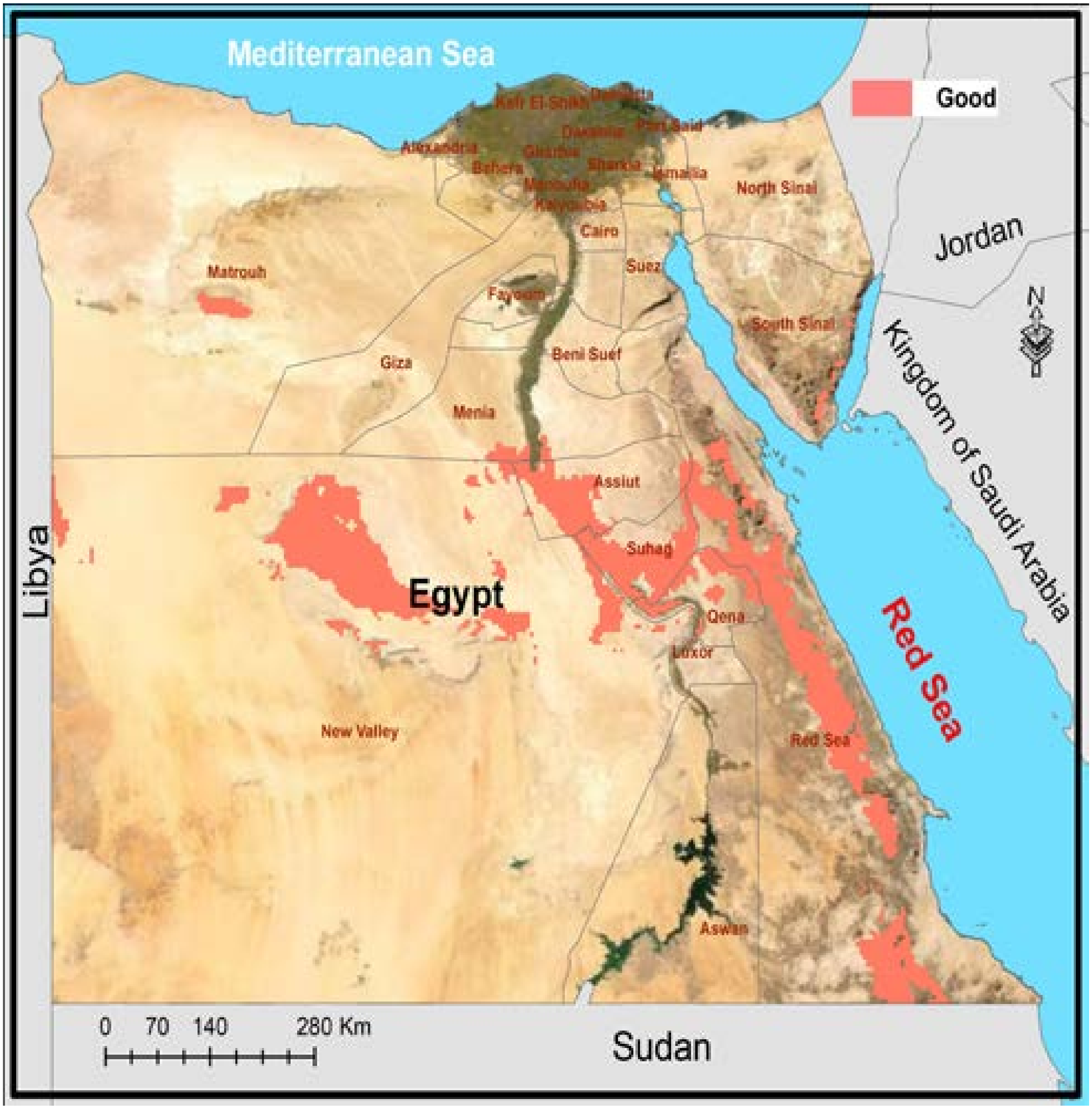
Excellent quality degree

Map 5- 97: Spatial distribution of Barhi cultivar "Excellent Quality" Optimum temperature unites between 1500-2000°C and relative humidity of 40-65%

Very good quality degree

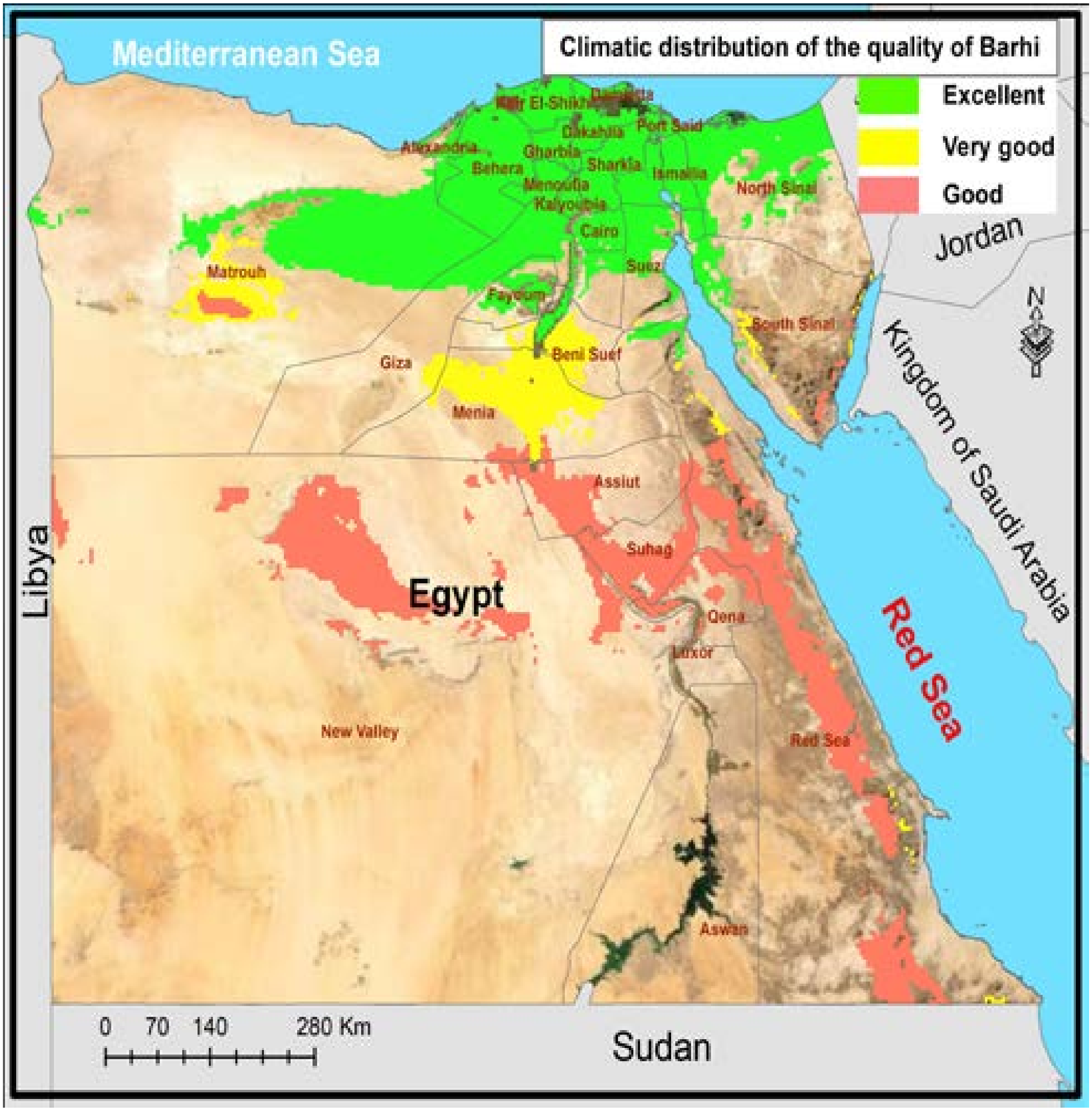
Map 5- 98: Spatial distribution of Barhi cultivar “Very good Quality” Optimum temperature unites between 2001-2300°C and relative humidity of 34-39%

Good quality degree



Map 5- 99: Spatial distribution of Barhi cultivar "Good Quality" Optimum temperature unites between 2301-2600°C and relative humidity of 25-33%

Aggregate agricultural areas



Map 5- 100: Spatial distribution of Barhi cultivar "three grade quality"

5.6.1.2 Khalas

A. Fruits characteristics

Fruit data

Parameter	Character State	Score
Fruit length	(cm.)	3.98±0.37
Fruit width	(cm.)	2.40±0.09
Fruit weight	(gm.)	12.80±1.98
Fruit volume	(cm3)	13.40±2.10
Fruit shape	Ovate	
Fruit apex	Obtuse	
Fruit base	Truncate	
Fruit colour (khalal)	Yellow	
Fruit colour of the maturity	Pale brown	
Flesh thickness	(cm.)	0.85
Flesh colour	Firm	
Flesh texture	Excellent	
Flavour	Delicious-sweet	
Flesh taste	Intermediate	

B. Fruits production & storing

Fruits production & storing

Parameter	Character State	Score
Suitable environmental conditions		
Ideal heat unites	Unit	2750-3150
Ideal humidity	%	18-25
Current area of cultivation	Giza (El-Baharia Oasis), Minya, Luxor, New valley, Aswan Governorates	
Cultivated area	Fadden	8×8
Tree No.	Tree	65
Harvest Time	First September –Mid October	
Harvest stage	Khalal or soft stages	
Harvest period	Week	1-2
Harvest times	Times	1-3
Production quantity	Kg/tree	40-60
Production area	Ton/Fadden	2.5- 3.5

Total Area, Yield and Production for Khalas

Production (Ton)	Yield (K. G.\Palm)	Fruiting palm (Palm)	Area (Fed.)
435	54.55	7975	145

Source: measurements of the team in the cultivation area.

