

Chapter Title: INTRODUCTION

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PART ONE

chapter one

INTRODUCTION

Previous works on ancient olive oil and wine production in the ancient Mediterranean (Frankel 1999; Brun 2003b, 2004) and North Africa (Mattingly 1985; 1988a-d; 1993; 1994; 1995; 2009; Mattingly and Hitchner 1993) have broadened our knowledge on specifications, techniques and scale of production of Roman presses. These works discuss how this significantly contributed to the success of the Roman economy and long-distance trade. They also provided important information for larger debates about the overall Roman economy and the most dynamic exporting areas in the ancient Mediterranean. The scale of production and the export of olive oil in the Mediterranean was accompanied by technological developments and regionalised technologies.

Cyrenaica is a critical zone linking the Eastern Mediterranean to the Western Mediterranean and North Africa to the Greek world. An important point of debate concerns the extent to which Cyrenaican data can contribute to our understanding of Mediterranean trade networks and the role it played within these wider trade patterns.

Although a great deal of information is now available on ancient olive oil production in North Africa, Cyrenaican press technology is poorly represented in the literature and has not been fully integrated into our understanding of the pressing technologies employed in Roman Africa. This book examines ancient olive oil production in Cyrenaica during the mid- to late Roman periods. It investigates, for the first time, the archaeological evidence for olive oil production in Cyrenaica in terms of typology, technology and capacity, with an attempt to establish the importance of the industry to the region's economy. The study examines archaeological evidence that was collected during recent fieldwork, with data gathered from some 104 rural sites across a wide geographical area covering about 30,000 km². A further important aim of the research was the attempt to identify typology and characteristics of Cyrenaican pressing elements, and to establish a site typology. In

addition, the scale of production is assessed with reference to local production of amphorae, to address the role Cyrenaican olive oil production played in the economy of North Africa and the Mediterranean.

This book is divided into two parts, with Part I organised into nine chapters. Chapter 1 provides a brief geographical and historical background of the research case study (Cyrenaica). The chapter additionally reviews the most relevant previous studies of the Roman olive oil/wine production in Cyrenaica, starting from early travellers to the most recent studies on the subject. Chapter 2 starts with the main research issues and introduces the research questions and the methods employed in my archaeological field survey. Chapters 3 and 4 investigate the press element typology and distribution patterns of milling and pressing equipment in Cyrenaica. Chapter 5 contains information about characteristics of milling and pressing equipment in Cyrenaica. Chapter 6 outlines the typology of the archaeological sites in Cyrenaica and their distributional patterns. Chapter 7 investigates oil production and provides an estimation of the region's population for assessing the scale of demand for olive oil within Cyrenaica. This examination provides the basis for comparison of Cyrenaican oil production with Tripolitania and other Mediterranean regions. Chapter 8 deals with the evidence of local amphora production (containers for transporting olive oil) and long-distance trade. This chapter identifies the already known local fabrics and types of Cyrenaican amphorae and their intra- and interregional distributions, along with the imported transport vessels. Finally, Chapter 9 presents the most important results with a number of suggestions for further research into the rural economy and settlement in Cyrenaica.

Part II of this book is organised into two appendices: Appendix I contains additional supplementary tables on the different types and measurements of pressing elements gathered during the survey and collected during the field survey. Appendix II presents a gazetteer of the

sites visited during my survey. These are available as a pdf on the BILNAS (formerly Society for Libyan Studies) website, with the Open Access version of the book. Geographical reference to each site and a description of visible remains within it are given, illustrated with figures and plans.

1.1 General Setting

1.1.1 Location

The ancient region of Cyrenaica is located in the north-east region of modern Libya (Figure 1.1). A grasp of the present morphology of the study area is essential to understanding and reconstructing the region's ancient landscape. It is important to first consider the climate geography and geology of the area.

1.1.2 Climate

The majority of the Mediterranean, including Cyrenaica, has relatively mild winters and very warm summers. The Libyan climate in general is dominated by the hot arid Sahara, but it is moderated along the coast where it is damper and cooler. The Sahara plays an important role in the Cyrenaican climate and in Libya in general. Its influence is stronger in summer and the desert climate reaches along the coast to the southern fringes of the Gulf of Syrtes. The region suffers from periodic drought, which often recurs every four or five years (Fisher 1952: 148). Annual rainfall in Tripolitania to the north-west is also extremely erratic in its distribution and it has been

shown that the Gebel Tarhuna is affected by drought in two out of every seven years. In the pre-desert zone beyond, this pattern of variation is even more serious and droughts of four to seven years have been recorded (Brehony 1960: 60–9).

Along the coast, the Mediterranean climate is characterised by a cool, rainy winter season and a hot, dry summer. The warmest months are July and August and the temperatures in Benghazi (ancient Berenice) range between 21.4°C and 32.3°C while in Shahat they can vary from 19.5° to 29.9°. The coolest months are January and February and in the winter months temperatures in Benghazi range from 18.3°C to 9.1°C, while those in Shahat (ancient Cyrene) range from 13.8°C to 7.8°C (Figure 1.2). The weather is cooler in the highlands of the Gebel Akhdar than in the lowland areas.

Most rain falls during the winter months between October and March. Shahat has an average January rainfall of 55 mm, while Benghazi receives an average of 48 mm (Figure 1.3) with an average annual precipitation of 400 to 650 mm and less than 400 mm, respectively (Figure 1.4). There is also the possibility of snowfall at high elevations (Fantoli 1952; Laronde 1987: 257; Raju 1980)¹. The same figures apply to the area stretching from Cyrene to Messa. Annual rainfall is relatively high with an average of 541.5 mm at al-Gubba and Ain Mara, to 501 mm at Slonta, Maraua, Taknis and al-Merj. Farther inland annual precipitation declines and its variability increases. The dry climate is exacerbated by the ghibli, a hot, arid wind that blows from the south over the entire country several times a year. The wind carries large quantities of sand and dust and can seriously affect crops.

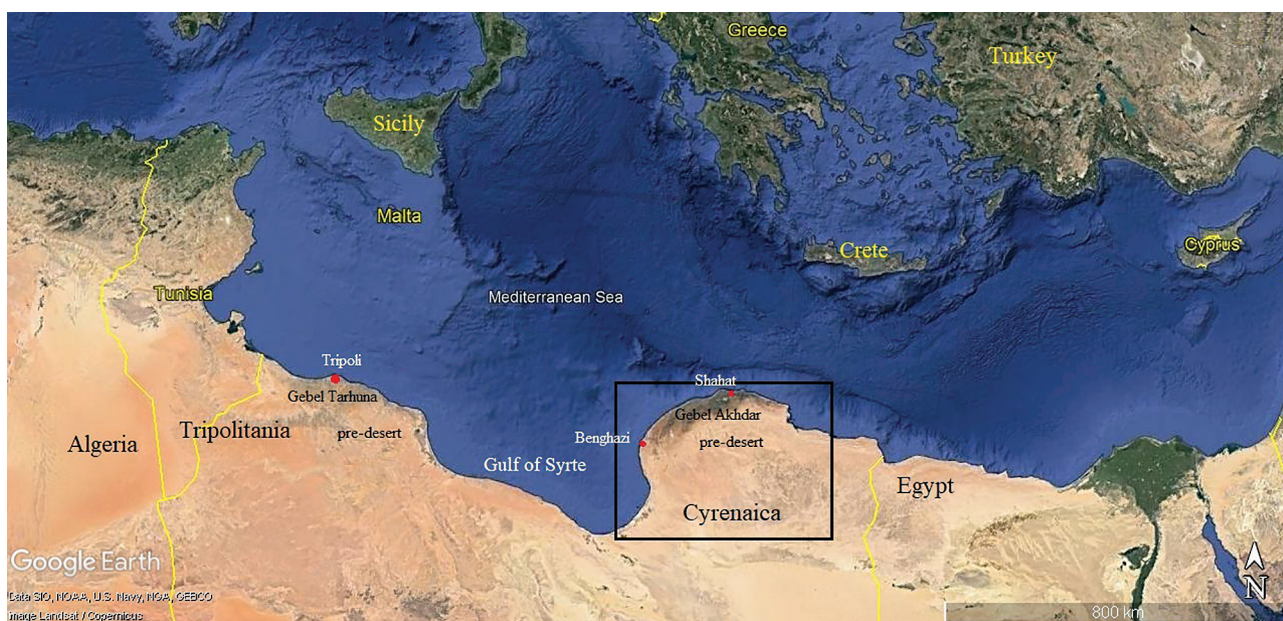


Figure 1.1: Location map of Cyrenaica (Source: Google Earth, Data SIO, NOAA, US Navy, NGA, GEBCO, Landsat/Copernicus © 2021).

¹ Some 28 meteorological stations cover the area from Suluq in the west to Shahat in the east. Some of these have records going back to 1915. Regular records are only available from 1954.

