5-1950

Farm Organization and Management in Egypt and Utah

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FARM ORGANIZATION AND MANAGEMENT

IN EGYPT AND UTAH

by

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A thesis submitted in partial fulfillment
of the requirements for the degree

of

MASTER OF SCIENCE

in

AGRICULTURAL ECONOMICS

1950

Utah State Agricultural College
Logan, Utah

ACKNOWLEDGMENT

The writer is indebted to Dr. George T. Blanch, professor of agricultural economics, Utah State Agricultural College, who directed and supervised this study; to Professor E. M. Morrison for his contribution; and to Mrs. Mary West Miller for her excellent secretarial help.

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Logan, Utah

March 24, 1950

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INTRODUCTION

Background to the Study

Agriculture in Egypt is important to the economic structure of the country today as it was during the ancient days of Joseph and the Pharoahs, which dates back more than 3,500 years. As for Utah, agriculture is still important to the economic structure of the state as it was a hundred years ago in the days of Brigham Young and the Pioneers. These two statements should not hide the fact that the importance of agriculture to the economic structure of the two areas is diminishing. Since these ancient days, new techniques and methods have been introduced and used in agriculture. A great deal of mechanization has also taken place during these many years, but since agriculture is not as dynamic as industry, many old methods of farm management and organization and many old tools of farming are still in use. The slowness of farmers in accepting new ideas and deviating from the inherited methods is a striking example of this fact. Social changes in the field of farm management and organization which occur over years and centuries are so gradual that they are often overlooked.

Farmers, everywhere, seek the maximum return from the most limiting factor of production. In order to get that maximum, the availability and cost of various factors have to be known. Accordingly, different methods of organizing and managing farms need to be adopted.

The factors of production are land, labor, capital, and management. Management, in order to function, depends upon the first three factors. Land, labor, and capital are usually shaped, governed, and their use proportioned by the physical, social, and economic conditions. The physical condition involves topography, climate, soil, irrigation water, and drainage. Social and economic conditions involve population, man/land ratio,

industries, services, availability of capital, markets, government regulations, education, and technology. The study of the availability and limitations of these factors and conditions gives a general outline to farm organization and management. The proportions with which these factors are combined in order to operate and the way they are used on a farm is the organization and management.

Purpose and Importance of the Study

The object of this study is to compare and contrast the organization and management of farms in Egypt and Utah. It is also to find out the common practices and methods used in organizing and managing farms in the two areas. This is done by presenting the availability and costs of the different factors of production and analyzing their effects on farm organization and management.

The value of the work is to know the effects of the different factors of production in two different areas. It is also to study the responses of the people of the two areas to these factors. Under different conditions, farmers make different adjustments within their factors of production in order to get the best returns from these factors. The knowledge of these adjustments is of value.

Method of Procedure

Data used in this work are from secondary sources. For Egypt, these sources are the publications of the Ministry of Agriculture, textbooks used in Fouad I University, and other publications. The sources used for Utah are the Census; publications of the Utah Experiment Station; mimeographed papers from the Utah State Agricultural College, Department of Agricultural Economics; and other publications. Some of these data were pertinent for the work, while some others, especially about Egypt, were

not exactly satisfying.

Definitions of terms are not always the same in Utah and in Egypt. The work needed also the use of some words and terms with definite meanings. Therefore, when a term is used frequently, the definition of such a term is given at the beginning. Some terms when used by Egyptian farmers have certain meanings. Whenever one of these terms is used, it will be written in Latin letters as close as possible to its Arabic pronunciation. The meaning of such a term will be given in parentheses. The same method will be followed in writing the Arabic bibliography.

Physical, social, and economic conditions of the two areas are respectively given. Their effects are discussed. Finally the comparison of farm organization and management is made.

DEFINITIONS

Farm. In Egypt "a farm is a piece of cultivated or cultivable land equipped with buildings, farm machinery, livestock, and permanent laborers and their houses in order to perform agriculture operations under the supervision of a manager and his aids" (5). This definition seems to be very broad, but in practice and for economic reasons, areas with less than 40 acres are usually left without buildings.

In Utah the definition of a farm is different. "A farm is all the land on which some agricultural operations are performed by one person, either by his own labors alone or with the assistance of members of his household or hired employees, and when this land is three acres or more, or when it produces $250 worth of agricultural products when it is less than three acres" (13).

Arable land. Arable land is any cultivated land or any land which could be cultivated. It constitutes cultivated and cultivable lands.

Cultivated land. Cultivated land is any piece of land used for the production of field crops, truck crops, or fruits.

Cultivable land. Cultivable or cultivatable land is any arable land not yet cultivated. It may be idle or may be grazed, and it needs reclamation in order to be used for crop production.

Winter closure. Winter closure is a term used in Egypt for a forty day period during which irrigation water is shut off all the canals except navigable canals. The period starts December 25th and ends on February 5th every year.

Rotation period of (5-10). The (5-10) means 5 days with water in the canal and either 10 days without water or 5 days with water for another area irrigated from the same canal and 5 days without water at all.

Man-work-unit. "Man-work-unit is the equivalent of 10 hours of labor at productive farm work for the average farmer and farm laborer in Utah" (25).

Perennial irrigation system. Irrigation throughout the year by rotation of water into canals according to designated schedules.