Storage & distribution

Short term storage	week	2
Long term storage	week	12
Refrigerator temperature	°C	0- (-5)
Storage ability	Week	24-52
Shelf time	Day	Khalal 15 soft 7 Semi-dry 60

C. Fruits consumption & marketing

Sales & Marketing

Fruit stage for marketing	Khalal, Soft, Semi-dry	
Fruit stage for export	Semi-dry	
Markets types	Asia & China	
Quality	Very good	
Future markets	Asia, China, Gulf countries, Morocco.	
Marketing opportunities	Good	
Marketing time	October	
Marketing period	All the year	
Nature of the product	1.fresh, 2.de-seeded 3.dried, 4.packaged 5.manufactured	
Price value/ Kg	Dollar	3-5
Consumption		
Consumption stage	Khalal, Soft, Semi-dry	
Fruit humidity	%	Khalal 45-55 Soft 30-40 Semi-dry 22-24

D. Current Agro-production map

Total Area, Yield and Production for Khalas cultivar (Average 5Y) (2016-2020)

Governorates	**Khalas**			
	Production	**Yield**	**F. Palm**	**Area**
	(Ton)	**(K. G.\ Palm)**	**(Palm)**	**(Fed.)**
Luxor	129	54.55	2365	43
Aswan	150	54.55	2750	50
New Valley	156	54.55	2860	52
Total	435	54.55	78075	145

Source: measurements of the team in the cultivation area.

E. Agro-climate map

Excellent quality degree

Regarding the "excellent" quality degree of the Khalas cultivars, the optimum heat units range between 2750° C and 3150° C and the relative humidity of 17-25% during the period of flowering, growth and ripening of fruits from April to October. The most suitable areas (Early harvest) for the cultivation of the Khalas cultivars in Egypt (Map), are represented in the following areas:

- The far south of New Valley Governorate at the south border of Egypt including Owainat and Toshka areas and extends northward through Paris and Kharga Oases. The area extends from Kharga Oasis to Mutte district of Dakhla Oasis.
- The area of far east of the New Valley Governorate adjacent to south-west of Qena Governorate, west of Luxor Governorate and north west of Aswan Governorate.
- Most areas of Aswan Governorate.'
- West and south of Luxor Governorate.
- Limited area locates south of Qena Governorate.
- The area of east desert of Red Sea Governorate locates east of Luxor and Aswan Governorates.

Very good quality degree

Regarding the “very good” quality degree of the Khalas cultivars, the optimum heat units range between 2600° C and 2751° C and the relative humidity of 26-28% during the period of flowering, growth and ripening of fruits from April to October. The most suitable areas (Intermediate harvest) for the cultivation of the Khalas cultivars in Egypt (Map 5-102) are represented in the following areas:

- Areas of reclamation in south Sohag Governorate.
- Desert areas of Qena Governorate.
- Limited area locates in North of Luxor Governorate.
- Limited areas locate in the east of New Valley Governorate adjacent to Sohag and Qena Governorates.
- The area of eastern desert in the Red Sea Governorate locates east of Sohag, Qena, Luxor and Aswan Governorates.

Good quality degree

Regarding the “good” quality degree of the Khalas cultivars, the optimum heat units range between 2500° C and 2599° C and the relative humidity of 31-29% during the period of flowering, growth and ripening of fruits from April to October. The most suitable areas (Late harvest) for the cultivation of the Khalas cultivars in Egypt (Map 5-103) are represented in the following areas:

- Areas of eastern desert of Red Sea Governorate locate east of Sohag, Qena and Aswan Governorates.
- Limited areas locate in Sohag Governorate.
- Limited area locates east of Manfalout district in Assuit Governorate.

Aggregate agricultural areas

Referring to the climatic analyzes and the needs of the fruits for the different quality levels, and comparing the heat and moisture needs of the Khalas cultivar during the period of flowering, growth and ripening of the fruits from April to October with the heat units recorded for the same period in the Governorates, it was possible to determine the agricultural areas suitable for production Khalas cultivar in Egypt (Map 5-104) is as follows:

- The cultivation in the south latitude of 27° and extends to the south border of Egypt at latitude of 22°. The cultivation extends eastward from the longitude 27.3°.
- Taking into account the agricultural production standards that are concerned with good agricultural practices and the requirements for different agricultural activities inside the farm, the required quality can be obtained in the specified

Excellent quality degree

Map 5- 101: Spatial distribution of Khalas cultivar "Excellent Quality" Optimum temperature unites between 2700-3150°C and relative humidity of 17-25%

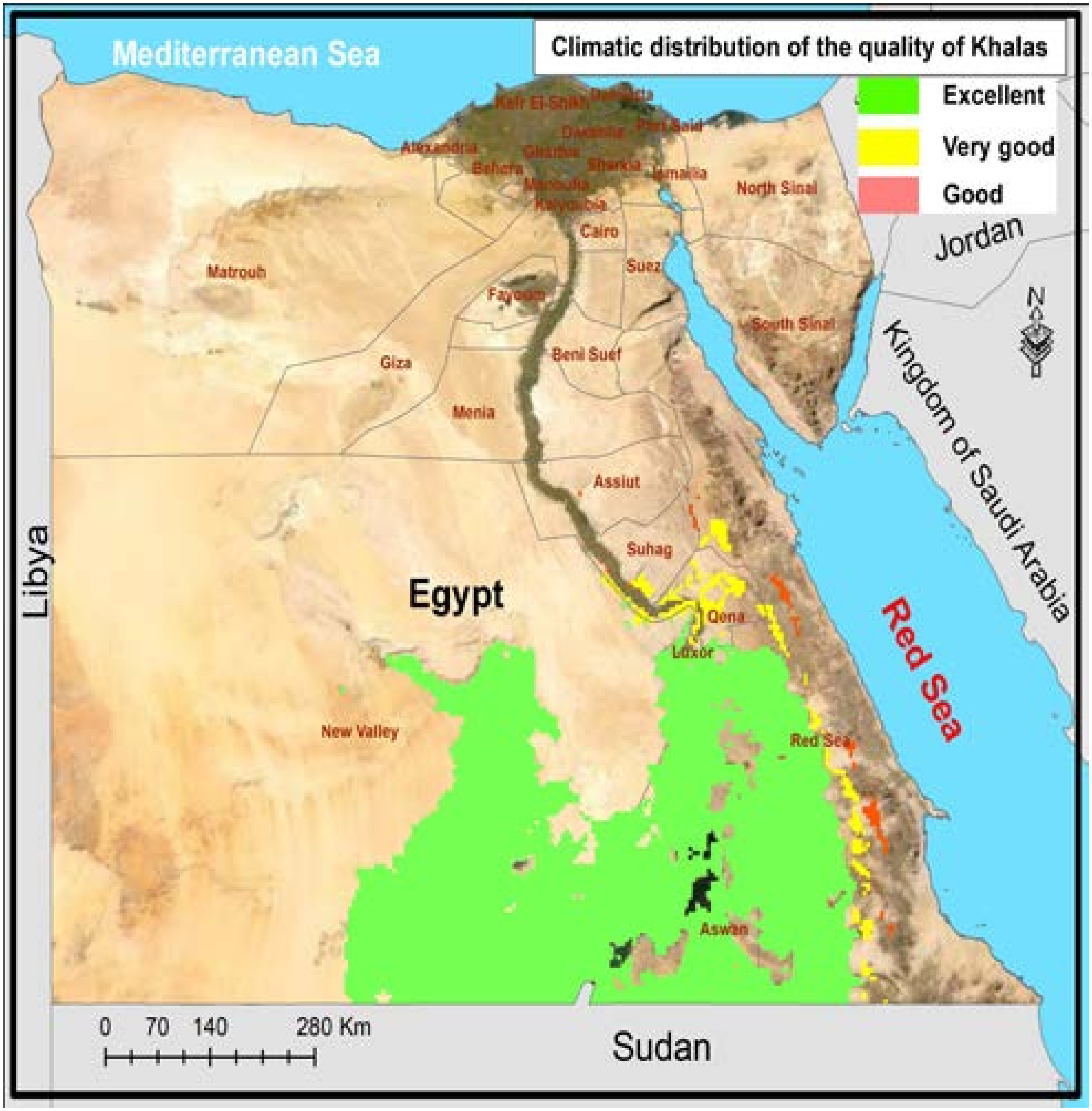
Very good quality degree

Map 5- 102: Spatial distribution of Khalas cultivar “Very good Quality” Optimum temperature unites between 2600-2751°C and relative humidity of 26-28%

Good quality degree

Map 5- 103: Spatial distribution of Khalas cultivar "Good Quality" Optimum temperature unites between 2500-2599°C and relative humidity of 29-31%

Aggregate agricultural areas



Map 5- 104: Spatial distribution of Khalas cultivar “three grade quality”

Chapter 6

Climatic map of areas

for the future expansion

# of date palm Cultivation in Egypt

6.1

The current map of the cultivation of date palm in Egypt

Egypt is characterized by the different climatic factors of an arid, semi-arid, very arid and Mediterranean climate. The consequent variation of temperature and humidity are the most influential and effective factors determining the date palm cultivars suitable for the geographical and climatic areas that can achieve high-quality production. Date palm need specific thermal needs (heat units) and average relative humidity during the growing and fruiting seasons. The amount of heat units and average relative humidity needed varies according to the different cultivars and types of fruits in order to give a production that conforms to the quality specifications. In Egypt, there are large numbers of cultivars of date spread throughout the Arab Republic of Egypt from north to south and from east to west.

The current work contains 26 date cultivars grown in the Arab Republic of Egypt, which differ in thermal units and relative humidity requirements.

Date palm cultivars can be compatible with areas all over Egypt, as Egypt contains 27 governorates with varying climatic factors (Tables 6-1: 6-7).

Table 6-1: Climatic factors for the New Valley Governorate (5 year average from 2017-2021).