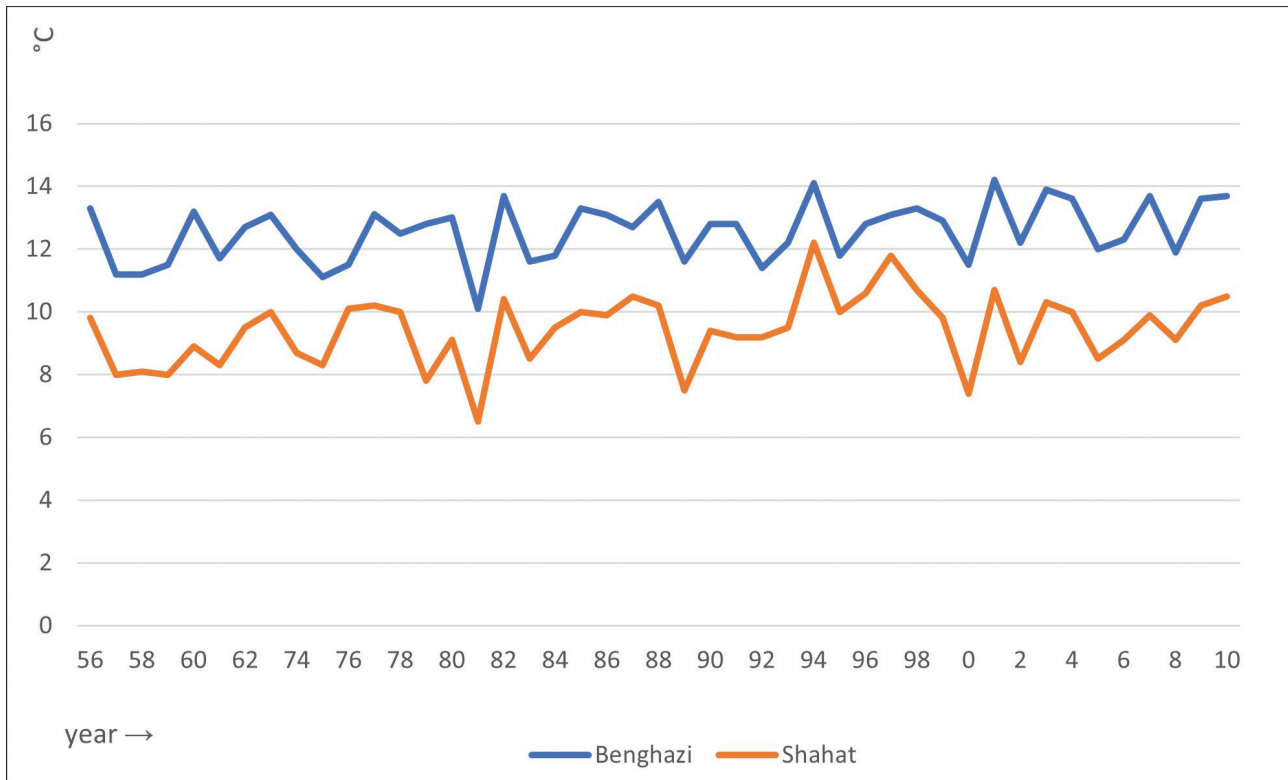


Figure 1.2: Benghazi and Shahat: average January temperatures, 1956–2010
(Source: Benina and Shahat Meteorological Station).

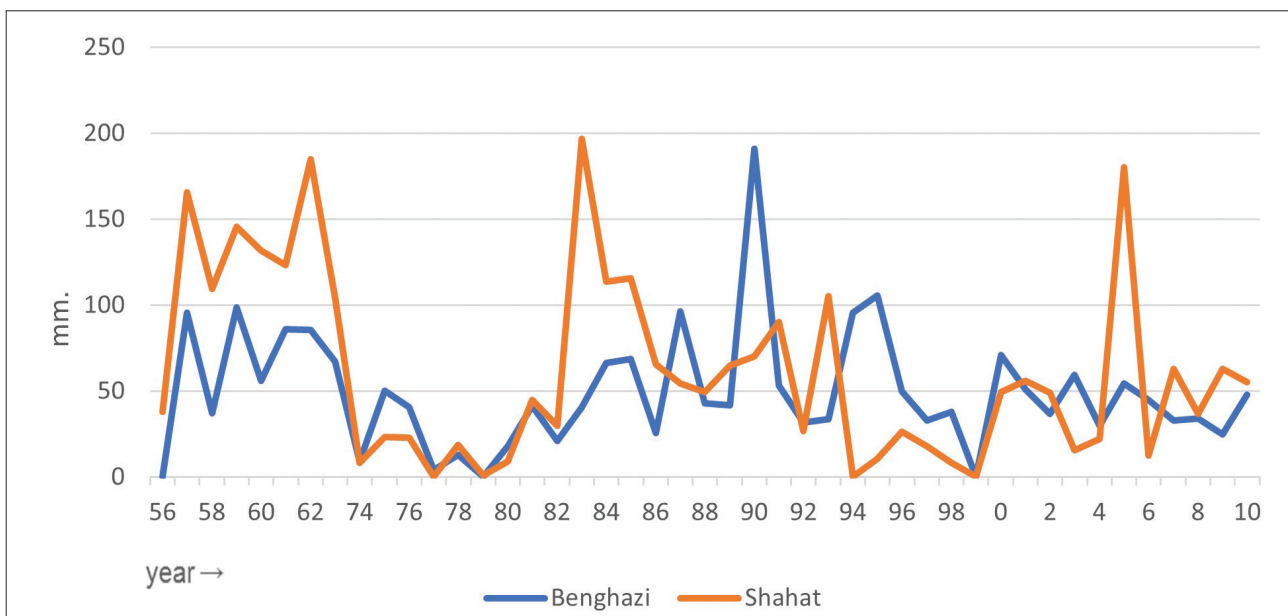


Figure 1.3: Benghazi and Shahat precipitation in January, 1956–2010
(Source: Benina and Shahat Meteorological Station).

The low rainfall is reflected in the absence of permanent rivers or streams and most of the perennial lakes are brackish or salty. The main water source instead comes from numerous springs of fresh water which go back to the Pleistocene Age (Little 1954). The bottoms of the Cyrene and Faidia formations have an important impermeable marl stratum which traps ground water. Once

these layers emerge at the surface, subsurface water is forced off laterally in the form of springs. There are over 300 springs in the north-eastern part of the Gebel Akhdar, which mostly occur along the scarp faces in different geological zones. As Bukechiem (1993) writes it is clear that the most plentiful springs are located between al-Beida in the west and Derna in the east and that they

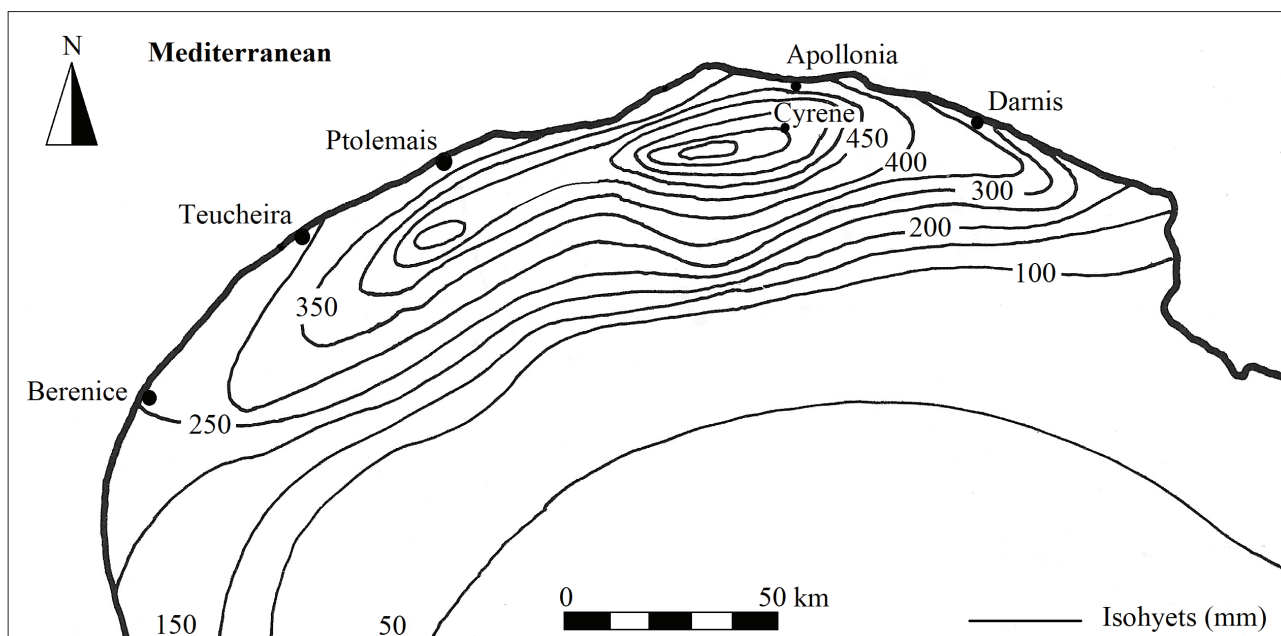


Figure 1.4: Rainfall Isohyets in Cyrenaica (in mm).

have an output in the winter months of over 10 litres per second (1993: Table 11). These springs along with the rainfall were main factors influencing the primary Greek settlements around Cyrenaica and the more habitable areas (Applebaum 1979: 80).

Spring	Rate of flow 1/sec.
Ayn Dabussiah	200
Ayn Marrah	40–80
Ayn Stewah (Ras-al-Hilal)	15
Ayn Kersah	30
Ayn Bumansur (Derna)	195–230
Ayn Blanaj (al-Beida)	10

Table 1.1: North-east Gebel Akhdar springs with a flow of more than 10 litres/second (Bukeshiem 1993).