Man-work-month. A man-work-month is the equivalent of 25 man-work units.

PHYSICAL CONDITIONS

Location, Latitude, Topography, and Elevation

Egypt occupies the northeastern part of Africa and the area of Sinai in Asia. Its boundries are the Mediterranean Sea on the north, Libya at the west, the Anglo-Egyptian Sudan to the south, and the Red Sea at the east. Egypt lies between the thirty-second and twenty-second north parallels of latitude.

Utah, which is one of the states of the United States, occupies the area that is surrounded by Wyoming and Idaho on the north, Nevada on the west, Arizona to the south, and Colorado and Wyoming at the east. It lies between the thirty-seventh and forty-second parallels north latitude.

Egypt, which covers 383,000 square miles, is a desert plateau with high mountains in Sinai and in the east overlooking the Red Sea. The plateau is cut from the south to the north by the Nile River and its narrow valley. The Delta and Valley of the Nile, five oases in the Libyan Desert and the province of Fayum are habitable and arable. This amounts to about 1/30 of the total area. The remainder of the land is a desert, uninhabited and unused. The Nile, which is the only river in Egypt, runs from the Egypt-Sudan line, which is 518 feet above sea level, to an altitude of 10 feet at Rosetta - one of its two mouths - on the Mediterranean in the north.

The State of Utah, which covers 87,720 square miles, about one-fourth the area of Egypt, is a high plateau. The Wasatch Mountains divide the state from north to south into two nearly equal parts. In the state there are 2,780 square miles of water and 84,970 square miles of land. The Great Salt Lake, Utah Lake, and Sevier Lake, which constitute the major part of the water body, are to be found in the Great Salt Lake

basin, west of the Wasatch Mountains. The state, according to the location of the mountains, their slopes, and the rivers, is divided into seven drainage basins. These basins are: Bear River basin, Utah Lake basin, Sevier River basin, Green River basin, Colorado River basin, Virgin River basin, and the Western basin. The mean elevation of Utah is 6,100 feet. Several mountain peaks rise to 12,000 feet or more above sea level. The valleys, in which most of the economic activities are concentrated, vary from about 4,250 to 5,250 feet.

Location, latitude, topography, and altitude directly affect and shape the climate of the area. Due to the location, the Delta in Egypt has the typical climate of the Mediterranean, while Upper Egypt and Utah have the continental climate. The amount of arable land is associated with the topography of the entire area. Location, latitude, topography, and altitude not only affect climate and soils, but also influence farming activities and marketing practices.

Climate

Climate is a basic natural resource. It involves directly the formation of soils and their fertility. It also involves the length of the growing season. The healthfulness of an area in relation to plant diseases and insects is also influenced by the climate. Even farming methods and practices are also affected by the climate and weather.

Temperature and growing season. The farmer, before attempting to grow a certain plant, must know two things: first, how many months the plant needs to mature; second, what is the favorable temperature for the plant growth.

Egypt and Utah have almost the same maximum and the same warm season's average temperatures. They differ when the minimum and the cold season's average temperatures are compared. (Table 1.)

Table 1. The temperature over a period of years in selected stations in Egypt and Utah

Item	Egypt			Utah					
	Alexandria	Cairo	Aswan	Logan	Moab	Salt Lake City	Manti	Vernal	St. George
	F	F	F	F	F	F	F	F	F
Jan. average	57.8	55.0	62.0	24.3	28.6	30.1	25.0	17.1	38.4
July average	79.0	82.8	92.6	73.1	78.4	77.0	69.2	70.4	82.9
Year's maximum	111.0	113.0	124.0	102.0	113.0	105.0	110.0	106.0	116.0
Year's minimum	37.0	31.0	36.0	-25.0	-24.0	-20.0	-27.0	-38.0	-11.0

Sources (26)

In Egypt the growing season is 365 days a year for the major and hardier plants. As for Utah, the length of the growing season differs in the different parts of the state. The season also differs in its starting and ending dates. In Table 2, the average length of the growing season in different locations in the state is given.

Table 2. Growing season over a period of years in selected stations in Utah

Station	Growing season		Length in days	
	Starts in spring	Ends in fall	Mean	Extreme
Salt Lake City	Mar. 9 to May 11	Sept. 25 to Nov. 15	192	140-246
St. George	Mar. 16 to May 20	Sept. 25 to Nov. 18	196	137-234
Moab	Mar. 25 to June 17	Sept. 14 to Oct. 30	169	95-211
Logan	Apr. 5 to June 13	Sept. 13 to Nov. 4	157	98-197
Manti	Apr. 5 to July 3	Aug. 31 to Oct. 19	124	79-173
Vernal	Apr. 25 to July 4	Aug. 31 to Oct. 10	118	62-155

Source (26)

Precipitation and snowfall. Water supply, from rainfall or irrigation canals, ranks with temperature as the great determiner of where plant species grow naturally or can be grown agriculturally. The usefulness

of rainfall to plants depends on the amount of rain and on the time of the year this amount falls in respect to the growing season. (Table 3.)