Month	Max. Temp.	Min. Temp.	Wind speed	Vapor pressure deficit	vapor pressure	Relative humidity	Solar radiation	Potential evapo-transpiration
	°C	°C	(M/S)	(kPa)	(kPa)	(%)	(W/m2)	(mm/Month)
Jan	20.67	4.79	2.93	1.01	0.64	38.86	184.5	101.92
Feb	23.51	6.70	3.16	1.34	0.65	32.51	219.4	118.19
Mar	28.35	10.84	3.69	1.96	0.69	26.05	258.3	182.99
Apr	32.76	14.56	3.64	2.66	0.71	21.00	282	215.98
May	38.20	20.27	3.61	3.79	0.83	17.97	300.3	260.18
Jun	40.35	22.72	3.46	4.18	1.02	19.61	315.9	265.80
Jul	40.24	23.93	2.86	4.21	1.12	20.97	314.5	254.33
Aug	40.39	24.17	2.81	4.12	1.18	22.32	302.5	244.59
Sep	37.01	21.40	3.45	3.31	1.18	26.30	270	225.75
Oct	33.30	17.52	3.06	2.57	1.04	28.87	234.2	183.26
Nov	27.25	11.57	2.39	1.63	0.90	35.74	198.3	119.65
Dec	22.94	7.41	2.76	1.11	0.80	41.94	175.1	103.30
Mean	**32.08**	**15.49**	**3.15**	**2.66**	**0.90**	**27.68**	**254.6**	**189.66**
Maximum	**40.39**	**24.17**	**3.69**	**4.21**	**1.18**	**41.94**	**315.9**	**265.80**
Minimum	**20.67**	**4.79**	**2.39**	**1.01**	**0.64**	**17.97**	**175.1**	**101.92**

Table 6-2: Climatic factors for the Aswan Governorate (5-year average from 2017-2021).

Month	Max. Temp.	Min. Temp.	Wind speed	Vapor pressure deficit	vapor pressure	Relative humidity	Solar radiation	Potential evapo-transpiration
	°C	°C	(M/S)	(kPa)	(kPa)	(%)	(W/m2)	(mm/Month)
Jan	23.89	9.71	3.29	1.33	0.75	36.07	188.6	125.22
Feb	26.31	10.88	3.67	1.71	0.70	28.95	222.6	143.23
Mar	30.73	14.86	3.56	2.42	0.70	22.49	261.4	199.99
Apr	35.40	18.65	3.90	3.26	0.73	18.29	289.1	243.41
May	40.34	24.17	3.18	4.51	0.85	15.88	302.9	260.79
Jun	42.74	26.18	3.28	5.02	0.97	16.22	311.7	273.28
Jul	42.35	27.26	2.87	4.96	1.13	18.51	307.5	264.91
Aug	42.60	27.35	2.92	4.81	1.28	20.98	291.7	258.62
Sep	40.89	25.53	3.35	4.44	1.20	21.21	267.5	244.46
Oct	37.11	22.25	2.92	3.43	1.14	24.96	235.4	200.47
Nov	30.60	15.94	2.86	2.05	1.06	34.02	199.9	146.23
Dec	26.00	12.34	3.06	1.45	0.96	39.71	179.9	123.98
Mean	**34.91**	**19.59**	**3.24**	**3.28**	**0.95**	**24.77**	**254.8**	**207.05**
Maximum	**42.74**	**27.35**	**3.90**	**5.02**	**1.28**	**39.71**	**311.7**	**273.28**
Minimum	**23.89**	**9.71**	**2.86**	**1.33**	**0.70**	**15.88**	**179.9**	**123.98**

Table 6-3: Climatic factors for the Luxor Governorate (5-year average from 2017-2021).

Month	Max. Temp.	Min. Temp.	Wind speed	Vapor pressure deficit	vapor pressure	Relative humidity	Solar radiation	Potential evapo-transpiration
	°C	°C	(M/S)	(kPa)	(kPa)	(%)	(W/m2)	(mm/Month)
Jan	22.67	6.79	2.89	1.12	0.75	40.15	176.5	105.19
Feb	25.75	8.74	2.92	1.52	0.74	32.92	214.9	119.96
Mar	30.17	12.83	3.20	2.17	0.77	26.18	254.2	180.16
Apr	34.86	16.95	3.68	2.94	0.83	22.08	285.1	227.45
May	40.19	22.86	3.15	4.21	0.96	18.57	303.1	255.84
Jun	42.09	24.39	3.20	4.48	1.15	20.42	318.9	267.64
Jul	41.74	25.19	2.86	4.39	1.34	23.45	312.1	260.81
Aug	42.02	25.60	2.94	4.34	1.42	24.66	299.5	255.34
Sep	39.65	23.54	3.13	3.75	1.41	27.29	267.8	225.09
Oct	36.26	20.14	2.65	3.00	1.25	29.37	228.2	179.98
Nov	30.18	13.79	2.27	1.85	1.08	36.88	190	122.93
Dec	25.42	9.31	2.52	1.26	0.94	42.79	169.3	103.54
Mean	**34.25**	**17.51**	**2.95**	**2.92**	**1.05**	**28.73**	**251.6**	**191.99**
Maximum	**42.09**	**25.60**	**3.68**	**4.48**	**1.42**	**42.79**	**318.9**	**267.64**
Minimum	**22.67**	**6.79**	**2.27**	**1.12**	**0.74**	**18.57**	**169.3**	**103.54**

Table 6-4: Climatic factors for the Qena Governorate (5-year average from 2017-2021).

Month	Max. Temp.	Min. Temp.	Wind speed	Vapor pressure deficit	vapor pressure	Relative humidity	Solar radiation	Potential evapo-transpiration
	°C	°C	(M/S)	(kPa)	(kPa)	(%)	(W/m2)	(mm/Month)
Jan	21.84	7.03	2.84	1.05	0.76	42.00	171.8	99.79
Feb	24.78	8.99	2.80	1.41	0.77	35.44	210.6	112.60
Mar	29.09	13.04	3.28	2.01	0.82	28.91	250.3	174.81
Apr	33.40	16.93	3.53	2.65	0.91	25.57	282.3	214.10
May	38.77	22.99	3.14	3.86	1.05	21.34	300.9	248.52
Jun	40.56	24.72	3.26	4.07	1.28	23.93	318.7	262.79
Jul	40.72	25.89	2.96	4.10	1.49	26.62	311	259.17
Aug	40.82	26.23	3.04	4.02	1.55	27.88	298.9	253.47
Sep	38.43	24.41	3.28	3.47	1.53	30.63	265.8	222.66
Oct	34.64	20.62	2.68	2.70	1.32	32.87	224.3	173.23
Nov	28.93	14.12	2.30	1.71	1.10	39.23	185.1	117.51
Dec	24.49	9.57	2.42	1.18	0.95	44.71	164.5	96.87
Mean	**33.04**	**17.88**	**2.96**	**2.68**	**1.13**	**31.59**	**248.7**	**186.29**
Maximum	**40.82**	**26.23**	**3.53**	**4.10**	**1.55**	**44.71**	**318.7**	**262.79**
Minimum	**21.84**	**7.03**	**2.30**	**1.05**	**0.76**	**21.34**	**164.5**	**96.87**

Table 6-5: Climatic factors for the Suhag Governorate (5-year average from 2017-2021).

Month	Max. Temp.	Min. Temp.	Wind speed	Vapor pressure deficit	vapor pressure	Relative humidity	Solar radiation	Potential evapo-transpiration
	°C	°C	(M/S)	(kPa)	(kPa)	(%)	(W/m2)	(mm/Month)
Jan	20.84	5.39	2.74	0.96	0.72	42.90	171.6	93.34
Feb	23.53	7.08	2.73	1.26	0.74	36.94	211.1	105.72
Mar	27.97	10.81	3.39	1.80	0.79	30.48	250.1	168.86
Apr	32.37	14.57	3.57	2.40	0.87	26.69	280.9	206.48
May	37.93	21.14	3.36	3.62	1.00	21.61	302	249.63
Jun	39.58	23.04	3.27	3.76	1.25	24.91	321.6	257.40
Jul	39.47	24.05	2.88	3.71	1.45	28.16	314.9	249.94
Aug	39.36	24.08	2.80	3.57	1.51	29.70	301.7	237.59
Sep	36.39	22.58	3.41	2.94	1.50	33.82	266.4	213.45
Oct	32.62	18.99	2.66	2.36	1.25	34.55	225.2	163.42
Nov	27.43	12.37	2.24	1.52	1.04	40.66	184.8	109.88
Dec	23.26	8.02	2.26	1.06	0.89	45.83	164	89.26
Mean	**31.73**	**16.01**	**2.94**	**2.41**	**1.08**	**33.02**	**249.5**	**178.75**
Maximum	**39.58**	**24.08**	**3.57**	**3.76**	**1.51**	**45.83**	**321.6**	**257.40**
Minimum	**20.84**	**5.39**	**2.24**	**0.96**	**0.72**	**21.61**	**164**	**89.26**

Table 6-6: Climatic factors for the Assiut Governorate (5-year average from 2017-2021).