1.1.3 Geology and morphology

Cyrenaican geology consists of outcroppings of rock, all sedimentary in origin and mainly marine limestone in nature. The oldest beds dated to the Upper Cretaceous Age and occupied the crest of the Gebel and part of the north coast. Much larger areas are covered by Eocene and Oligocene beds and restrained in and around the Gebel. Rocks from the Miocene Age are the most widespread and covered the greater part of the region, with a very limited number of Pleistocene beds (McBurney and Hey 1955: 10).

The morphology consists of three main features: a coastal plain, a high limestone plateau named the Gebel Akhdar (Green Mountain, so called because of its leafy cover of pine, juniper, cypress and wild olives) and a

further high plateau farther inland. From the Gebel, Cyrenaica extends southward across a barren grazing belt that gives way to the Great Sahara.

Part of the coastal plain is known as the 'Plain of Benghazi'. This is roughly triangular in shape with the north-eastern end near Tocra, where it is only 4 km wide, extending west 120 towards Benghazi by which point it is 25 km wide before widening rapidly and fading out towards the south in the Syrtic desert. Generally speaking the Benghazi plain is almost flat terrain, with a gradual incline to the east where some rugged slopes occur near the scarps of the Gebel Akhdar. Many large isolated marshlands are spread along the coast, including the marshes of Bersis and Bojrar.

There are a number of *karst* phenomena, known as *dolinas* or sink holes, which consist of several large depressions in the limestone floor. A group of small lakes is located just to the east of Benghazi, the largest of which are the lagoons of Bodzerah and Ayen Zaiannah. The coastal plain continues east of Ptolemais, but narrows considerably and even disappearing in a few places, particularly in the area from Ras al-Hilal to Latrun near Derna. It rarely exceeds one kilometre in width between Apollonia and Derna. The Gebel Akhdar forms the main geographical feature in Cyrenaica. In extent, it is a limestone plateau about 250 km wide east to west by 80 km long north to south. Generally, the dip-slope is gentle and descends gradually into the interior until it merges with the semi-desert zone. To the west, the Gebel drops abruptly to the shores of the Syrtic Gulf, and to the east, it falls gently toward the Gulf of Bomba and the Marmarica. Its northern parts descend abruptly towards the coast and end by sharp scarps overlooking the coastal plain and the sea.

The northern line of the Gebel Akhdar is marked by long successive terraces, which vary in width and stretch from west to east in line with the Mediterranean Sea. It is possible to distinguish three main terraces separated by escarpments, which vary in height and the degree of their descent.

The first and longest escarpment has an average height of 250-300 m above sea level and increases in height between Apollonia and Ras al-Hilal. The escarpment is intercut by a range of short and deep valleys. The first terrace beyond varies in width and reaches around 20 km at al-Merj basin, which is structurally a giant sinkhole. It then begins to narrow gradually eastward, where it is characterised by a large network of deep valleys cut off from the slopes toward the north.

The second escarpment is a gentle dip-slope and is not as high, with an average height of 120 m away from the first and is intercut by a number of valleys. The second terrace ranges in height from 420 to 600 m and appears in the form of simple low hills separated by a series of valleys.

The third escarpment rises along the slope and is smaller than the two previously mentioned, with an average height of 60 m. It is followed by the third terrace, which comes in the form of elevated ground in the case of Sidi al-Homry, which rises up to 880 m above sea level.

Of the main Cyrenaican cities founded by the Greek settlers, only Cyrene and Barca were located on the plateau. The former was established on the edge of the second escarpment, while the latter was founded in the heart of the first terrace beyond the first escarpment. The other cities, Apollonia, Teucheira, Ptolemais and Euesperides, were located in the coastal plain bordering the Mediterranean as the Greeks preferred to live near to the sea (Applebaum 1979: 2).

1.1.3.1 Soil

Very little research has been devoted to the soil in Cyrenaica. There are different types of soils and they can vary from place to place depending on the source material, as well as climatic factors and biological conditions. Cyrenaican soils can be classified into two main groups:

1. Soils of the sub-humid and sub-arid zones. These are the best agricultural soils and are concentrated in the region of Gebel Akhdar and the coastal strip.
2. Soils of arid zones.

In general, very little of the total area of the country is suitable for agriculture and fertile lands exist in pockets distributed between the Gebel Akhdar and the coastal plain. The alluvial soils of the inland regions are fertile. These were formed by the deposition of sediments carried by water from the northern mountains, which formed fans before being deposited in the wadis.

It is possible to distinguish between different classes of soils. Red soil rich in iron silicate known as Terra Rossa is considered to be one of the most important soils in the region. It is a deep depositional sediment, found mainly in the al-Merj and al-Ftaieh areas east of Derna. Structurally it is of good quality and the use of fertilisers such as nitrogen and organic manures would tend to increase its phosphorus content and thus the soil fertility. There is also a type of reddish-brown dry calcareous soil found in south-western Benghazi, Taknis and Marawa. Shallow limestone soils rich in calcium carbonate and nitrogen but poor in phosphorous are also available at al-Beida, Labraq and al-Gubba (Johnson 1973: 8–10).

The modern agricultural land of the Gebel Akhdar can be divided into several categories in terms of agricultural potential. The first type is considered the richest agricultural resource in Cyrenaica and is estimated at around 16,251 hectares, being used for cultivation of various crops. The next type covers 51,688 hectares and is of lesser quality with abundant trees. The third category is suitable for cereal and occupies approximately 41,291 hectares of clay of medium to shallow depth with notable limestone outcrops. The remaining soils today are generally poor and very thin. They are unsuitable for agricultural activity and cover limestone terraces and sloping terrain that can be exploited for trees (Benkhaïal 1995: 549-627).

1.1.4 Cultivation and transhumance

In the last 100 years pastoralism and agriculture have been the two main activities for most people. The staple foods consisted of barley, wheat, olives and grapes, which were grown in northern areas (Applebaum 1979: 82-3, 91). Historically, pastoralism has also been important (Laronde 1984: 5). The majority of the nomadic and semi-nomadic inhabitants sow their fields with barley and wheat during the rainy season in winter. Herds of goats remain throughout the year in the north part of the Gebel and the more rugged parts of the country (Johnson 1973: 27). After the December rains, some herds of goats and sheep will move with their shepherds due south in search of better pasture and, at the same time, camel herds will shift farther south across the inland plateau (Barker 1979: 7). With the beginning of summer and lack of pasture and water, the goat and sheep herds will return to the north and be replaced by camels. Cattle on the other hand seem to have played an insignificant role in the nomadic system. They were never grazed over substantial distances, were often herded in small numbers and were confined to the northern areas of the Gebel (Johnson 1973: 39–66).

With few exceptions, there was no dividing line between arable farming and animal husbandry. During these transhumance movements, nomadic people based in the northern regions planted their fields with crops

when the rains came in late September and early October. The staple crop was barley which was mainly grown for local consumption, although surpluses could be sold overseas (Barker 1979: 7). At the beginning of October and during their journey to the south with their herds they would also cultivate a second crop. The second crop would be harvested and the stubble would support the camel herds in the summer. After they return to the north, the first crop would be harvested between April and May (Barker 1979: 7).

Clearly, pastoralism and agriculture are the primary components in the economy of ancient and modern Cyrenaica and a large part of arable agriculture appears to have been used for cereal cropping. Based on the relatively recent historical past it seems that olive cultivation, otherwise, was not a widespread traditional occupation.

1.2 Historical Outline

Before the Greeks, Cyrenaica was occupied by different tribal groups conventionally known as Libyans. Archaeological evidence for these natives is rather ambiguous and there is scarce information on them, which often derives grasped from ancient Egyptian sources that dated back to the Old Kingdom (Carter 1963: 18).

Greek colonisation of Cyrenaica began only in the second half of the seventh century BC. when they first founded the mother city, Cyrene (modern Shaha) in 631 BC on the upper plateau, some 18 km from the coast. Battos I was the first Greek king of the city and his family ruled for eight generations, alternately named Battos and Arkesilaos (Herodotus 4.159-205). With no complete control of the hinterland, four more Greek cities were established along the coast: Teucheira (modern Tocra), the port of Cyrene, Apollonia (modern Susa), Barce (modern Al-Merj) and Euesperides (later Berenice, modern Benghazi). By this time, Cyrenaica grew rich from grain, stockbreeding and silphium and Cyrene became one of the famous intellectual centres of the Greek world.

When the Persians occupied Egypt, the Cyreneans sent a diplomatic mission to the Persian king announcing their subordination to the new rulers. In 440 BC, the Battid monarchy came to an end when Arkesilaos IV was killed in Euesperides. Subsequently, the region suffered from political unrest caused by bitter competition between aristocratic and popular parties and increased risk of attacks by the Libyan tribes. The Republic that followed (440–322 BC) was also characterised by a political schism which eventually enabled the protagonists to set up a mixed constitution (Diodorus 14.34). After Alexander the Great conquered Egypt in 331 BC, Cyrenaica willingly submitted at once to him (Diodorus 17.49.3). Soon after his death the region went to one of his Macedonian generals, Ptolemy, who ruled it with Egypt. The Ptolemies enacted a new constitution

(SEG IX, 1–4) to Cyrene which became customarily governed by a king appointed by the Ptolemaic dynasty. However, the region suffered from political unrest and increased risk of attacks by the Libyan tribes until it was finally suppressed by Magas, who had re-established the monarchy again by claiming himself as the new king of Cyrenaica and declaring independence from the Ptolemaic rule. After the death of Magas, Cyrenaica was involved in a civil war that resulted in its return to Ptolemaic control until its last king, Ptolemy Apion, bequeathed it to Rome in 96 BC (SEG IX, 7).