Table 3. Precipitation in inches in selected stations over a period of years in Egypt and Utah

Average Precipitation	Egypt			Utah					
	Alexandria	Cairo	Aswan	Logan	Moab	Salt Lake City	Manti	Vernal	St. George
January	2.09	0.35		1.60	0.77	1.31	0.97	0.59	0.93
February	0.94	0.20		1.57	0.69	1.55	1.16	0.56	1.11
March	0.51	0.16		1.93	0.86	2.00	1.36	0.77	0.88
April	0.16	0.12		1.90	0.75	1.85	1.24	0.90	0.54
May	0.04	0.04		1.91	0.79	1.94	1.30	0.83	0.39
June	T	T		0.83	0.41	0.74	0.56	0.34	0.22
July	T	0.00		0.65	0.98	0.57	0.91	0.61	0.88
August	T	0.00		0.70	0.88	0.91	0.86	0.77	0.95
September	0.04	T		1.14	0.93	0.95	1.01	1.00	0.64
	0.20								
October	0.28	0.08		1.74	0.91	1.43	1.07	0.90	0.78
November	1.34	0.12		1.25	0.68	1.28	0.85	0.68	0.57
December	2.64	0.20		1.26	0.93	1.26	0.87	0.58	0.84
Year	8.04	1.07	T	16.48	9.58	15.79	12.16	8.53	8.73
Growing season	7.52			5.41	6.65	8.54	3.24	2.57	4.06

Source (27)
T means trace
Marked months, in Utah are the months of growing season, in Egypt are the months of barley's growing season.
Each (_) represents 7½ days, and each (.) represents 4 days.

Since grazing, as it is known in Utah, is not practiced in Egypt, the amount of rainfall is almost useless except for the narrow strip of land along the Mediterranean. In the northern part of the Delta, where artesian wells are not available, rainfall helps the vegetation during

the "winter closure." The Bedouins, on the northern part of the desert, practice dry-farming by growing barley on the seven inches of rain that fall during barley's growing season. Crops grown in the Valley and the Delta are irrigated from the Nile, which gets its water from rainfall at the Equator and over the Abyssinian Mountains.

Precipitation in Utah is the main source of moisture for plants. The major part of the precipitation in Utah comes in the form of snow during the winter season. The melting snow in late spring and early summer provides the main source of water for the streams and rivers.

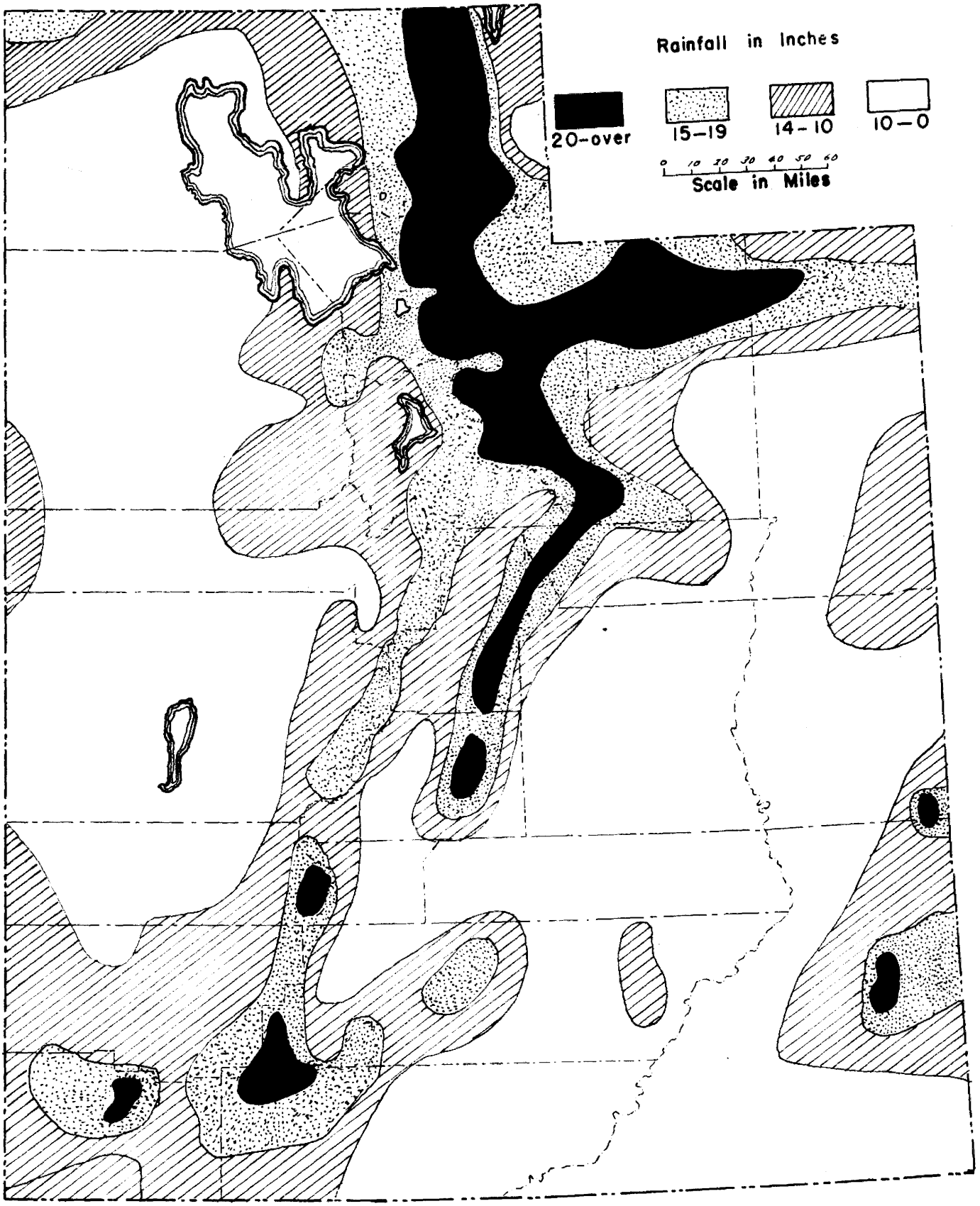
The amount of rain differs from place to place according to the elevation and location. (Table 3 and map on page 11.) This rainfall, according to amount and time of the year, provides moisture for crops on dry-farms and for grazing lands. It also supplements water requirements of plants grown under irrigation.