Month	Max. Temp.	Min. Temp.	Wind speed	Vapor pressure deficit	vapor pressure	Relative humidity	Solar radiation	Potential evapo-transpiration
	°C	°C	(M/S)	(kPa)	(kPa)	(%)	(W/m2)	(mm/Month)
Jan	19.59	5.04	2.55	0.85	0.72	45.88	168.1	84.53
Feb	22.22	6.59	2.54	1.12	0.75	39.86	206.2	96.52
Mar	26.75	10.28	3.40	1.64	0.81	33.11	247.9	160.73
Apr	31.03	13.75	3.53	2.16	0.89	29.19	279.5	197.09
May	36.35	20.00	3.41	3.24	1.02	23.86	301.3	242.33
Jun	37.97	22.22	3.24	3.36	1.29	27.83	322.1	247.43
Jul	38.18	23.51	2.79	3.35	1.52	31.22	315.8	240.27
Aug	37.90	23.44	2.61	3.19	1.57	32.95	300.7	224.02
Sep	35.07	21.79	3.42	2.60	1.56	37.50	264.4	203.86
Oct	31.41	18.30	2.64	2.12	1.28	37.64	223.6	155.90
Nov	26.11	11.93	2.03	1.36	1.05	43.71	180.8	155.90
Dec	21.92	7.72	2.12	0.94	0.89	48.75	159.4	81.03
Mean	**30.37**	**15.38**	**2.86**	**2.16**	**1.11**	**35.96**	**247.5**	**169.44**
Maximum	**38.18**	**23.51**	**3.53**	**3.36**	**1.57**	**48.75**	**322.1**	**247.43**
Minimum	**19.59**	**5.04**	**2.03**	**0.85**	**0.72**	**23.86**	**159.4**	**81.03**

Table 6-7: Climatic factors for the Menia Governorate (5-year average from 2017-2021).

Month	Max. Temp.	Min. Temp.	Wind speed	Vapor pressure deficit	vapor pressure	Relative humidity	Solar radiation	Potential evapo-transpiration
	°C	°C	(M/S)	(kPa)	(kPa)	(%)	(W/m2)	(mm/Month)
Jan	19.79	4.09	2.68	0.78	0.78	49.88	167.5	82.14
Feb	22.34	5.91	2.54	1.04	0.80	43.62	201.3	92.50
Mar	26.82	9.72	3.41	1.56	0.88	36.09	246.2	156.61
Apr	31.12	12.88	3.30	2.07	0.95	31.39	278.1	189.20
May	36.36	19.05	3.49	3.10	1.09	26.06	303.1	242.34
Jun	38.06	21.32	3.27	3.19	1.41	30.68	323.4	245.92
Jul	38.54	22.71	2.65	3.20	1.66	34.10	318.5	235.81
Aug	38.44	23.04	2.39	3.11	1.71	35.47	301.8	217.94
Sep	35.49	20.87	3.31	2.48	1.68	40.34	264.1	199.40
Oct	32.06	17.10	2.50	2.01	1.40	41.03	224.1	150.73
Nov	26.45	11.64	1.80	1.30	1.14	46.71	179.1	92.93
Dec	22.00	7.15	2.13	0.86	0.95	52.49	155.7	77.63
Mean	**30.62**	**14.62**	**2.79**	**2.06**	**1.20**	**38.99**	**246.9**	**165.26**
Maximum	**38.54**	**23.04**	**3.49**	**3.20**	**1.71**	**52.49**	**323.4**	**245.92**
Minimum	**19.79**	**4.09**	**1.80**	**0.78**	**0.78**	**26.06**	**155.7**	**77.63**

Table 6-8: Climatic factors for the Beni Suef Governorate (5-year average from 2017-2021).

Month	Max. Temp.	Min. Temp.	Wind speed	Vapor pressure deficit	vapor pressure	Relative humidity	Solar radiation	Potential evapo-transpiration
	°C	°C	(M/S)	(kPa)	(kPa)	(%)	(W/m2)	(mm/Month)
Jan	19.48	4.79	2.71	0.74	0.81	52.18	163	79.25
Feb	21.95	6.42	2.40	0.97	0.85	46.76	195.6	86.91
Mar	26.07	9.99	3.30	1.42	0.93	39.63	240.1	147.67
Apr	30.19	12.89	3.25	1.87	1.02	35.22	276.5	180.80
May	35.74	18.92	3.41	2.89	1.17	28.83	300.3	233.99
Jun	37.46	20.97	3.24	2.91	1.55	34.77	321.4	238.25
Jul	38.09	22.55	2.71	2.92	1.83	38.48	316.8	232.13
Aug	38.05	22.83	2.40	2.85	1.88	39.77	299	213.38
Sep	35.42	20.89	3.30	2.34	1.80	43.44	261.2	194.43
Oct	31.96	17.30	2.50	1.92	1.49	43.73	221.3	147.19
Nov	26.28	12.26	1.77	1.26	1.19	48.72	175.1	89.78
Dec	21.63	7.74	2.08	0.82	0.99	54.56	150.9	73.82
Mean	**30.19**	**14.80**	**2.75**	**1.91**	**1.29**	**42.18**	**243.4**	**159.80**
Maximum	**38.09**	**22.83**	**3.41**	**2.92**	**1.88**	**54.56**	**321.4**	**238.25**
Minimum	**19.48**	**4.79**	**1.77**	**0.74**	**0.81**	**28.83**	**150.9**	**73.82**

Table 6-9: Climatic factors for the Fayoum Governorate (5-year average from 2017-2021).

Month	Max. Temp. °C	Min. Temp. °C	Wind speed (M/S)	Vapor pressure deficit (kPa)	vapor pressure (kPa)	Relative humidity (%)	Solar radiation (W/m2)	Potential evapo-transpiration (mm/Month)
Jan	20.05	5.69	2.93	0.74	0.89	54.71	160.6	80.69
Feb	22.33	7.23	2.58	0.93	0.93	49.81	190.3	87.41
Mar	26.13	10.54	3.48	1.36	1.01	42.65	237.5	147.22
Apr	30.37	13.20	3.37	1.82	1.09	37.46	275.8	181.47
May	35.59	18.98	3.43	2.77	1.27	31.36	299.1	231.81
Jun	37.36	20.96	3.26	2.76	1.68	37.88	319.7	235.26
Jul	38.16	22.90	2.67	2.78	1.98	41.60	315.8	229.23
Aug	38.18	23.15	2.37	2.70	2.07	43.37	297.4	211.03
Sep	35.63	21.16	3.22	2.27	1.92	45.87	259.5	191.01
Oct	32.15	17.44	2.70	1.82	1.61	46.91	218.9	148.71
Nov	26.85	13.12	1.92	1.25	1.31	51.23	171.7	90.94
Dec	22.23	8.51	2.20	0.82	1.08	56.85	146.9	73.96
Mean	**30.42**	**15.24**	**2.84**	**1.84**	**1.40**	**44.97**	**241.1**	**159.06**
Maximum	**38.18**	**23.15**	**3.48**	**2.78**	**2.07**	**56.85**	**319.7**	**235.26**
Minimum	**20.05**	**5.69**	**1.92**	**0.74**	**0.89**	**31.36**	**146.9**	**73.96**

Table 6-10: Climatic factors for the Giza Governorate (5-year average from 2017-2021).

Month	Max. Temp. °C	Min. Temp. °C	Wind speed (M/S)	Vapor pressure deficit (kPa)	vapor pressure (kPa)	Relative humidity (%)	Solar radiation (W/m2)	Potential evapo-transpiration (mm/Month)
Jan	18.89	4.76	2.88	0.72	0.80	52.48	163.7	80.01
Feb	21.48	6.62	2.61	0.97	0.83	46.13	194.9	88.78
Mar	25.44	9.85	3.49	1.40	0.91	39.28	242	148.64
Apr	29.69	12.37	3.17	1.87	0.95	33.69	276.3	178.19
May	34.92	18.35	3.55	2.80	1.11	28.41	301.2	234.19
Jun	36.87	20.50	3.26	2.90	1.43	33.07	320.7	230.87
Jul	37.69	22.25	2.68	2.97	1.68	36.05	317.8	230.87
Aug	37.61	22.64	2.44	2.89	1.73	37.51	301.4	214.72
Sep	34.94	20.32	3.16	2.36	1.67	41.47	262.8	192.17
Oct	31.36	16.79	2.55	1.88	1.42	42.98	221.2	146.47
Nov	25.92	12.15	1.87	1.25	1.17	48.34	175.9	90.87
Dec	21.55	7.61	2.26	0.83	0.97	54.04	150	75.99
Mean	**29.70**	**14.52**	**2.83**	**1.90**	**1.22**	**41.12**	**244**	**159.82**
Maximum	**37.69**	**22.64**	**3.55**	**2.97**	**1.73**	**54.04**	**320.7**	**236.94**
Minimum	**18.89**	**4.76**	**1.87**	**0.72**	**0.80**	**28.41**	**150**	**75.99**

Table 6-11: Climatic factors for the Matrouh Governorate (5-year average from 2017-2021).

Month	Max. Temp.	Min. Temp.	Wind speed	Vapor pressure deficit	vapor pressure	Relative humidity	Solar radiation	Potential evapo-transpiration
	°C	°C	(M/S)	(kPa)	(kPa)	(%)	(W/m2)	(mm/Month)
Jan	18.46	5.53	3.30	0.69	0.83	54.57	153.4	79.14
Feb	20.81	7.29	2.80	0.90	0.88	49.28	184.7	85.49
Mar	23.90	9.87	3.81	1.23	0.95	43.45	235	140.43
Apr	27.20	12.36	3.27	1.58	0.99	38.42	269.4	164.33
May	31.75	17.74	3.67	2.22	1.19	34.90	296.7	214.69
Jun	34.39	20.15	3.42	2.42	1.54	38.90	318	222.51
Jul	35.53	22.45	3.23	2.58	1.75	40.51	321.2	231.23
Aug	35.75	22.75	2.87	2.54	1.82	41.78	304.6	215.19
Sep	33.34	20.48	3.20	2.10	1.71	44.95	262	183.05
Oct	30.19	16.59	2.79	1.66	1.47	47.05	211	140.58
Nov	25.29	12.32	2.20	1.17	1.19	50.53	166.6	90.06
Dec	21.08	8.02	2.63	0.79	0.99	55.72	137.9	75.57
Mean	**28.14**	**14.63**	**3.10**	**1.66**	**1.28**	**45.00**	**238.4**	**153.52**
Maximum	**35.75**	**22.75**	**3.81**	**2.58**	**1.82**	**55.72**	**321.2**	**231.23**
Minimum	**18.46**	**5.53**	**2.20**	**0.69**	**0.83**	**34.90**	**137.9**	**75.57**

Table 6-12: Climatic factors for the Behera Governorate (5-year average from 2017-2021).