At first, Rome did not show any interest in the region when it became under indirect control of the Roman Senate. The five main cities of the province were collectively known as Pentapolis (Pliny NH 5.5.5) and were united with Crete into a single province sometime in the middle or second half of the first century BC (Chevrollier 2016: 23). Chaos prevailed once again and it was not until the reign of Augustus (27 BC–14 AD) that the region was returned to relative order and prosperity. About a century later, by the reign of Trajan, the region was heavily devastated by the major events of the Jewish Revolt in AD 115–117. The turmoil, which spread across Egypt and extended to Palestine (Fuks 1961: 98–104), had conspicuously shattered Cyrenaica, Cyrene being sacked and resulting in huge loss of life (Romanelli 1943: 115; Applebaum 1979: 269–84). An ambitious program was launched by Hadrian in an attempt to revive the Greek legacy and bring back the region to prosperity (Fraser 1950). A new ill-fated coastal city, Hadrianopolis (named after Hadrian), was established between Berenice and Teucheira and later the region was temporarily called Hexapolis (Goodchild 1967a).

Cyrene had been severely devastated by a localised earthquake in AD 262 (Goodchild 1967a). A few years later the province suffered a serious calamity caused by an invasion from the Marmaric tribesmen, during which Cyrene seems to have been sacked. In AD 268 the prefect Probus defeated these tribes and Cyrene, at this time, was renamed Claudiopolis (SEG IX, 9). In AD 365 the Cyrenaica was affected by a major earth tremor that occurred in the central and eastern Mediterranean regions (Ammianus Marcellinus XXXVI, 10, 15–18; Libanius 'Oratio XVIII, 291–3'). These natural and man-made disasters depopulated the region considerably.

As mentioned above, the province combined with Crete as a single province. This was continued until the reforms of Emperor Diocletian at the end of the third century or at the beginning of the fourth century AD. After that, Cyrenaica was divided it into two provinces. The first is Libya Superior or the Pentapolis with its capital Ptolemais. The second is Libya Inferior, or Sicca, that covered the area between Darnis (modern Derna) and Alexandria, which was at the beginning administrated from Paraetonium (modern Marsa Matruh) and then Darnis (Roques 1987: 74–5).

By the fifth century raids of the native Libyan tribes became more frequent and formidable and was greatly exacerbated by inefficient and corrupt military governors. The correspondences of Syensius, the Bishop of Cyrenaica, depicts a grim picture of the political situation of the region and difficulties at that time.

Early reference to Christianity in Cyrenaica was from the records of the first Bishop of Ammonas of Berenice in AD 260 (Kenrick 2013: 7). Toward the first quarter of the fourth century, we hear of bishops in Teucheira, Ptolemais, Barca and Boreum in the Libya Superior, Antiburgos (modern Tobruk) and Ammonium (modern Siwa) in the Libya Inferior (Goodchild 1981: 22–24).

By the time of Anastasius I (AD 491–518) the provincial capital was relocated from Ptolemais to Apollonia-Sozousa (Pedley 1976: 20–21). This step with a new military command structure (dux Libyae Pentapoleos) was perhaps taken as one of the measures against the successful Vandal conquest of the western half of North Africa (Barthel 2017). Although the Byzantine Empire regained the region in the sixth century AD under the reign of Emperor Justinian, it still suffered from frequent tribal attacks. By the middle of the seventh century AD, the Islamic troops had advanced to Cyrenaica and westwards across the whole of North Africa to put an end to the Byzantine rule.

The following section presents the available information on olive oil and wine production provided by early travellers and previous archaeological works (Figure 1.5).

1.3 The Literary and Archaeological Evidence for the Olive Tree and Oil Press in Cyrenaica

1.3.1 Ancient literature

The richest area of Cyrenaica in terms of soil fertility and high rainfall is located on the second escarpment of Gebel Akhdar, which is where the city of Cyrene is situated. Indeed, the Greeks settled this part of Cyrenaica primarily for agricultural reasons. Olive trees thrive in zones which receive 400–600 mm rainfall per year, but it is possible for olives to grow even in areas where rainfall does not exceed 200 mm per annum (Pansiot and Rebour 1961: 42). The tree can survive temperatures in excess of 40° C, but unless hardy cannot survive temperatures below 7° C (Pansiot and Rebour 1961: 40). Clearly, these growth and development factors make the olive tree suitable for the climate of Cyrenaica.

Theophrastus (c.371–287 BC) (HP, IV, 3, 1) was fascinated by the enormous number of olive trees around Cyrene and the region's high levels of production. Diodorus Siculus (c.90–30 BC) (*Bibliotheca historica*, III, 50, 1) tells us that the land near Cyrene had a deep fertile soil that provided wheat, vast vineyards, olive groves and natural forests. Pliny (AD 23–79) (*NH*. V.5) included Cyrene within the most fertile part of a tree-rich habitat known as the *arboribus fertilis*. This division of the Cyrenaican landscape in the first century AD is strikingly similar to the current topography of Gebel Akhdar and reflects the region's soil fertility and agricultural potential.

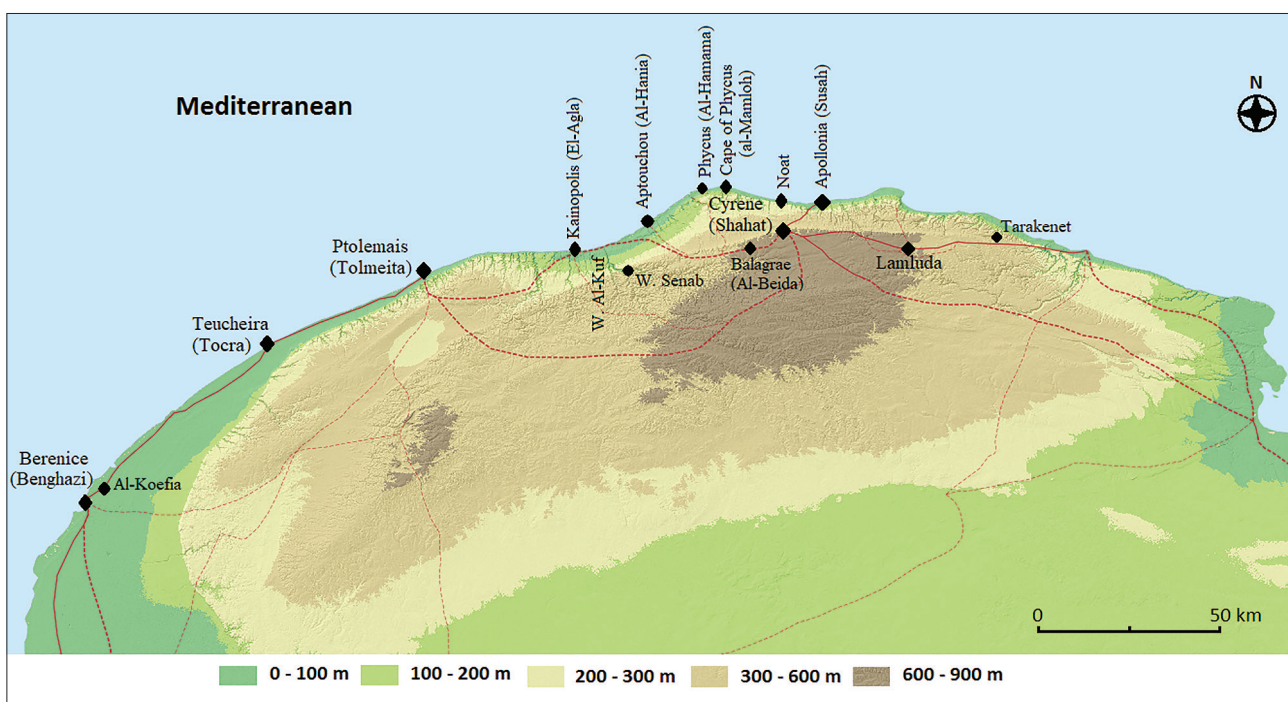


Figure 1.5: The Cyrenaican sites mentioned in early travellers' accounts and previous archaeological works conducted in different parts of the region (Source: 2012 Ancient World Mapping Center).

The Roman jurist Scaevola wrote towards the end of the second century AD (Digesta 19.2.61.1) that a cargo of at least 250 tonnes (which included 3,000 *metretae* of oil = at least 200 tons and 8,000 *modii* of grain = c.55 tons) was shipped from Cyrenaica province to Aquileia, northern Italy, for a fixed price.

In the early fifth century AD, Synesius, the celebrated bishop of the five cities, wrote letters to his brother and friends containing references to the lives of several contemporary inhabitants of the region. He talked about their crops, livestock and farming, as well as the production of olive oil. He highly praised the local heavy olive oil and its utility as a lighting fuel, in addition to its use as a massage oil for athletes (letter 148). In the same letter, he also mentioned that the region was rich in olive trees and told his brother Euoipius that when he prepares himself to face an enemy, he should use clubs made of hard wood taken from wild olive trees. On another occasion in letter 134, Synesius talks of a cargo sent to a friend with a load of wine. He adds that another shipment, presumably of local origin, containing olive, saffron, ostriches and silphium, had been unable to reach its destination due to tribal raids. Synesius, however, was evidently personally partial to Cypriot wines (letters 146 and 264). Agricultural vandalism in the early fifth century was recorded in considerable detail (letters 125 and 130).