Winds, humidity, and sunshine. Winds, relative humidity, and sunshine are as important to agriculture as other climatic factors. They affect the rate of evaporation and hence, the plant needs for water. Winds, humidity, and the lack of sunshine help in carrying, spreading, and stimulating plant diseases and insects. Germination, maturity, and productivity of plants are closely affected by these three factors. Winds, humidity, and sunshine not only affect the plant, but also the soil. Winds may erode it, while humidity and sunshine stimilate or stupefy the formation of soil nitrogen.

Wind velocities in Egypt and Utah are usually light to moderate. In Modena and Salt Lake City, Utah, they range normally from about 7 to 12 miles an hour (26). As for Egypt, the mean wind velocity ranges from 5.5 at Aswan to 10 miles at Alexandria (1). In Utah, there has never

AVERAGE ANNUAL PRECIPITATION

IN UTAH



been a destructive tornado, though strong winds occur occasionally, some of them attaining damaging proportions in limited areas. Also in Egypt, there has never been a destructive tornado, though the Kahmseen, which blows in the spring, causes damages to some crops, especially wheat.

The Utah atmosphere is comparatively dry, the noon and evening relative humidities observed being between 35 and 45 per cent for the year. In Egypt, relative humidities differ from place to place and according to season. On the average, humidity rises to 80 per cent in the Delta during the winter, and in July it drops to 27 per cent in Southern Egypt. However, during the Khamseen, the relative humidity fluctuates from 5 per cent while the wind is blowing to 90 per cent when the regular northern wind blows again.

Sunny skies predominate most of the year in Egypt and Utah. In the two areas, the wind, sunshine, temperature, and low atmospheric humidity in summer all tend to promote rapid evaporation.