Month	Max. Temp.	Min. Temp.	Wind speed	Vapor pressure deficit	vapor pressure	Relative humidity	Solar radiation	Potential evapo-transpiration
	°C	°C	(M/S)	(kPa)	(kPa)	(%)	(W/m2)	(mm/Month)
Jan	19.34	8.09	3.34	0.68	0.99	59.42	146.7	77.24
Feb	20.60	9.00	2.46	0.75	1.04	58.13	175.8	75.81
Mar	23.38	10.96	3.44	0.97	1.15	54.05	226.2	123.48
Apr	26.90	12.81	3.01	1.27	1.24	49.46	267.2	150.18
May	31.97	18.40	3.19	1.96	1.50	43.33	294.5	198.23
Jun	33.91	20.79	2.90	1.92	1.98	50.71	314	200.96
Jul	34.71	22.86	2.68	1.85	2.32	55.59	311.6	203.73
Aug	35.18	22.92	2.49	1.85	2.39	56.37	294.7	192.76
Sep	33.29	21.71	2.74	1.78	2.10	54.12	255.6	165.50
Oct	30.78	18.33	2.57	1.52	1.80	54.17	210.2	133.31
Nov	26.27	14.93	2.02	1.13	1.46	56.44	160.8	85.43
Dec	21.97	10.66	2.40	0.78	1.19	60.25	131	70.27
Mean	**28.19**	**15.95**	**2.77**	**1.37**	**1.60**	**54.34**	**232.4**	**139.74**
Maximum	**35.18**	**22.92**	**3.44**	**1.96**	**2.39**	**60.25**	**314**	**203.73**
Minimum	**19.34**	**8.09**	**2.02**	**0.68**	**0.99**	**43.33**	**131**	**70.27**

Table 6-13: Climatic factors for the Alexandria Governorate (5-year average from 2017-2021).

Month	Max. Temp.	Min. Temp.	Wind speed	Vapor pressure deficit	vapor pressure	Relative humidity	Solar radiation	Potential evapo-transpiration
	°C	°C	(M/S)	(kPa)	(kPa)	(%)	(W/m2)	(mm/Month)
Jan	18.88	8.91	4.22	0.63	1.03	62.09	141.1	80.15
Feb	20.27	10.37	2.94	0.72	1.09	60.23	172.2	77.90
Mar	22.50	12.12	3.82	0.87	1.21	58.03	223.9	121.24
Apr	25.53	13.35	3.44	1.05	1.32	55.70	267.2	145.50
May	29.06	18.30	3.48	1.39	1.65	54.17	294.2	181.43
Jun	31.46	20.93	3.20	1.41	2.13	60.17	314.4	187.14
Jul	32.61	23.54	3.20	1.42	2.48	63.49	313.3	197.01
Aug	33.64	23.54	2.98	1.50	2.54	62.94	298.3	190.76
Sep	31.60	22.82	3.26	1.52	2.21	59.27	258.5	164.98
Oct	30.15	19.07	2.98	1.39	1.89	57.66	208.5	133.69
Nov	25.87	15.58	2.71	1.04	1.53	59.51	157.3	90.51
Dec	21.58	11.43	3.35	0.73	1.23	62.82	125.2	76.22
Mean	**26.93**	**16.66**	**3.30**	**1.14**	**1.69**	**59.67**	**231.2**	**137.21**
Maximum	**33.64**	**23.54**	**4.22**	**1.52**	**2.54**	**63.49**	**314.4**	**197.01**
Minimum	**18.88**	**8.91**	**2.71**	**0.63**	**1.03**	**54.17**	**125.2**	**76.22**

Table 6-14: Climatic factors for the Kafr El-Shikh Governorate (5-year average from 2017-2021).

Month	Max. Temp.	Min. Temp.	Wind speed	Vapor pressure deficit	vapor pressure	Relative humidity	Solar radiation	Potential evapo-transpiration
	°C	°C	(M/S)	(kPa)	(kPa)	(%)	(W/m2)	(mm/Month)
Jan	18.01	8.20	3.60	0.51	1.09	68.28	14.3	66.81
Feb	19.48	9.16	2.61	0.58	1.13	66.25	17	68.27
Mar	22.17	11.22	3.53	0.77	1.24	61.80	22.3	112.35
Apr	25.48	13.35	2.85	1.04	1.36	56.51	26.3	136.39
May	30.59	18.24	3.22	1.60	1.68	51.27	29.2	183.56
Jun	31.73	20.44	2.89	1.39	2.19	61.23	31	181.55
Jul	33.22	22.80	2.75	1.39	2.58	65.05	30.9	189.82
Aug	33.64	23.09	2.59	1.43	2.63	64.80	29.5	182.32
Sep	32.47	22.04	2.71	1.53	2.28	59.85	25.6	157.21
Oct	29.64	19.17	2.48	1.30	1.96	60.18	20.9	123.47
Nov	25.39	15.52	2.05	0.95	1.60	62.62	15.9	79.82
Dec	20.83	11.02	2.49	0.63	1.27	66.80	12.7	63.31
Mean	**26.89**	**16.19**	**2.81**	**1.09**	**1.75**	**62.05**	**23**	**128.74**
Maximum	**33.64**	**23.09**	**3.60**	**1.60**	**2.63**	**68.28**	**31**	**189.82**
Minimum	**18.01**	**8.20**	**2.05**	**0.51**	**1.09**	**51.27**	**12.7**	**63.31**

Table 6-15: Climatic factors for the Dakahlia Governorate (5-year average from 2017-2021).

Month	Max. Temp.	Min. Temp.	Wind speed	Vapor pressure deficit	vapor pressure	Relative humidity	Solar radiation	Potential evapo-transpiration
	°C	°C	(M/S)	(kPa)	(kPa)	(%)	(W/m2)	(mm/Month)
Jan	17.77	7.47	3.34	0.49	1.05	68.27	146.1	65.30
Feb	19.51	8.72	2.70	0.57	1.10	65.62	173.3	70.07
Mar	22.37	10.99	3.00	0.79	1.19	59.96	221.5	111.30
Apr	25.60	13.09	2.71	1.06	1.29	54.79	261.9	137.39
May	31.40	17.98	3.10	1.76	1.57	47.05	292	189.26
Jun	32.53	20.28	2.96	1.55	2.07	57.19	312.5	190.33
Jul	33.31	22.96	2.79	1.48	2.46	62.44	310.2	194.52
Aug	33.60	22.80	2.66	1.45	2.53	63.46	294.3	184.04
Sep	32.06	21.12	2.66	1.43	2.22	60.82	255.3	154.31
Oct	29.42	19.25	2.41	1.31	1.91	59.29	210.4	123.37
Nov	25.16	15.54	2.05	0.96	1.55	61.78	160.1	80.82
Dec	20.54	10.49	2.65	0.63	1.22	65.89	129.6	65.24
Mean	**26.94**	**15.89**	**2.75**	**1.13**	**1.68**	**60.55**	**230.6**	**130.50**
Maximum	**33.60**	**22.96**	**3.34**	**1.76**	**2.53**	**68.27**	**312.5**	**194.52**
Minimum	**17.77**	**7.47**	**2.05**	**0.49**	**1.05**	**47.05**	**129.6**	**65.24**

Table 6-16: Climatic factors for the Damietta Governorate (5-year average from 2017-2021).

Month	Max. Temp.	Min. Temp.	Wind speed	Vapor pressure deficit	vapor pressure	Relative humidity	Solar radiation	Potential evapo-transpiration
	°C	°C	(M/S)	(kPa)	(kPa)	(%)	(W/m2)	(mm/Month)
Jan	17.89	9.56	3.94	0.53	1.09	67.32	142.1	71.22
Feb	19.33	10.49	3.07	0.57	1.14	66.87	170.6	72.73
Mar	21.78	12.54	3.38	0.74	1.24	62.52	219.2	112.50
Apr	24.19	14.03	3.10	0.90	1.36	60.17	261.1	134.55
May	29.10	18.52	3.43	1.36	1.68	55.25	292.2	179.58
Jun	30.86	21.20	3.29	1.27	2.18	63.13	311.9	183.46
Jul	32.29	24.16	3.12	1.32	2.58	66.07	310.4	193.00
Aug	32.58	24.22	2.98	1.30	2.65	67.06	295.3	183.76
Sep	31.08	22.56	2.97	1.30	2.32	64.01	255	154.20
Oct	28.74	20.59	2.77	1.24	1.99	61.63	208.4	125.25
Nov	24.94	16.81	2.20	0.94	1.62	63.20	157.4	81.69
Dec	20.65	12.33	3.04	0.67	1.27	65.27	126.5	69.79
Mean	**26.12**	**17.25**	**3.11**	**1.01**	**1.76**	**63.54**	**229.2**	**130.14**
Maximum	**32.58**	**24.22**	**3.94**	**1.36**	**2.65**	**67.32**	**311.9**	**193.00**
Minimum	**17.89**	**9.56**	**2.20**	**0.53**	**1.09**	**55.25**	**126.5**	**69.79**

Table 6-17: Climatic factors for the GharbiaGovernorate (5-year average from 2017-2021).