Palynological investigation of deposits in the wadis al-Rejel, Murgus and al-Athrun in the Gebel Akhdar show evidence of ancient forest clearance and cultivation (Hunt *et al.* 2002). A conventional pollen and palynofacies analysis of three samples taken from about 1m below the current wadi floor indicated the presence of human activity in the landscape in the form of olive and cereal cultivation, as well as land reclamation and animal grazing. The samples are no older than the Archaic period, which marked the transition from semi-nomadic pastoralism to agricultural urbanism in Cyrenaica. It is likely that the Cyrenaican landscape was affected by the extensive and intensive farming operations which began in the early first century AD as a result of growing demand for agricultural products in imperial Rome, particularly olive oil. This proposed date corresponds somewhat with the ubiquitous olive oil and wine presses distributed across the region. However, without wider excavation and accompanying systematic soil sampling, especially in the rural sites, one can hardly say more.

1.3.2 Early European exploration

When Cyrenaica was annexed by the Ottoman Empire in 1638, travel in the region became safer. Throughout the eighteenth century, European travellers entered the country not only as tourists but also to investigate archaeological sites. Most of these travellers were not trained scholars, but were rather treasure hunters interested in retrieving artefacts for a growing number of

European collectors and museums. They nonetheless produced invaluable information regarding the condition of the ancient sites they visited.

Ever since the Banu Hilal and Banu Sulaym invaded North Africa in the mid-eleventh century, a shroud of mystery has been cast over the area west of the Nile. Despite its proximity to Egypt, Cyrenaica was apparently unable to escape Maghrebi influence. The narratives by the Muslim geographer Al Idrisi (1099-1165) on Cyrenaica have no archaeological or antiquarian interest. The year 1706 marked the journey of Lemaire, the region's first European explorer and the French consul in Tripoli, who visited a number of ancient sites in country's inhospitable region. In 1730 another attempt was made by the French surgeon Granger, who was followed by the British traveller Bruce in 1766. Both of these visitors, like their predecessors, displayed great concern for the ancient cities but paid little attention to the rural sites and the surrounding landscape.

The Italian physician Paolo della Cella crossed Cyrenaica in 1817 as a medical officer accompanying a punitive military campaign sent from Tripoli. He was struck by the fertility of the land and the number of wild olive trees which throve throughout the country. Della Cella remarked that the local inhabitants used no sauce other than butter, did not understand the significance of the tree or its fruits and made no oil (Della Cella 1822: 118).

The British traveller James Hamilton pushed inland in 1852 as far east as the port of Derna before returning to Benghazi. During his passage in the area between Wadi al-Kuf and Balagrae (modern al-Beida), he found groves of domesticated olive trees almost everywhere. However, these trees were neglected and their fruits used only to feed sheep and cattle. He believed that olive trees had played an important economic role in antiquity and that the local people could potentially make great profits from their cultivation (Hamilton 1856: 80). In al-Merj, Hamilton reported that there were many ambitious government-funded development schemes. Among these new constructions was an olive oil press project, as the governor planned to benefit from the abundant olive trees found across the region. Although he recorded a useful account his travels, Hamilton misinterpreted the round flat stones hollowed on one side with a square hole in the centre, which were found in great numbers at Lamluda, as the cap stones of cisterns (Hamilton 1856: 106-7). As we shall see later (section 6.3.3.1), this was, in fact, important evidence for ancient olive oil and wine installations.

In 1881 the Società di Esplorazione Commerciale e Scientifica di Milano organised two exploratory expeditions to Cyrenaica. The first was conducted by Manfredo Camperio, who visited the region to assess its economic, commercial and agricultural potential. He reported that the Ottoman census in Derna and its environs contained upwards of 111,000 olive trees (Camperio 1881: 70). Giuseppe Haimann (1882) led the second scientific

and cultural mission, which estimated that there were 200,000 wild olive trees between Benghazi and Derna. A concurrent journey led by Giacomo De Martino (1912: 26) found a 'spectacular' number of olive trees growing on the upper plateau in al-Guba and around Ain Mara.

Less than two decades later Gregory led an expedition to explore Cyrenaica as the head of an ITO scientific mission assessing the area for possible Jewish colonisation. He reported the presence of many plants, trees and shrubs. Among the trees were cedars, cypresses, palms, lentisks (*Pistacia leatiscus*), carobs (*Ceratonia siliqua*), apples, figs, pomegranates and oranges. He mentioned the presence of large numbers of olive trees and noticed a lack of commercial production (Leake 2011: 34, 125–7).

Enrico Corradini visited Cyrenaica in 1911 and was particularly impressed by the number of wild olive trees growing almost continuously along the road from Cyrene to al-Merj and which were almost everywhere in the region's forests and valleys (Wright 2005: 233–4). Corradini saw the immense agricultural potential of this resource and believed that the olive had become naturalised in the region. He considered it to be a favoured and prolific tree.

The narratives of nineteenth and early twentieth century travellers make it clear that olive trees were mainly grown along the greater part of the coastal plain from Ghemines to Derna and from the first escarpment of the Gebel Akdar to the fringe of al-Faidia, some 13 km south of Shahat.

It has been aptly pointed out by both ancient and modern writers that the lands of Cyrenaica were of great agricultural potential. Silphium, the legendary plant, cereals and many other agricultural products thrived in the region and much of them found their way in external markets, but time has shown that this situation of plenty could not be sustained for a long period. After the Islamic conquest of Cyrenaica in the mid seventh century AD, the population seems to have had less interest in olive cult and the production of olive oil and eventually shifted to stockbreeding and pastoralism. This led to gradual abandonment of the intensive land exploitation and consequently urban and rural centres went into decline. Life, however, continued though in a slow pace at least until the arrival of the Banu Hilali in AD 1046, which marks the decisive move to exclusively nomadic life (Goodchild 1967b; 1976: 226; Laronde 1987: 260). It was not an abandonment of crops but a disappearance of the sedentary lifestyle. This may be seen as an oversimplified and straightforward explanation but future fieldwork and excavation, of course, are desperately needed. At a relatively recent date a similar picture had been depicted when the Italian farmers fled from Cyrenaica in 1943. The Arabs returned and took their previously confiscated lands. The British Military Administration failed to revive the agricultural potential of the Gebel Akhdar and the locals were even reluctant to cultivate the land and in fact ignored the already planted fruit trees and pitched their tents in the shade of the farmhouses (Foot 1964: 82).

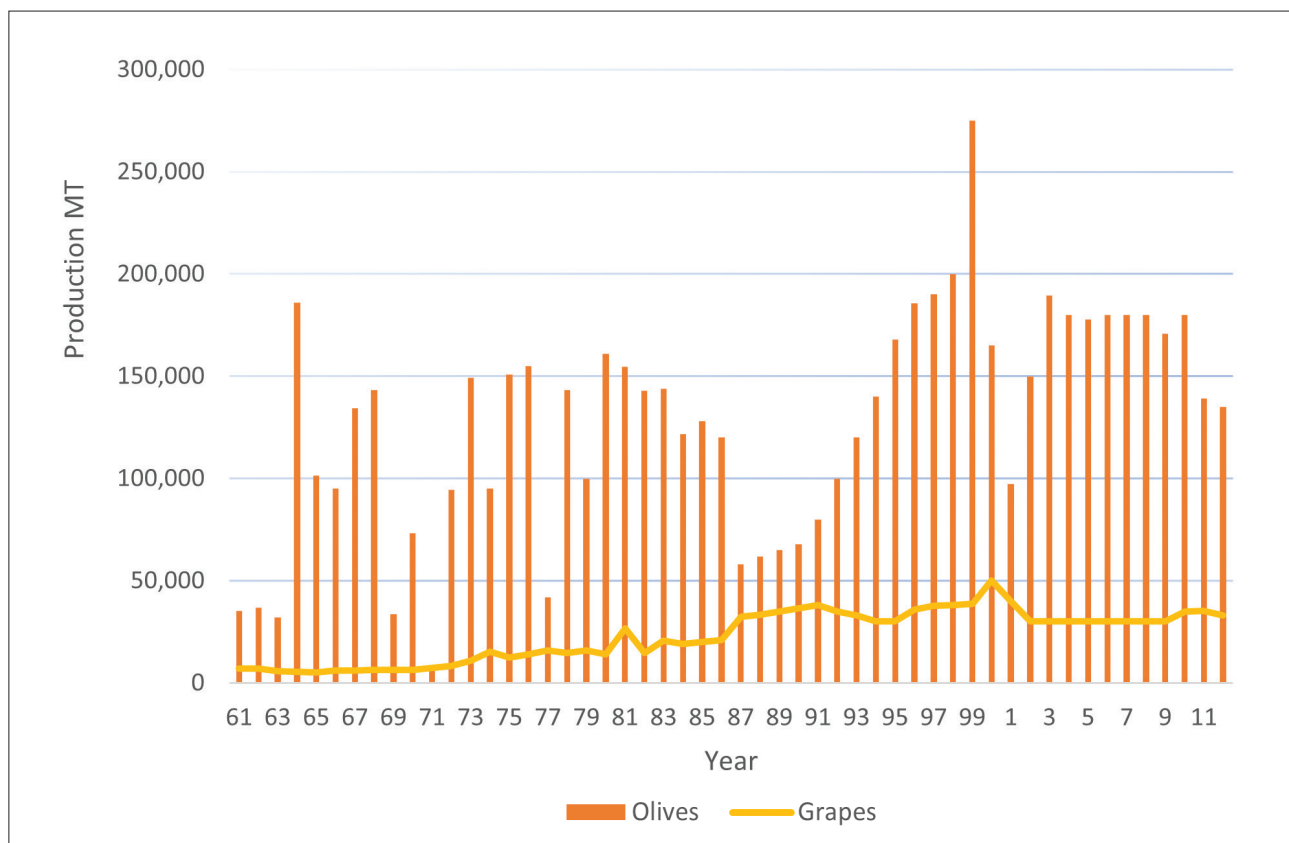


Figure 1.6: Olives and grapes production in Libya from 1961 to 2011 in metric tonnes (FAOSTAT data).