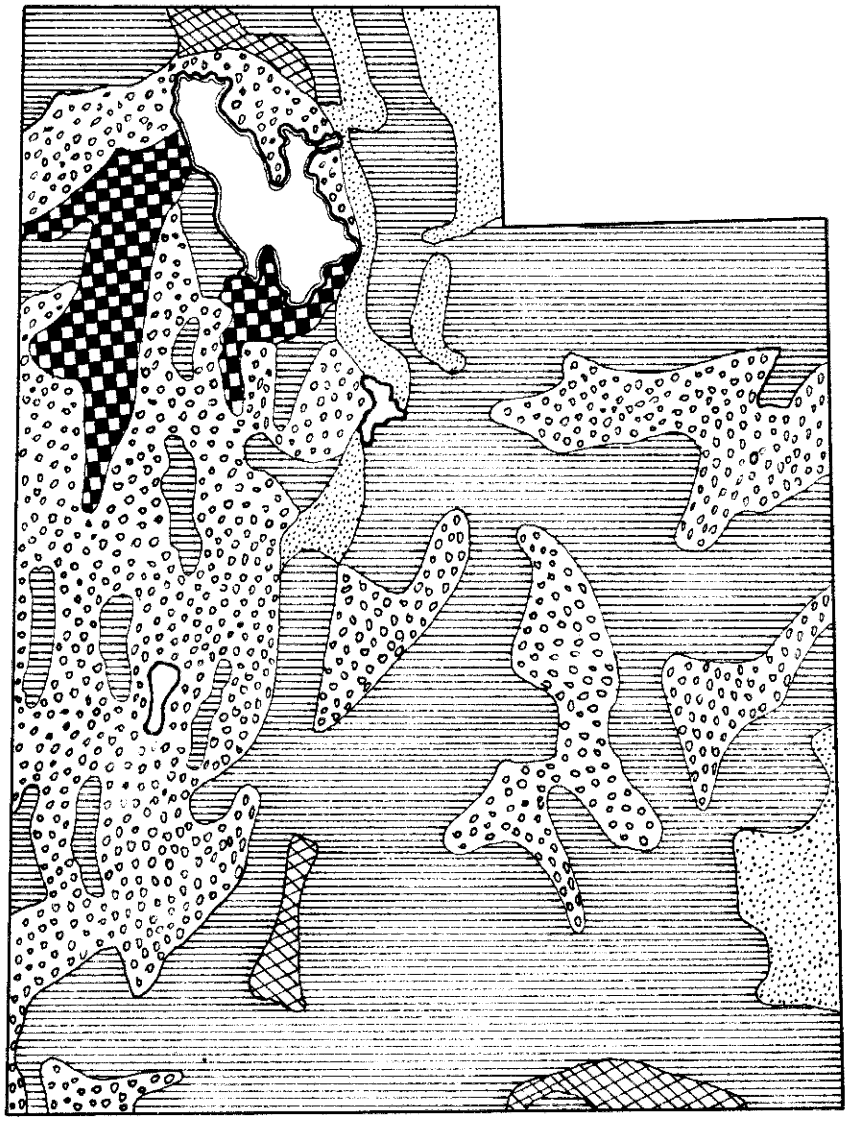
Soils

Soil is the natural medium for the growth of plants. In different areas, this medium differs in quantity as well as in quality. The agricultural wealth and income of a nation depend upon the quantity and quality of the soil as well as upon the other factors of production. Crops grown and farming methods are also influenced by the soil.

Description of the soil. The three groups of soils are to be found in Utah. Chestnut soils, brown soils, and sierozem or gray desert soils represent the zonal soils. Solonchak and solonetz soils represent the intrazonal group. The azonal soils are represented by the lithosols and shallow soils (page 13). The only group of soil found in habitable Egypt is the azonal group, which is represented by the alluvial soils (29).

UTAH

SOIL GROUPS



ZONAL

CHESTNUT SOILS.

BROWN SOILS.

SIEROZEM OR GRAY DESERT SOILS.

INTRAZONAL

SOLONCHAK AND SOLONETZ SOILS.

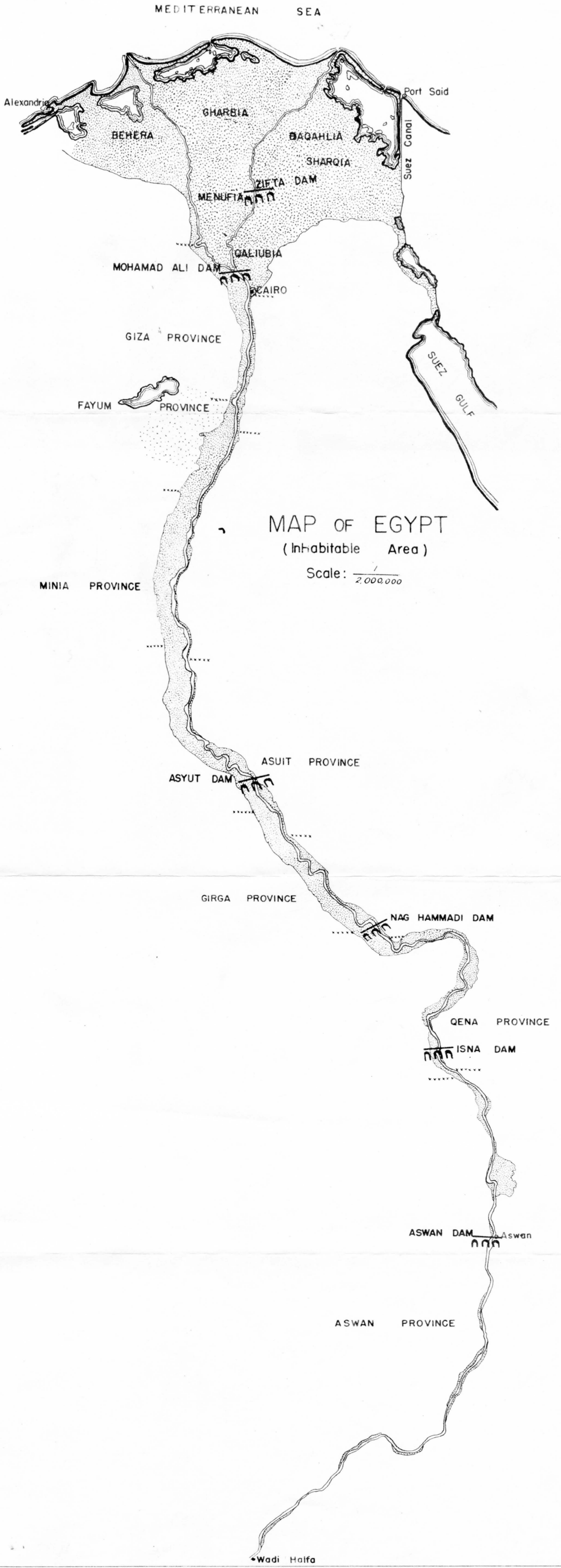
AZONAL

LITHOSOLS AND SHALLOW SOILS.

Chestnut soils of Utah are mellow, granular, gravelly loam topsoils over very gravelly subsoils. Brown soils vary from fine sandy loams to silt loams. Sierozem, or gray desert soils, are with surface soils that range from not calcareous to distinctly so. These three sub-groups of soils have a distinct concentration of lime in the subsoils. They are naturally subject to rapid erosion. Soluble salts are present in moderate to high concentration in many places. Solonchak and solonetz soils, or the saline and alkali soils, are often intimately mixed. Saline soils are commonly light brown to light brownish gray with a white salty crust in places on the surface. The surface is granular, while the subsoil is moderately compact. Alkali soil is present in spots scattered through the solonchak. It has a light brownish-gray, ashy surface soil, somewhat compact. The subsoil is usually cemented into hardpan. The lithosols and shallow soils are mostly shallow and stony or gravelly. They are subject to rather rapid natural erosion.