Month	Max. Temp.	Min. Temp.	Wind speed	Vapor pressure deficit	vapor pressure	Relative humidity	Solar radiation	Potential evapo-transpiration
	°C	°C	(M/S)	(kPa)	(kPa)	(%)	(W/m2)	(mm/Month)
Jan	18.81	5.78	2.93	0.54	1.01	65.23	149.4	66.32
Feb	20.66	7.04	2.45	0.66	1.05	61.40	175.9	72.04
Mar	23.54	9.30	2.88	0.89	1.15	56.25	224.1	114.50
Apr	27.50	11.93	2.51	1.28	1.23	49.13	263.6	143.68
May	33.22	17.15	2.88	2.08	1.47	41.48	292.3	196.31
Jun	34.70	19.54	2.66	1.94	1.97	50.43	311.4	198.01
Jul	35.12	21.21	2.55	1.74	2.35	57.48	308.6	199.13
Aug	35.43	21.15	2.39	1.72	2.41	58.26	292.6	187.77
Sep	33.71	19.73	2.42	1.67	2.12	55.92	255.3	157.89
Oct	30.68	17.11	2.13	1.41	1.82	56.32	211.2	123.34
Nov	25.52	13.77	1.87	0.97	1.49	60.46	162.1	79.28
Dec	21.28	8.87	2.27	0.66	1.19	64.46	132.1	63.44
Mean	**28.35**	**14.38**	**2.50**	**1.30**	**1.61**	**56.40**	**231.5**	**133.48**
Maximum	**35.43**	**21.21**	**2.93**	**2.08**	**2.41**	**65.23**	**311.4**	**199.13**
Minimum	**18.81**	**5.78**	**1.87**	**0.54**	**1.01**	**41.48**	**132.1**	**63.44**

Table 6-18: Climatic factors for the Menoufia Governorate (5-year average from 2017-2021).

Month	Max. Temp.	Min. Temp.	Wind speed	Vapor pressure deficit	vapor pressure	Relative humidity	Solar radiation	Potential evapo-transpiration
	°C	°C	(M/S)	(kPa)	(kPa)	(%)	(W/m2)	(mm/Month)
Jan	19.25	6.36	2.96	0.63	0.97	60.36	15.3	72.82
Feb	21.10	7.45	2.54	0.76	1.01	57.18	18	77.57
Mar	24.54	10.14	3.41	1.08	1.10	50.44	22.7	129.86
Apr	28.68	12.61	3.05	1.50	1.18	44.01	26.6	160.72
May	33.84	17.82	3.08	2.31	1.38	37.37	29.3	207.74
Jun	35.74	19.99	2.96	2.24	1.85	45.21	31.1	211.81
Jul	36.10	21.90	2.58	2.10	2.21	51.25	30.7	208.07
Aug	36.75	22.35	2.39	2.15	2.28	51.39	29	197.13
Sep	34.66	20.67	2.75	1.97	2.03	50.83	25.4	171.28
Oct	31.11	17.08	2.47	1.54	1.74	53.07	21.3	133.74
Nov	25.91	13.69	2.01	1.07	1.42	56.98	16.5	84.65
Dec	21.64	9.05	2.42	0.73	1.15	61.23	13.7	68.93
Mean	**29.11**	**14.93**	**2.72**	**1.51**	**1.53**	**51.61**	**23.3**	**143.69**
Maximum	**36.75**	**22.35**	**3.41**	**2.31**	**2.28**	**61.23**	**31.1**	**211.81**
Minimum	**19.25**	**6.36**	**2.01**	**0.63**	**0.97**	**37.37**	**13.7**	**68.93**

Table 6-19: Climatic factors for the Kalyoubia Governorate (5-year average from 2017-2021).

Month	Max. Temp.	Min. Temp.	Wind speed	Vapor pressure deficit	vapor pressure	Relative humidity	Solar radiation	Potential evapo-transpiration
	°C	°C	(M/S)	(kPa)	(kPa)	(%)	(W/m2)	(mm/Month)
Jan	19.18	7.25	2.98	0.68	0.94	57.90	156.6	76.19
Feb	21.33	8.27	2.64	0.83	0.99	54.21	183.1	82.03
Mar	24.97	11.03	3.48	1.20	1.07	47.21	228.1	136.92
Apr	28.90	13.25	3.06	1.59	1.15	41.92	266.1	164.64
May	34.19	18.46	3.23	2.47	1.32	34.78	290.4	214.98
Jun	36.04	20.55	3.10	2.40	1.79	42.68	307.1	217.44
Jul	36.73	22.86	2.63	2.37	2.13	47.35	302	213.63
Aug	36.78	23.02	2.49	2.30	2.20	48.91	285	200.61
Sep	34.29	20.97	2.94	1.98	2.00	50.23	251.8	174.09
Oct	31.12	17.83	2.42	1.64	1.70	50.92	214.5	135.55
Nov	26.10	14.48	2.12	1.17	1.38	54.06	167.2	89.64
Dec	21.67	9.76	2.43	0.80	1.12	58.26	141.1	72.66
Mean	**29.28**	**15.65**	**2.79**	**1.62**	**1.48**	**49.04**	**232.7**	**148.20**
Maximum	**36.78**	**23.02**	**3.48**	**2.47**	**2.20**	**58.26**	**307.1**	**217.44**
Minimum	**19.18**	**7.25**	**2.12**	**0.68**	**0.94**	**34.78**	**141.1**	**72.66**

Table 6-20: Climatic factors for the Cairo Governorate (5-year average from 2017-2021).

Month	Max. Temp.	Min. Temp.	Wind speed	Vapor pressure deficit	vapor pressure	Relative humidity	Solar radiation	Potential evapo-transpiration
	°C	°C	(M/S)	(kPa)	(kPa)	(%)	(W/m2)	(mm/Month)
Jan	18.26	7.68	2.99	0.72	0.85	54.12	157.1	78.55
Feb	20.60	8.80	2.58	0.89	0.91	50.66	185.9	83.51
Mar	24.27	11.14	3.54	1.24	0.99	44.45	231	139.58
Apr	28.45	13.43	3.20	1.64	1.06	39.37	269.7	169.00
May	34.02	18.65	3.46	2.58	1.21	31.98	291.7	222.70
Jun	35.55	20.56	3.05	2.47	1.65	40.00	308.8	217.80
Jul	36.69	22.74	2.63	2.55	1.95	43.30	303.9	217.15
Aug	36.58	23.04	2.54	2.47	2.00	44.75	286.3	204.59
Sep	34.15	21.55	2.78	2.15	1.85	46.29	251.9	175.08
Oct	30.52	18.21	2.65	1.73	1.56	47.50	217.8	142.56
Nov	25.13	14.13	2.01	1.18	1.25	51.55	169.1	88.68
Dec	20.68	9.90	2.24	0.83	1.01	55.05	144.3	72.06
Mean	**28.74**	**15.82**	**2.81**	**1.70**	**1.36**	**45.75**	**234.8**	**150.94**
Maximum	**36.69**	**23.04**	**3.54**	**2.58**	**2.00**	**55.05**	**308.8**	**222.70**
Minimum	**18.26**	**7.68**	**2.01**	**0.72**	**0.85**	**31.98**	**144.3**	**72.06**

Table 6-21: Climatic factors for the Port Said Governorate (5-year average from 2017-2021).

Month	Max. Temp.	Min. Temp.	Wind speed	Vapor pressure deficit	vapor pressure	Relative humidity	Solar radiation	Potential evapo-transpiration
	°C	°C	(M/S)	(kPa)	(kPa)	(%)	(W/m2)	(mm/Month)
Jan	18.76	10.51	3.74	0.65	1.06	61.78	145.5	79.02
Feb	20.29	11.60	3.11	0.71	1.12	61.38	175.6	80.46
Mar	22.67	13.87	3.95	0.93	1.20	56.46	220.3	127.98
Apr	25.04	15.63	3.70	1.11	1.32	54.48	263.7	151.11
May	29.39	20.10	3.64	1.58	1.63	50.71	293.8	192.01
Jun	31.63	22.41	3.53	1.57	2.11	57.27	314.7	197.82
Jul	33.66	24.95	3.32	1.72	2.48	59.08	310.2	208.31
Aug	33.87	25.22	3.20	1.69	2.56	60.25	294.1	198.77
Sep	32.00	23.67	3.41	1.56	2.29	59.49	256.1	168.71
Oct	29.10	20.93	3.15	1.35	1.96	59.26	210.3	135.04
Nov	25.04	17.25	2.62	1.02	1.56	60.50	160.5	90.23
Dec	21.00	12.87	3.20	0.77	1.23	61.62	130.8	76.53
Mean	**26.87**	**18.25**	**3.38**	**1.22**	**1.71**	**58.52**	**231.3**	**142.16**
Maximum	**33.87**	**25.22**	**3.95**	**1.72**	**2.56**	**61.78**	**314.7**	**208.31**
Minimum	**18.76**	**10.51**	**2.62**	**0.65**	**1.06**	**50.71**	**130.8**	**76.53**

Table 6-22: Climatic factors for the Sharkia Governorate (5-year average from 2017-2021).

Month	Max. Temp.	Min. Temp.	Wind speed	Vapor pressure deficit	vapor pressure	Relative humidity	Solar radiation	Potential evapo-transpiration
	°C	°C	(M/S)	(kPa)	(kPa)	(%)	(W/m2)	(mm/Month)
Jan	18.25	7.45	3.02	0.59	0.98	62.21	151.3	70.59
Feb	20.16	8.61	2.55	0.71	1.03	59.27	178.9	75.15
Mar	23.54	10.96	3.09	1.00	1.10	52.30	224.1	122.55
Apr	27.24	13.35	2.66	1.35	1.18	46.68	263.1	148.91
May	32.90	18.62	3.06	2.21	1.39	38.64	291.4	203.37
Jun	34.50	20.58	2.96	2.06	1.87	47.64	311.6	206.50
Jul	35.21	22.92	2.65	2.00	2.24	52.73	307	206.45
Aug	35.25	22.92	2.59	1.94	2.30	54.34	290.9	195.21
Sep	33.10	21.05	2.79	1.73	2.07	54.55	254.6	164.86
Oct	30.26	18.54	2.25	1.50	1.78	54.27	212.5	127.73
Nov	25.45	15.16	2.00	1.08	1.44	57.17	163.8	84.47
Dec	21.06	10.22	2.47	0.75	1.14	60.40	135.6	69.65
Mean	**28.08**	**15.87**	**2.67**	**1.41**	**1.54**	**53.35**	**232.1**	**139.62**
Maximum	**35.25**	**22.92**	**3.09**	**2.21**	**2.30**	**62.21**	**311.6**	**206.50**
Minimum	**18.25**	**7.45**	**2.00**	**0.59**	**0.98**	**38.64**	**135.6**	**69.65**

Table 6-23: Climatic factors for the Ismailia Governorate (5-year average from 2017-2021).