When Libya was granted independence in 1951, agriculture and livestock-breeding were the two main activities that employed most of the local working population. In 1958 agriculture absorbed 72% of the labour force (McLachlan 1982: 14). At the same year, oil was discovered in Libya (Hallett 2002: 20) and ever since then the Libyan economy has become heavily reliant on the export of hydrocarbons, now the major contributor to the national income at 93% of the total revenues (Edwik 2007: 12).

In 2002 these trees produced about 150,000 metric tons of olives. Figure 1.6 shows the average annual olive oil and grape production from 1961 to 2012. Obviously, grapes have had only a modest production while the output of olives has oscillated, generally due to the combination of the biannual bearing nature of the tree and the degree of fluctuation in annual rainfall that normally occurs, i.e. one good year in two to five years. The year 2012 indicates there being a marked reduction, perhaps due to the increasing number of unproductive trees and unstable security. In addition, olives may be attributable to a lack of investment in the agricultural sector, both in arboriculture and dryland farming.

According to a study published by the FAO in 1969, the grape was the most cultivated tree in the Gebel Akhdar, particularly in the territory of Messa and al-Beida which enjoys more than 600 mm of rainfall. Unsurprisingly, it is the same geographical area that was heavily populated and farmed in ancient times. The report added that the most important horticulture were almond and olive trees (1969a: 53). After independence in 1951, as a part of tree cultivation initiative, the Ministry of Agriculture supplied the private farmers with young olive trees free of charge. However, due to inadequate maintenance and irrigation their productivity was negligible. The farmers were in fact reluctant to harvest the olive trees even for their home consumption. For example, the Government from 1963 to 1965 was forced to shut down the olive presses in Messa because of shortage of supply (General Report 1969a: 167). This also indicates that there were no presses owned by the private sector. A mixed agricultural regime was adopted and because of deficiency soil moisture companion planting grapes and olive together has proved to be an unsuccessful practice (1969b: 42).

1.3.3 Iconographic and epigraphic evidence

Pharaonic Egyptian documents may provide us with the oldest archaeological evidence for olive trees in Cyrenaica. The Libyan or *Teheno* stele is a relief sculpture found in Abydos, Egypt, which bears three scenes depicting the booty taken from a defeated tribe by the Egyptians and included possible depictions of olive trees (Gardiner 1972: 394). If the identification is correct, this is the first evidence we have which demonstrates the value of the tree to the region.

Epigraphical evidence from the late Classical and early Hellenistic periods indicates that there were a number of notable agricultural products. The most important evidence comes from the stelai of the *Demourgoi*, which were part of a series initiated in the fifth century BC and that continued until the second century BC (Applebaum 1979: 33; Laronde 1987: 325). These inscriptions listed Cyrenaican crops and provided approved prices and weights for each commodity.

The revenue generated by many estates and groves in Cyrene was dedicated to the maintenance of several cults (Applebaum 1979: 87–8). An inscription dating from the first century BC (SEG IX, 4) tells us that Barkaios son of Theochrestos bequeathed his olive grove and its oil to the gymnasium of Cyrene (SEG IX, 4, 43–6). This inscription implies the value of the gift and that these trees were fruitful and produced a good harvest. At the same time, Claudia Venusta, whose wealth was probably derived from agriculture, funded several religious construction works in Cyrene (SEG IX, 163–164).

An inscription, probably from the mid-fourth century AD, records that Demetria, daughter of Gaios and her son Theodoulo died, possibly in an earthquake, and were buried by their family in a substantial tomb found in the northern necropolis of Cyrene:

(Chi-Rho) Διμιτρία θυγάτηρ
Γάϊου τοῦ ὄνηραμένου
τὸ μνημῖο <v> τοῦτο ἐνθαδε κίτε
μετὰ τοῦ υἱοῦ αὐτῆς Θεω-
δούλου· οὗτοι ἐτελεύτησαν
ἐπὶ [ἀ]γροῦ Μυροπῶλας κισμοῦ
γενομένου· τέθεικαν αὐτὸς
Κάλλιπος ὁ {υ} ἀνὴρ αὐτῆς κὲ
{κὲ} υἱὸς αὐτοῦ Γάϊος κὲ γαμ-
βρέδ[ε] αὐτοῦ Πολύβουλος
Κ(ύρι)ε μνησθήτω τὸν ἐντὸ[ς] σπελέ-
ου τοῦτου.

Translation:

Dimitria daughter of Gaius, who bought the tombs, lies here with her son Theodoulos; they died on the farme Myropyas, in an earthquake. Kallippos himself, her husband buried them and his son Gaius and his brother-in-law Polyboulos, Lord, remember those within this cave.

Reynolds, Ward-Perkins and Goodchild, 2003

This inscription is somewhat curious as it indicates the possibility that the victims were members of a farm named Μυροπῶλας, which onomastic lexicons suggest that it was not used as a personal name. Therefore, the farm belonged to an *unguentarius*, a perfumer or dealer in unguents and acquired the name Myropyas which could easily have also been chosen as a result of him growing unguent-bearing plants (Bacchielli *et al.* 1992:

22). The inscription may also hint at the possibility that there had been a scent-sellers' quarter, or market, within the city. The region was renowned for its roses and *unguentum rosaceum* (Pliny NH 21. 10.19). Therefore, it is difficult to resist the idea that there were workshops around Cyrene for producing very high quality olive oil or unguents, tasks for which wedge or direct screw presses would have been better suited (Mattingly 1990; 1996). Fine olive oil was used as a key base for ancient perfume. The presses of these types were probably usually completely fabricated of wood and therefore rarely survive within the archaeological record.

1.3.4 Archaeological evidence of presses and mills

The first secure archaeological evidence of ancient olive oil production was found in al-Koefia area, 13 km north-east of Benghazi and about 2 km south of the Central Prison of al-Koefia. The site was reported by Narducci (1934: 84) and is consisting of two separate buildings which were less than 40 m apart (Figures AII.48–50). The west building was rectangular in shape, consisting of seven rooms and housing four mill mortars. The east building was also rectangular but smaller in size with five rooms of different dimensions and seems to form an ancillary unit to the western building. At about 200 m to the east are the remains of an ancient settlement situated in a modern cemetery. It now is overgrown with vegetation and largely obliterated by modern graves.

The two landmark studies by Brun in 2003a and 2004 on the production of olive oil and wine in the ancient Mediterranean, from prehistory down through the Late Roman period, provide an indispensable background to this subject. In his first work Brun investigated the early primitive attempts of prehistoric societies to produce these two valuable liquids, which were among the most important commodities in the ancient world market. With the dawn of history, more advanced techniques began to emerge as a response to the increasing alimentary demand for these goods. It is unsurprising to see Cyrenaica included in the chapter devoted to Greece (Chapter III, 73–90). Cyrene was founded by the Greeks around 631 BC and soon became the core of the cultural, economic and political life of the region, which was known as Cyrenaica. Consequently, as Fitzgerald (1926: 16) inferred from Synesius' letters, the Cyrenaican people still regarded themselves as Greeks, despite the Roman domination of the region for over five centuries.

In a succinct section on Cyrenaica, Brun (2003a: 156–7) summarises the sparse textual and archaeological data, the latter compounded by the absence of related excavations and field survey studies. Archaeological data on olive oil, wine and perfume production in Cyrenaica during the Greek and Hellenistic periods

remain dubious, despite the relatively vivid literary narratives that evidently held the agricultural potential of the region in high esteem (Aristotle, *Hist. Anim.* V, 30; Diodorus III, 50, 1; IV, 17, 4; Herodotus IV, 199; Scylax *Periplus*, 108, 109). This eerie silence from the early archaeological evidence is largely the influence of the colonial archaeology in Libya, when Italy tried to revive the glory of ancient Rome and reconstructed the ancient cities in an idealised Roman model (Munzi 2012: 81). Otherwise, Brun (2004: 86–9) gives a wider perspective on the region during the Roman period. He provides a full description of the industrial installations found in the Wadi Senab area, as well as those discovered at the site of Siret Qasrin el-Giamel in the centre of the city of al-Beida. Surprisingly, he did not mention the vats discovered in Berenice (Lloyd 1977: 214), Teucheira (Buzaiian 2000: 67–8) and Apollonia (Pedley 1979; Rebuffat *et al.* 1978: 269, n. 5). Moreover, little effort was paid to considering the issue of the function of the underground chamber discovered in Siret Qasrin el-Giamel. While the above-ground evidence strongly suggests wine production, the underground elements are still ambiguous in this regard. However, it is probably not far from the truth to envisage that the press was used for wine making.

1.3.5 Archaeological excavations of pressing installations in Cyrenaica

Since scientific excavations in the field of archaeology started in Libya over a century ago, no systematic field survey of Cyrenaica has taken place and urban excavations have continued to be predominant. There are few excavated presses in the hinterland of Cyrenaica and most of them involved clearance of the site with little attention to obtaining a detailed record of the archaeological material.