The alluvial soil of Egypt comes from a great variety of soil materials. It is for the most part fertile, and where drained and protected from uncontrolled overflow, is highly productive. In this group there is a range of soil texture from sand to clay. The alluvial soil near the banks of the Nile and in the southern part of the Delta is deeper and of finer texture and more fertile than that of the northern part of the Delta and along the edges of the deserts.

Limitations and crops grown. Lands of zonal soils in Utah are largely under cultivation. Some of the steeper, stonier, or coarser soils are used only for grazing, although they have a low carrying capacity for livestock. Crops grown on this land, when irrigated, are alfalfa, small grains, corn, sugar-beets, fruit trees, and vegetables.


MEDITERRANEAN SEA
Alexandria
Port Said
GHARBIA
BEHERA
DAQAHLIA
SHARQIA
Suez Canal
ZIFTA DAM
MENUFIA
QALIUBIA
MOHAMAD ALI DAM
CAIRO
GIZA PROVINCE
SUEZ GULF
FAYUM PROVINCE
MAP OF EGYPT
(Inhabitable Area)
Scale: 1/2,000,000
MINIA PROVINCE
ASUIT PROVINCE
ASYUT DAM
GIRGA PROVINCE
NAG HAMMADI DAM
QENA PROVINCE
ISNA DAM
ASWAN DAM
Aswan
ASWAN PROVINCE
Wadi Halfa

In dry-farming areas, wheat raising is fairly successful. The chief needs of these soils are organic matter and nitrogen. Superphosphate fertilizer proved to increase production of the lighter-colored, limier soils. Irrigation water, especially in the sierozem and gray desert soils areas, should be handled carefully, as these soils wash badly. Seepage and concentration of salts (alkali) are common on irrigated lands. Artificial drainage and leaching are essential for this land. Erosion control measures, such as reestablishment of natural vegetation and disking, are also needed.

Solonchak and solonetz soils of Utah are wasteland. Lithosols and shallow soils have, in most places, no value for agriculture and have only small value for range. A few narrow strips of land in canyon bottoms are farmed and are producing fruits, vegetables, alfalfa hay, and small grains.

Crops grown on the soils of Egypt range from peanuts on the sandy soils to rice on the heavier soils. They also range from sugar-cane in the warmer areas to potatoes in the cooler areas. Cotton, corn, clover, wheat, barley, sorghums, broadbeans, truck crops, and citrus fruits are the main crops grown in Egypt. Frequent irrigation is needed on sandy soils, while much of the heavier soil requires drainage projects, especially where rice is cultivated and where saline and alkali soils are found. Saline and alkali soils are in scattered areas in Lower Egypt, especially in the northern part. Near the edges of the deserts and where the soil is shallow, hardpan subsoils sometimes are formed. Nitrogen is very essential for the alluvial soils of Egypt, while potash is not needed at all. Superphospate is required for legumes and cotton. Organic matters are also needed, especially on sandy soils.

Land uses. Egypt covers an area which is four and a half times as great as that of Utah, but has an agricultural area which is only 1/5 of that of Utah. Only 1/30 of Utah's agricultural land is used for crop production, while more than 2/3 of Egypt's agricultural land is used for crop production. In Egypt, grazing land is unknown, but in Utah it engages 29/30 of the agricultural land. One-fourth of Egypt's arable land is cultivable and could be reclaimed. More than one-half of Utah's arable land is cultivable, but because of a lack of irrigation water, only 2/3 of this cultivable land can ever benefit from irrigation projects. (Table 4.) Almost 1/5 of Utah's agricultural land is in farms, while 7/8 of Egypt's cultivated land is in farms.