Month	Max. Temp.	Min. Temp.	Wind speed	Vapor pressure deficit	vapor pressure	Relative humidity	Solar radiation	Potential evapo-transpiration
	°C	°C	(M/S)	(kPa)	(kPa)	(%)	(W/m2)	(mm/Month)
Jan	19.12	8.93	3.37	0.73	0.95	56.61	146.7	81.11
Feb	20.87	10.16	2.61	0.83	1.02	55.13	178.4	80.90
Mar	24.13	12.34	3.33	1.14	1.08	48.67	223.3	131.93
Apr	27.35	14.43	3.10	1.41	1.18	45.53	264.2	158.55
May	32.47	19.18	3.32	2.18	1.39	38.88	293.4	208.86
Jun	34.66	21.07	3.21	2.13	1.86	46.62	315.1	214.27
Jul	36.42	23.62	2.79	2.30	2.20	48.85	309.6	217.87
Aug	36.53	23.94	2.76	2.26	2.26	49.91	293.7	208.77
Sep	34.19	22.49	3.03	1.98	2.08	51.21	255.3	177.04
Oct	30.51	19.33	2.66	1.59	1.77	52.69	213	137.82
Nov	25.61	15.36	2.14	1.13	1.39	55.18	163.8	88.73
Dec	21.40	11.21	2.58	0.85	1.10	56.43	134.5	75.34
Mean	**28.61**	**16.84**	**2.91**	**1.55**	**1.52**	**50.48**	**232.6**	**148.43**
Maximum	**36.53**	**23.94**	**3.37**	**2.30**	**2.26**	**56.61**	**315.1**	**217.87**
Minimum	**19.12**	**8.93**	**2.14**	**0.73**	**0.95**	**38.88**	**134.5**	**75.34**

Table 6-24: Climatic factors for the Suez Governorate (5-year average from 2017-2021).

Month	Max. Temp.	Min. Temp.	Wind speed	Vapor pressure deficit	vapor pressure	Relative humidity	Solar radiation	Potential evapo-transpiration
	°C	°C	(M/S)	(kPa)	(kPa)	(%)	(W/m2)	(mm/Month)
Jan	17.80	6.85	3.37	0.70	0.83	54.37	155.5	80.42
Feb	20.11	8.28	2.96	0.87	0.90	50.88	187.8	85.58
Mar	23.69	10.85	3.83	1.21	0.98	44.66	230.9	140.34
Apr	27.40	13.13	3.64	1.50	1.08	41.71	269.9	169.43
May	32.92	18.43	3.80	2.38	1.26	34.72	294.3	222.41
Jun	34.72	20.26	3.49	2.31	1.67	41.97	314.2	222.20
Jul	36.36	22.74	3.06	2.52	1.95	43.65	309.4	226.22
Aug	36.37	22.97	3.07	2.45	2.01	45.07	292.6	216.60
Sep	33.51	21.16	3.64	2.01	1.90	48.63	255.4	185.81
Oct	29.80	17.66	3.08	1.61	1.58	49.62	216.8	144.73
Nov	24.75	13.51	2.38	1.13	1.24	52.31	169.2	92.79
Dec	20.40	9.42	2.60	0.82	0.99	54.67	144.3	76.48
Mean	**28.15**	**15.44**	**3.24**	**1.63**	**1.37**	**46.85**	**236.7**	**155.25**
Maximum	**36.37**	**22.97**	**3.83**	**2.52**	**2.01**	**54.67**	**314.2**	**226.22**
Minimum	**17.80**	**6.85**	**2.38**	**0.70**	**0.83**	**34.72**	**144.3**	**76.48**

Table 6-25: Climatic factors for the Red Sea Governorate (5-year average from 2017-2021).

Month	Max. Temp.	Min. Temp.	Wind speed	Vapor pressure deficit	vapor pressure	Relative humidity	Solar radiation	Potential evapo-transpiration
	°C	°C	(M/S)	(kPa)	(kPa)	(%)	(W/m2)	(mm/Month)
Jan	22.78	10.69	3.14	1.15	0.90	43.99	174.9	109.83
Feb	24.76	11.78	3.35	1.42	0.86	37.80	209.8	124.05
Mar	27.92	14.73	3.49	1.86	0.91	32.87	250.2	174.46
Apr	31.71	17.87	3.73	2.40	1.01	29.71	281.9	208.44
May	36.36	23.20	3.46	3.34	1.18	26.16	296.3	243.02
Jun	38.73	25.21	3.49	3.72	1.35	26.56	308.7	254.65
Jul	39.16	26.72	3.30	3.82	1.54	28.77	304.5	258.63
Aug	39.21	26.85	3.43	3.63	1.70	31.89	289.5	252.77
Sep	37.61	25.17	3.57	3.38	1.55	31.40	261.8	224.63
Oct	33.74	21.51	3.08	2.51	1.44	36.41	226.3	179.75
Nov	28.55	16.47	2.70	1.65	1.26	43.20	186	125.37
Dec	24.74	12.98	2.85	1.28	1.06	45.24	167.2	108.79
Mean	**32.11**	**19.43**	**3.30**	**2.51**	**1.23**	**34.50**	**246.4**	**188.70**
Maximum	**39.21**	**26.85**	**3.73**	**3.82**	**1.70**	**45.24**	**308.7**	**258.63**
Minimum	**22.78**	**10.69**	**2.70**	**1.15**	**0.86**	**26.16**	**167.2**	**108.79**

Table 6-26: Climatic factors for the North Sinai Governorate (5-year average from 2017-2021).

Month	Max. Temp.	Min. Temp.	Wind speed	Vapor pressure deficit	vapor pressure	Relative humidity	Solar radiation	Potential evapo-transpiration
	°C	°C	(M/S)	(kPa)	(kPa)	(%)	(W/m2)	(mm/Month)
Jan	16.32	7.10	3.40	0.64	0.79	55.22	142.5	75.27
Feb	18.37	8.60	2.84	0.77	0.86	52.78	177.5	78.76
Mar	21.64	11.06	3.68	1.06	0.92	46.58	219.6	128.92
Apr	24.58	13.44	3.39	1.29	0.98	43.28	262.2	155.03
May	29.81	18.01	3.42	2.02	1.16	36.49	295.7	201.93
Jun	32.09	20.17	3.47	2.04	1.53	42.82	318.6	212.74
Jul	34.21	22.95	3.12	2.33	1.80	43.61	314.8	221.63
Aug	34.54	23.04	3.12	2.27	1.88	45.30	297.6	212.41
Sep	32.16	21.57	3.29	1.90	1.82	48.92	253.4	175.42
Oct	28.47	17.82	2.82	1.48	1.53	50.76	205.7	133.58
Nov	23.11	13.14	2.28	1.01	1.15	53.30	159.2	85.93
Dec	18.91	9.41	2.68	0.79	0.91	53.65	133.6	73.41
Mean	**26.18**	**15.53**	**3.13**	**1.47**	**1.28**	**47.73**	**231.7**	**146.25**
Maximum	**34.54**	**23.04**	**3.68**	**2.33**	**1.88**	**55.22**	**318.6**	**221.63**
Minimum	**16.32**	**7.10**	**2.28**	**0.64**	**0.79**	**36.49**	**133.6**	**73.41**

Table 6-27: Climatic factors for the South Sinai Governorate (5-year average from 2017-2021).

Month	Max. Temp.	Min. Temp.	Wind speed	Vapor pressure deficit	vapor pressure	Relative humidity	Solar radiation	Potential evapo-transpiration
	°C	°C	(M/S)	(kPa)	(kPa)	(%)	(W/m2)	(mm/Month)
Jan	16.61	6.51	3.06	0.78	0.67	46.31	152.9	82.07
Feb	18.77	7.63	2.94	0.97	0.71	42.27	189.2	90.12
Mar	22.16	10.75	3.78	1.28	0.78	38.00	227.6	142.82
Apr	25.80	13.69	3.93	1.60	0.86	34.90	265.6	176.57
May	31.28	18.90	3.75	2.45	1.00	29.02	290.2	221.93
Jun	33.25	20.88	3.58	2.55	1.28	33.41	309.2	227.44
Jul	34.76	23.41	3.27	2.82	1.48	34.45	304.9	234.00
Aug	34.92	23.07	3.29	2.68	1.57	36.97	291.6	224.87
Sep	32.64	21.52	3.82	2.31	1.53	39.90	253	196.11
Oct	28.47	17.20	3.26	1.71	1.27	42.56	209.4	150.73
Nov	23.07	12.43	2.53	1.14	0.99	46.44	166	96.76
Dec	19.06	8.69	2.61	0.90	0.79	46.60	144	81.01
Mean	**26.73**	**15.39**	**3.32**	**1.77**	**1.08**	**39.24**	**233.6**	**160.37**
Maximum	**34.92**	**23.41**	**3.93**	**2.82**	**1.57**	**46.60**	**309.2**	**234.00**
Minimum	**16.61**	**6.51**	**2.53**	**0.78**	**0.67**	**29.02**	**144**	**81.01**

6.2

The future map for the cultivation of date palm in Egypt

6.2.1 Area of Toshka & Owainat

Owainat area locates in the southwestern region of the Western Desert, between latitudes 22.00-23.3N and longitudes 27.55-29.3E. It comprises an area of 16,000 km2. The area covers about 230 thousand Feddan for agricultural reclamation. Irrigation is available from the water of a huge underground reservoir that can be exploited within the limits of safety for 100 years. The water salinity rate ranges between 200-700 parts / million.