The first reference to an excavated olive oil press came from Tarakenet, some 12 km east of the modern village of al-Gubah and about 0.6 km north-east of the main road to Derna on the edge of the upper plateau (Figures AII.153–154). This was an underground chamber and excavated by the Department of Antiquities under Goodchild's supervision between 1959 and 1960 (Goodchild and Reynolds 1962). Stucchi (1975: 345) suggests that the chamber was originally intended for burials and that the chamber was later converted to industrial use. Similar arrangements of the tanks with drains have been noted in almost every underground press visited in Cyrenaica. The rock-cut chamber contained Greek inscriptions, stylistically datable to the sixth century AD, in its south, west and north walls². A reference in one of three inscriptions that was carved in the south wall of the chamber may support

²For further details on these inscriptions see Goodchild and Reynolds, 1962.

the interpretation that the installation was used solely as an underground olive-press. The word ἐπλαλίον in the inscription has been interpreted by Robert (1964, no. 586) to refer to an oil-press. Goodchild apparently missed a counterweight which was laid opposite the eastern end of the north wall. A parallel counterweight was presumably located along the south wall, but stone rubble prevented this from being confirmed.

Similar arrangements of the tanks with drains have been noted in almost every underground workshop visited in Cyrenaica. Inscriptions found within a workshop are unusual, but in this case having been found, it would suggest different phases and an alternative use of the chamber. Despite this there is no conclusive evidence to indicate that the rock-cut chamber was initially established as a tomb and then converted into an olive-press. A reference in one of three inscriptions that was carved in the south wall of the chamber may support the interpretation that the installation was used solely as an underground olive-press. The word ἐπλαλίον in the inscription has been interpreted by Robert (1964, no. 586) to refer to an oil-press.

The second press was found at the site of Lamluda, 28 km east of Cyrene. It was excavated by Goodchild in 1950s, but nothing close to a final report ever appeared. It should be noted that many pressing facilities in North Africa were initially identified as oil installations, but there is increasing demand for many of them to be re-examined. Some presses discovered in these regions were certainly wineries; for example, we now know now that Meunier's (1941) identification of the site of Khirbet Agoub in the region of Constantine Algeria as an olive oil facility was incorrect. Numerous presses in previous surveys and excavations were identified as olive oil installations, but it now appears that a number of these were actually used for wine production (Brun 2004: 196; Decker 2001: 79–80). My recent study (Buzaian 2009) on the press found at Lamluda was thus an attempt to re-examine the available archaeological evidence and reignite discussion on this controversial issue. Although the results are not conclusive, they may help to promote our standards and validate archaeological interpretation. Goodchild (1968) briefly made mention to this press and saw it as connected to olive oil production. However, the absence of a crushing basin in the pressing room proper was taken as the first clue, suggesting that the facility was used for wine production rather than olive oil. In addition, there was a treading tank with a channel leading directly into a deep vat and a lever-press to extract more juice. Other supporting evidence includes a group of sunken *dolia* found adjacent to the pressing room to the north, which suggests that production was geared beyond immediate family needs. Brun (2004: 6) has claimed that wine production was only conducted systematically in *dolia* in southern Europe. This appears to be a possible African exception.

Farther west is the third olive press which located at the southern limit of the Northern Necropolis, about 1 km north-east of Cyrene. It was found during building works in 2014, parts of it were then cleared by the Department of Antiquities at Shahat (Cherstich *et al.* 2018: 145–50). There is evidence suggesting that this was originally a rock-cut tomb, probably dating to the Hellenistic period with several transformations for subsequent Roman burials. At some later date the tomb was converted to an olive-pressing room. One of the interesting features found in the press was a rectangular tank lined internally with *opus signinum*. Its base a channel was cut along the entire length to breach the northern wall to end into an adjacent square rock-cut collecting vat. Therefore, it is reasonable to assume that the same installation served also for wine production. This interpretation is based on similar feature found associated with presses found in Lamluda, Balagrae and Wadi Senab and was thought to have been used for wine production.

The fourth site is Siret Qasrin el-Giamel at modern al-Beida, on the main road across Cyrenaica, a few kilometres east of the ancient site of Balagrae. The excavations brought to light two complexes dating back to the end of the fifth century AD and which continued to be occupied until the seventh century (Catani 1976; 1978; 1998; Stucchi 1975: 423, 523, 531, 547). The two complexes (Figure AII.108) include a monastery to the east, with domestic buildings of simple construction which housed a wine press, and a fortified agricultural villa to the west. The latter was associated with three press facilities, one underground and two above ground. The latter were certainly connected with wine making.

More intriguing industrial evidence dating back to the early Roman period evidence came to light during the recent excavations at Balagrae, modern al-Beida (Bentaher and Buzaian 2006; 2010; Buzaian and Bentaher 2002; 2006). The project is part of a training programme conducted under the auspices of Omar al-Mokhtar University and indeed a turning point in Cyrenaican archaeology given the prevalence of the urban excavation over the rural. As might be expected, the Balagrae excavations explicitly demonstrate that the countryside is a promising mine of economic information and suggests that most industrial activities were probably non-urban. The evidence almost exclusively relates to wine making and was discovered at the north-eastern edge of the settlement approximately 100 m east of the Roman temple of Asclepius. The excavations discovered a variety of shapes of pressing facilities, which were no doubt used for the production of wine.

These presses excavated in Balagrae can be divided into two types by their design features. The first type consisted of a sloped treading floor connected to a deep vat. The juice was conveyed directly to the vat through a channel with no means of housing a collecting receptacle. The second type consisted of a built-up tank coated

with impermeable mortar. Its floor had a shallow channel which extended along almost its entire length, and which turned sharply to end in a small settling tank. Further excavations have brought to light a press room furnished with a raised circular press bed in the middle of the treading floor, which is direct evidence of the use of the lever technique for wine making. It is impossible to elaborate further on the subject of these installations as the details have not yet been fully published.

Further evidence of industry comes from the coastal city of Ptolemais (modern Tolmeita), which became the regional capital at the beginning of the fourth century AD as a consequence of Diocletian reforms. A counterweight made from a reused frieze block was found in House G and was considered to be an upright for an olive press (Ward-Perkins *et al.* 1986). It was later reinterpreted as a screw press type (Mattingly 1996: no. 44). Based on parallel examples from the region, Buzaian (2009, no. 2) states that this block is a typical Cyrenaican counterweight stone with two holes and grooves cut on the underside for mounting the windlass. The press seems to be installed within the house after a short abandonment, possibly caused by a natural disaster. Further industrial features possibly involved in olive oil production were found in the so-called North-East Quadrant house, located just across the road opposite Building G (Ward-Perkins *et al.* 1986: 123–6).

A little farther east of the Colonnaded Palace, recent excavations carried out by the Polish archaeological mission have unearthed a luxurious urban villa which boasted lavish mosaics and painted wall-plasters that could be dated to the late second or early third century AD (Łajtar 2012: 257). The villa was ruined as a result of an earthquake in the middle of the third century AD and as a consequence the possession of part of it passed to a new owner named Leukaktios (Łajtar 2012: 258). Seven vats with rebated mouths were discovered in various rooms of the villa, with openings which varied in diameter from 0.86m to 1.06m and which were 0.95m to 3.00m deep. A ledge was noticed in the shaft of each of these vats, which was interpreted as a division between the upper and lower parts of the vat, or as having held some kind of framed mesh (Żelazowski *et al.* 2010: 17). Similar phenomena have been detected in the excavated vats at Tocra (Buzaian 2000: 67–8) and were likely seen as marking the level at which the bedrock started and the digging became difficult. Corresponding examples found elsewhere in Cyrenaica led them to be identified as receptacles for liquids with wine probably the most likely candidate (Żelazowski 2012: 141). This was suggested by the absence of a crushing facility. In archaeological survey, the presence of the crushing mill is taken for granted as constituting evidence for oil production; however, this criterion was also applied in the excavation in a straightforward manner, without consideration of the other archaeological finds. Other similar vats were

found in the northern part of the Roman villa (Kraeling 1962: 136) and the southern end of the Colonnaded Palace (Pesce 1950: 64–5). The evidence therefore suggests that urban centres were also engaged in olive oil/wine production and other industrial operations.

Furthermore, a number of vats have been discovered at Teucheira (modern Tocra). A group of three were discovered in the so-called Roman villa (Buzaian 2000) and a group of eight were found within building VII, which was excavated by Benghazi University (Bentaher 1994; Buzaian 2000: 67–8). A rebated groove around the mouths of most of the vats seems to have provided a seating for a lid. While only two of the latter group of eight have been fully excavated, these provided a large quantity of coarse pottery. The most distinctive of these sherds belong to cooking wares of a corrugated body type made in Berenice from the late second to the early third century AD (Riley 1979: 263–4, fig. 104, D515). Another group of four vats was recently discovered due north of the excavated area and could be dated to the mid third century AD.

At Berenice (modern Benghazi), a series of 18 vats installed in two rooms of Building PI have been dated to the third century AD (Lloyd 1977: 214, fig. 41). These vats were clearly designed for the storage of liquids, implying a connection with olive oil or wine. On the basis of these comparable examples, it seems logical to assume that by the mid second century such wine making installations had become commonplace across the entirety of Cyrenaica. It would appear that wine production was in full swing in the region by the beginning of the first century AD. This date seems to be fairly consistent with a gradual growth of trade between Cyrenaica and Italy following the establishment of the Roman administration in the early first century BC (Lloyd 2002; Riley 1979: 410).