Table 4. Land uses in Egypt and Utah

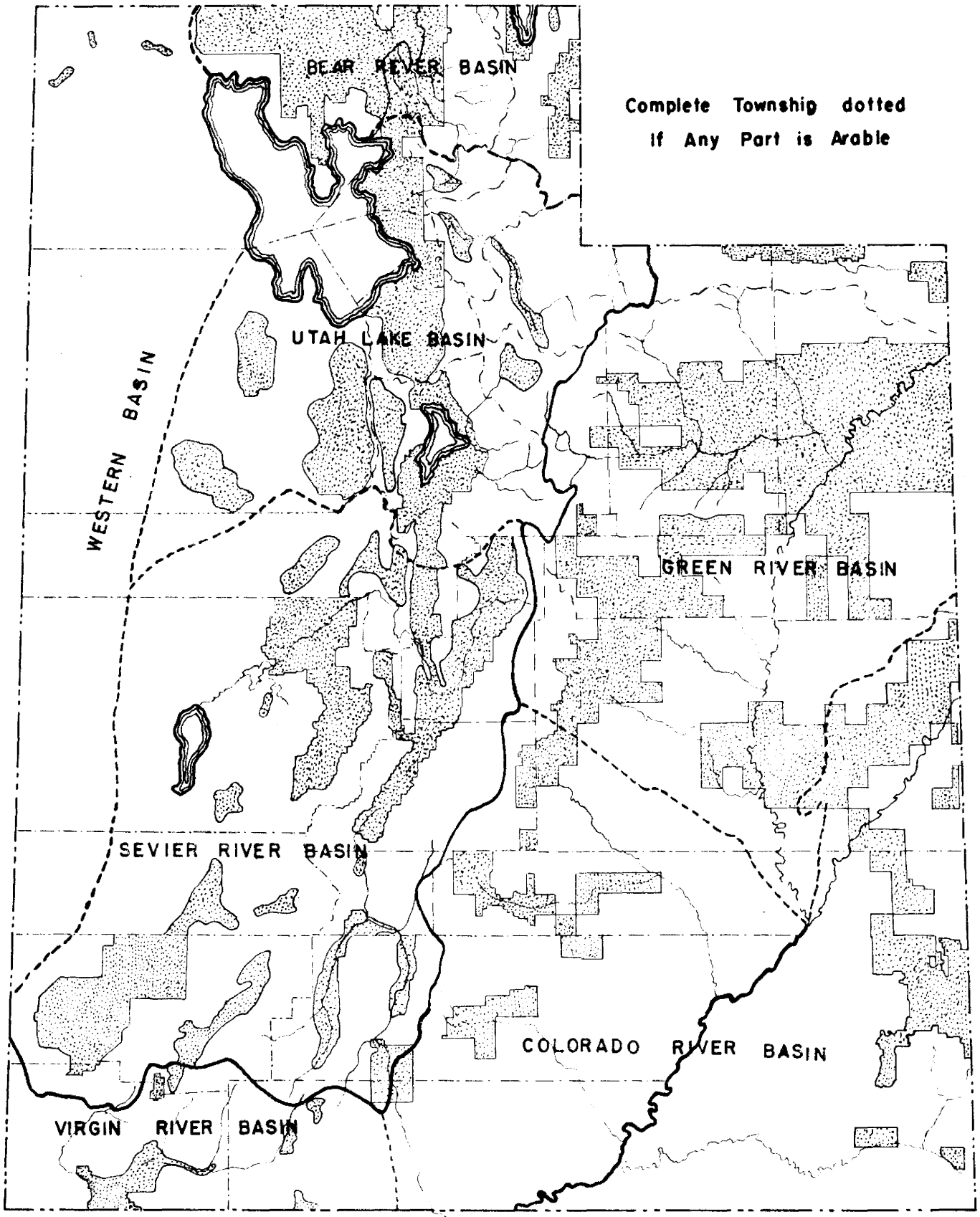
Item	Egypt - 1944		Utah - 1945	
	Acres	Per cent	Acres	Per cent
	(1,000)		(1,000)	
Land used for agriculture				
Irrigated land	5,914	2.40	1,019	1.90
Dry-farming land	T		517	1.00
Grazing and pasture land			45,841	87.00
Wood land			11	.02
Other land	2,707	1.10	95	.18
Total agricultural land	8,621	3.50	47,483	90.10
Non-agricultural land	238,419	96.50	5,217	9.90
Total land area	247,040	100.00	52,700	100.00
Total arable land	7,681	3.10	3,176	6.00
Cultivated land	5,914	2.40	1,536	3.10
Could be reclaimed	1,768	0.70	1,014	1.90
Beyond reclamation	-	-	625	1.20

Sources (3) and (33) for Egypt and Utah respectively
T means trace.
Other land in Egypt includes cultivable land and public utility land.

Productivity of the soil. A comparison of the productivity of the soils of the two areas can be made by comparing the cropping rate