Toshka area locates at the far southwest of the Nile extending over 8 million Fadden, from which about 3.3-3.4 million are high-quality lands (in case of water reaches). This region is bounded by Toshka overflow at the south and the Paris oasis at the north and extends westward to East Owainat. Toshka area is characterized by the multiplicity of water resources; from Toshka overflow, the Toshka Canal, and the underground reservoir (Shaheen and Abdel Aziz, 1998).

The temperature and humidity are suitable for many international date cultivars, namely:

1. Saidi, Ambara and Agwet El Madinah cultivars: "excellent" and "very good" quality.
2. Sakaai, Sukari and Khalas cultivars: "Excellent" quality.
3. Kedri cultivar: "Very good" quality.

6.2.2 Area of West-West Minya

West-West Minya area is located in the area of agricultural reclamation located in the Western Desert of the Minya Governorate. The West-West Minya area was chosen for the availability of groundwater, the flatness level of the area land, and the presence of a cracked limestone reservoir containing available water. The West-West Minya area contributes to the project of one and a half million acres by 370,000 Feddan in three phases. The first phase includes 80,000 Feddan, the second phase is 140,000 Feddan and the third phase is 150,000 Feddan. The area located between Bani Mazar and Minya districts is allocated for the 1.5 million Feddan project. The project area will be irrigated through wells that digging by the Ministry of Irrigation and water resources.

The temperature and humidity are suitable for many date cultivars, namely:

1. Sewi, Amri, Frehi, Mejhool (Medjool) cultivars: "Excellent" quality.
2. Barhi cultivar: «Very good» quality.
3. Selmi cultivar: "Good" quality.

6.2.3 Area of Farafra Oasis

Farafra Oasis date back to the Pharaonic era. It has been mentioned in several ancient Egyptian documents, especially since the Tenth Dynasty in the twenty-first century BC. It was called "Ta Aht", meaning the land of the cow, and the ancient Egyptians called it this title due to a large number of pastures and cows.

The Farafra Depression lies in the middle of the central plateau and of the Western desert. It extends between latitudes 26.5-27.5 north and longitudes 27-29 east. The length of the depression from north to south is estimated at 150 km, and its maximum width in the south is about 135 km.

Water resources are mainly those of the huge Nubian sandstone aquifer that extends with varied thicknesses under the majority of the area of the Western Desert.

The thickness of the Nubian sandstone layer in the Farafra area reaches 1800 m (Ministry of Environment, 2007).

The temperature and humidity are suitable for many date cultivars, namely:

1. 1. Mejhoul ((Medjool) cultivars: “Excellent”

2. 2. Sewi cultivar and Mejhoul ((Medjool) cultivars: “Very good” quality.

3. 3. Barhi cultivar: “Good cultivar”

6.2.4 Area of Siwa Oasis, Qattara Depression & Moghrah

Siwa and Qara Oases are entirely dependent on groundwater derived from the Nubian Sandstone Aquifer System (NSAS), an extensive artesian system that consists of sandstone deposits spanning early Paleozoic to Cretaceous ages with depths ranging from 2500 to 3000 m (Aql, 1992). The NSAS in Siwa lies beneath fractured Miocene–Eocene sequences which receive recharge from the NSAS complexes below. Salinity varies within the carbonate rocks and ranges from above 1500 ppm in the upper Miocene layers to as low as 200 ppm in the Eocene–Cretaceous beds (Shata, 1982). The Qattara Depression is located in the northern part of the Western Desert of Egypt. The depression extends between the latitudes of 28°35’ and 30°25’ north and the longitudes of 26°20’ and 29°02’ east (El Bassyony, 1995).

The temperature and humidity are suitable for many date cultivars, namely :

1. Amhat, Oreebi, Frahi, Mejhoul (Medjool), Sewi, Barhi cultivars: “Excellent quality.

2. Selmi, Zaghloul, Amhat, Bent Eisha, Oreebi, Amri, Samani, Barhi cultivars: “very good” quality.

3. Selmi, Amhat, Bent Eisha, Oreebi, Amri, Frahi, Sewi, Samani, cultivars: “Good” quality”.

Note: Sewi and Mejhoul (Medjool)) are found in East Mughrah, and not in all its parts.

6.2.5 Area of Wadi El-Natrun & West Beheira governorate

Wadi El Natrun is a depression in the northern of the western desert. Wadi al-Natrun is the common name for a desert valley located west of the Nile Delta, along the El Tahrir district of Beheira governorate. The length of this depression ranges between 55 and 60 km, while its deepest point reaches 24 meters below sea level.

The valley contains several alkaline lakes, salt marshes and freshwater marshes. The Wadi contains 12 lakes, the total surface area of which is 10 km square and their average depth is only 2 m. The color of these lakes is reddish blue because their water is saturated with the Natron salt (Taher, 1999).

The temperature and humidity are suitable for many date cultivars, namely:

1. Selmi, Zaghloul, Bent Eisha, Samani, Oreebi, Amhat, Barhi cultivars: "excellent" quality.

2. Oreebi, Barhi cultivar: "Very good" quality.

6.2.6 Area of reclamation of North Sinai

The reclamation areas in North Sinai start from the "Sahl El-Teena" Teena plain, which is the area between the Mediterranean Sea in the north and the Tih plateau in the south until the areas of Wadi Al-Arish. "Sahl El-Teena" Teena plain area is rich in water resources resulting from the rains whose waters descend from the southern highlands and the plateaus of the central region. Al-Salam Canal is also considered one of the major agricultural land reclamation projects in Egypt, which aims at the agricultural development of Sinai. Al-Salam Canal, east of the Suez Canal, is called Sheikh Jaber Al-Sabah Canal, and it is the main canal for irrigating 400,000 Feddans.

The temperature and humidity are suitable for many date cultivars, namely:

1. Selmi, Zaghloul, Bent Eisha, Hayani, Oreebi, Samani, Barhi cultivars: "Excellent quality.
2. Samani cultivar: "Very good" quality.
3. Amri cultivar: "Good" quality.

6.2.7 Area of reclamation of South Sinai

The agricultural reclamation project of 1.5 million feddans extends to the Governorate of South Sinai in the third phase. A total of 20,000 Feddans were chosen in the Al-Qaa Plain area in Tor Sinai, South Sinai Governorate. Many areas are subjected to agricultural reclamation, such as Tor Sinai, Feran Valley, and Ras Sidr.

The temperature and humidity are suitable for many date cultivars, namely:

1. Frehi, Mejhoul (Medjool), Sewi, Barhi cultivars: “Excellent” quality.
2. Amhat, Amri, and Barhi cultivars: “Very good” quality.
3. Selmi, Zaghloul, Bent Eisha, Oreebi, Samani, Barhi cultivars: “Good” quality.

6.2.8 Area of reclamation of great Cairo

There are many agricultural reclamation areas in Great Cairo (Cairo, Giza, and Qalyubia governorates). It includes Ahmed Orabi Association area, which is located east of Qalyubia Governorate (east of Obour City - the beginning of the Ismailia Desert Road).

The temperature and humidity are suitable for many date cultivars, namely:

1. Amhat, Barhi cultivars: “Excellent” quality.
2. Zaghloul, Bent Eisha, Oreebi, Samani cultivars: “Very good” quality.
3. Zaghloul, Bent Eisha, Oreebi, Samani cultivars: “Good” quality

The summary of this book is to focus on the climatic areas suitable for the most important date palm cultivars in Egypt, which give the most productivity with the highest quality fruits that can compete in the export markets without resorting to the use of additional methods of money, time and effort.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(Arabic);
referring to its origin:
Unknown

MEJHOUL DATES
have slightly different names depending on the country or region of cultivation we use the most popular name:

Mejhoul

مَجْهُولْ

- Mejhol
- Madqul
- Majdoul
- Majhool
- Majhul
- Mashghul
- Mechghoul
- Medjeheul
- Medjool
- Medjoul
- Mejhool
- Mejool

جائزة خليفة الدولية لنخيل التمر والابتكار الزراعي
KHALIFA INTERNATIONAL AWARD FOR DATE PALM AND AGRICULTURAL INNOVATION

AEC
Egyptian Agricultural Export Council

Investment Map

A look at the Arab world production of dates which exceeds 70% of the average of the world production and at the number of planted palm trees which constitute 80% of the total number of palm trees in the world would reveal the importance of the Arab serious work and the thoughtful future vision to maintain and invest in the date palm sector.

In spite of the success of some investments in the date palm sector, yet the focus in these investments and the suggestion of the investment strategic plans at the Arab level are still below the desired level because the traditional methods in producing and marketing are the most prevailing whereas the advanced technologies in food production are still very limited.

In its turn, the General Secretariat of Khalifa International Award for Date Palm and Agricultural Innovation, has sensed the importance of date palm trees and dates in its various research, marketing, manufacturing and productive aspects and the obstacles this sector faces that hinder its benefit in agricultural investments to support the economies of date growing countries.

The emergence of international economic obstacles and the liberation of international trade within the framework of the World Trade Organization (WTO) would lead to the opening of international markets before Arab dates and their derivatives, which will increase the degree of competition, a fact which necessitates the raising of the marketing and productive efficiency, decreasing production cost and increasing the quality of products and adherence to international standards. All this requires the increase of the exerted efforts by the public and private sectors in the various stages of date palm production and marketing.

Hence the importance of the Award's General Secretariat role to support the production of the "Climatic map of the most important commercial dates varieties in the Arab Republic of Egypt" book, to be a witness to the importance of investing in this sector and a guide to the new investor in choosing the best commercial varieties, and the best agricultural areas for growing this or that variety. With the aim of maximizing the benefit and increasing the yield in order to achieve an added value to the quality of Egyptian dates in the local and international markets.

Prof. Dr. Abdelouahhab Zaid