1.3.6 Archaeological surveys

Only a few detailed studies of rural sites have been carried out, due to the fact that Cyrenaican archaeology has long been marked by the traditional focus of urban over rural sites and so landscape surveys thus played no part in the archaeological work. In 1974, S. Stucchi and his team published the first detailed account on the survey of Wadi Senab. The site is a very curious, as it composed of troglodyte units dedicated to agricultural production (section 6.7; Appendix II: site no. 86). It included several industrial installations for olive oil and wine production, in addition to two large caves. All these rock-cut features were obviously used for agricultural processing and there is no clear evidence of habitation. Remains of a small bath complex were found immediately at the southern end of one of the large caves located on the west bank of the wadi. The later modification of part of the baths into an olive press room may indicate a change in the function of the site during the late antique

period, when such a luxurious facility gave way to industrial activities. seems to have been continually occupied from the Hellenistic era down to the Byzantine period. The close proximity of the site to the hilltop settlement of *qasr* Wadi al-Sanab (just 350 m to the east) suggests that it was linked to the *qasr*, which also encompassed a number of agricultural and industrial features indicating that the whole area extensively exploited the fertile soil on wadi bottoms through a series of retaining walls constructed across the course of the nearby wadis.

The Italian mission was also able to carry out a brief survey in Ghot Giaras, which is c.2 km north of Wadi Senab (Bacchielli 1974–1975: 260–1). Rock-cut tombs pitting the cliff were reported along with many other archaeological features, including rock-cut oil and wine presses perched on a spur overlooking the fertile fields of Ghot Giaras.

One of the weaknesses of the Italian publication is that there were no detailed measurements. However, a visit to the site in 2010 has enhanced knowledge by providing more detailed measurements, which have been included and properly recorded as part of this research (Appendix II: site no. 27).

In the early 1980s the Department of Antiquities in Shahat conducted an archaeological survey of the area around Wadi al-Kuf, west of al-Beida (Abdussaid *et al.* 1984). The project covered an area of difficult mountainous terrain interspersed with arable tracts and endowed with adequate rainfall for sustained cultivation. The deep gorges of Wadi al-Kuf formed a natural barrier in antiquity between Apollonia and Cyrene in the east and the other major cities in the west. Both sides of the wadi are dotted with ancient settlements, farms, fortified buildings and field systems, which testify to its vitality and potent strategic position. The survey recorded about 34 sites and was a simple catalogue of sites with no attempt to offer information on site types or intra-regional relationships. In general, the study was descriptive, and interpretation of some features was ambiguous, especially those related to industrial aspects. For example, it was mentioned (p. 71) that the site of Bartamido has 11 tanks, but there is no description of their shapes or dimensions. Based on the attached plan (not numbered), it appears that they were circular in shape and arranged together in three rows, meaning they were more likely to be seen as vats. The presence of olive oil and wine production is inferred from the general description given to certain pieces of evidence. Terms such as ‘press’, ‘pressing element’ and ‘rock cut chamber press’ were frequently used with no regard to their definite function. However only one photo was published and this shows a crushing basin to give a clear indication of its use. Despite its shortfalls, the study remains an important site record of an area that may now be almost destroyed as a result of the region’s accelerated agricultural expansion and looting activities.

In 2003 S. Akab carried out an archaeological survey in the environs of Cyrene and identified 20 sites with olive presses. Part of his work was published in 2010 in the proceedings of the conference held in Urbino in 2006. While the work is an invaluable record of the many archaeological sites located around Cyrene, there were a number of misinterpretations made relating to the function of some of the industrial elements involved in oil production. He pointed out that there were three sites in the surveyed area, not mentioned by name, which employed stone piers erected in pairs (*orthostats* = *arbores*). In fact, there is no evidence so far for the use of *arbores* in the region. Cyrenaican oil presses are of a different kind, with the pressing beam anchored in a free-standing stone or in the wall of the press room in a purpose-made niche or socket. Additionally, a counterweight block was interpreted as an upright (Akab 2010: fig. 3). The work reflects the desperate need for further survey projects in light of the accelerating destruction of the region’s archaeological sites since the 2011 revolution and consequent political troubles.

The Archaeological Mission of Chieti’s survey project under the direction of Oliva Menozzi is a step in the right direction, as it will allow us to flesh out our information about rural Cyrenaica (Menozzi and Antonelli 2014). The preliminary results illustrate that the countryside prospered between the fourth and seventh centuries AD, with surplus revenues accrued from specialised industry in olive oil and wine production invested in fortified and ecclesiastical buildings. This view seems to support Roques (1987) of a late antique economic boom, but contradicts Wilson (2001: 28) who suggested there was economic recession.

Nevertheless, production of olive oil and wine production did not exclude the importation of these commodities from abroad, as evidenced by the frequency of the LR1 amphora. The LR1 amphora type enjoyed a wide distribution throughout the Mediterranean (Empereur and Picon 1989). Its occurrence in Lamluda (Menozzi and Antonelli 2014: 75–6) as well as Berenice (Riley 1979: 212–5) and Tocra (Reynolds 1995: 389) indicates a lively commercial exchange between Cyrenaica and the eastern Mediterranean. Menozzi and Antonelli (2014: 76) connected the presence of the LR1 amphora at Lamluda with the *milita annonae* supply of the military garrisons based in Cyrenaica. This hypothesis is in line with Wilson (2001: 39), who is sceptical about the role of Late Roman Cyrenaica in Mediterranean trade. He assumes that if the exchange pattern was one-traffic trade heavily reliant on imports, then some of the imported items may have been confined to the provisions for military garrisons.

However, the contents of LR1 amphorae could have either been imported directly to the local markets or exchanged between the locals and the mobilised soldiers (Karagiorgou 2001: 153; Poulter 1999: 43). Nevertheless,

we must not underestimate the LR1 amphorae which were found in association with the vats discovered at Berenice, as the type was probably reused again for the same purpose (Lloyd 1977: 148) at least on the inter-regional level.

Nonetheless, much work needs to be done to clarify the context in which the LR1 amphora arrived in Cyrenaica. Similarly, there is a desperate need to evaluate the processing capacity of the Cyrenaican presses. At the same time, without quantifiable data this type of imported amphora and these retrieved finds would remain negligible and their economic implications are limited.

More recently, three doctoral research projects were launched in different areas of the region. The first was carried out by A. Emrage (2015) who adopted a combination of extensive and intensive archaeological, topographical and landscape surveys in the Wadi al-Kuf region. He recorded during this Archaeological Survey (KAS), which covered c.1,350 km², the remains of 55 sites and found a range of new evidence regarding the function of the recorded buildings in an undulating terrain. The recorded sites could generally be divided into two main types. The first comprises sites that are most likely of military character and the second relates to fortified buildings (*qsur*) and *qasr*-like buildings of civilian function associated with industrial features. These included olive presses and wine production elements.

The second survey was conducted by M. Hesein and aimed to assess the harbours along the Cyrenaican coastline. An area of 50 km long has been chosen from outside of the surveyed area for more in-depth investigation. This area extends from the ancient site of Kainopolis (El-Agla) to the area of Noat, about 17 km to the west of Apollonia. The new evidence has greatly increased our knowledge about productive activity along the coast of Cyrenaica. The sites of Noat 1 and 2 are perhaps one of the interesting sites that were engaged in industrial activity. The first site, Noat 1, is located 16 km to the west of Apollonia and it has been suggested that wine was produced here as the site contained at least 23 dolia and 15 rock-cut vats, along with pressing elements, such as counterweight blocks and a millstone (Hesein 2015: 218). In fact, evidence of a crushing facility may indicate that the site may also have been involved in oil

production. Farther west at a distance of 200 m is the second site, Noat 2, which consists of a set of parallel circular vats that might have also been involved in wine making, rather than tanning for tanning processes (Hesein 2015: 219). Hesein published in 2014 a further analysis of vats, that were documented during his PhD fieldwork, found in six coastal sites distributed within the same strip. Initial estimates of the capacity of the vats recorded suggest that these coastal sites were involved in large-scale manufacturing. He concludes that some of these vats are more likely to be associated with the production of fish-related goods (Hesein 2014: 140). However, this hypothesis is based on an analogy of similar vats found along the coast of North Africa and their location by the sea. Only evidence from excavation and chemical analysis can provide conclusive proof as to what these features were used for.

The third project was carried out by M. Abdrbba (2019) who addressed the nature of the Cyrene's suburban zone and its relationship to the core site. The study revealed that most fortified farms around the city were associated with oil presses and it has been suggested that this could have been due to the relative lack of space within the city. In addition, proximity to the city was for reasons of protection, while the middle location, that between the city and the orchards, would have played a crucial role in facilitating the transfer and marketing of various crops (Abdrbba 2019: 169–70). The work recorded a plethora of archaeological sites around the ancient city. Most of the presses found around Cyrene were commonly open air and more likely related to wine making. These were exclusively rock-cut and consisted of a sloping floor connected to a lower sunken collecting vat, while others were established within rock-cut chambers. The latter were originally tombs and evidence of mill mortars found in most of these installations indicating that they were oil presses.

In sum, these previous works demonstrate that up to now little attempt has been made to investigate Cyrenaican production and trade in relation to both local and overseas markets. The survey projects have on the other hand revealed the high potential of the Cyrenaican countryside and the need for interdisciplinary work at both urban and rural sites, along with collaborative synthetic research and analysis.