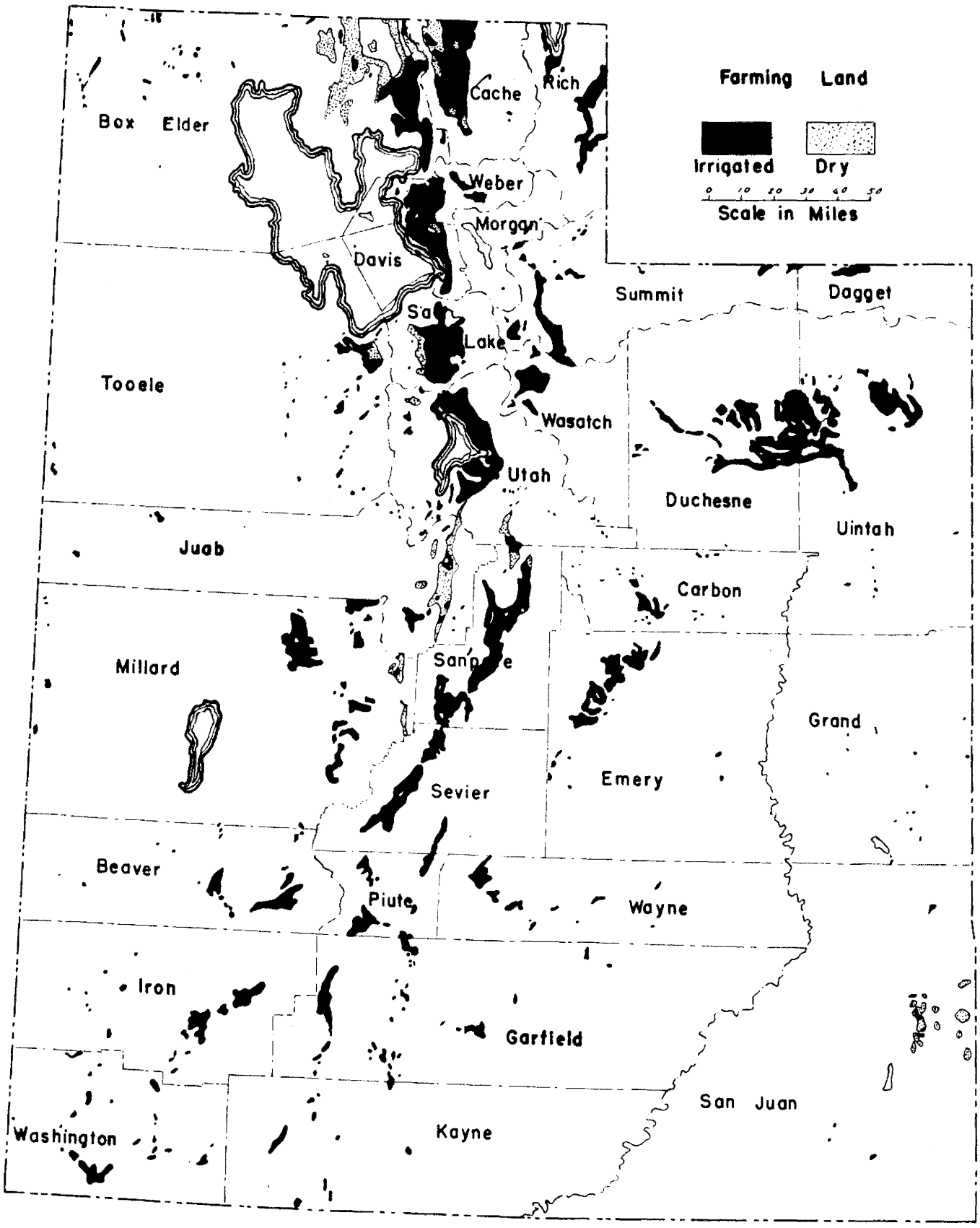
KNOWN ARABLE LAND

IN UTAH



AGRICULTURAL LAND USE

IN UTAH



and the yield per crop acre of the two areas. The average cropping rate in Egypt is little over one and one-half crops per year, about two in Lower Egypt, and more than one in Upper Egypt. The total cropped area in 1944-45 was 9,148,000 acres on a total cultivated area of 5,914,000 acres (3). In Utah, the irrigated and dry-farm land in 1945 was 1,536,000 acres, but only 1,248,000 acres were reported as harvested. The remainder was either idle (274,000 acres) or reported crop failure (14,000 acres) (14). This high cropping rate of Egypt is possible because of the long growing season, a perennial irrigation, and adequate supply of water for most land under cultivation. The amount of double cropping in Utah is negligible because of the short growing season and also because the supply of water is inadequate for all the land under cultivation.

Even with the high cropping rate in Egypt, yields are very high also. (Table 5.) The high yields are partially due to the inherent qualities of the alluvial soils and the nourishing value of the water of the Nile. Mainly these high yields are achieved by the lavish use of artificial fertilizers. (Table 23.)

Table 5. Average yield per acre of selected crops in Egypt and Utah compared to average yield in the United States and the highest yield in the world

Crops	Egypt	Utah	U.S.	Highest in the world	
	1935-39	1933-44	1935-39	1935-39	
Cotton, bales	1.03	...	.47	Egypt	1.03
Wheat, bushels	31.30	21.58	13.20	Denmark	45.40
Corn, bushels	39.50	26.08	25.00	New Zealand	45.40
Rice, bushels	71.60	...	49.70	Italy	103.90
Barley, bushels	38.80	41.40	22.10	Belgium	48.20
Sugar-beets, short tons	...	12.40	11.20	Sweden	16.20
Sugar-cane, short tons	32.68	...	20.21		

Source (27)

Irrigation

Irrigation water, besides rainfall, has two other sources, rivers and wells. Both sources are used in Egypt and Utah. To guarantee water rights and to get the maximum use of water, certain rules and measures are enforced by the authorities of the two areas.

Water sources. In Egypt, the source of water, even for ground water, is the Nile. The average annual flow of water through Aswan Dam is 2,936,525,000,000 cu. ft., or about 8.8 acre-feet per each arable acre. This amount is estimated by the experts to be more than enough for the country when the Nile is completely harnessed. It should be mentioned that there are three reservoirs on the Nile, one in Egypt and the other two in the Sudan. There are also five dams on the river in Egypt.

Although the Nile's water is enough, artesian wells are used, but mainly for emergency cases. The healthfulness of ground water for plants depends upon the pH value. As a rule, the pH value of water taken from wells drilled in areas where the elevation is less than 17 feet above sea level is less than 5; therefore, this water is unhealthy for irrigation.

Utah has five main rivers - Bear River, Weber River, Sevier River, Colorado River, and Green River - and many small rivers and streams. All those rivers and streams give a full supply of water to 407,000 acres and a partial supply to 757,000 acres. The construction of several reservoirs and dams made the irrigation of this land possible. At the present time, it is possible to increase the irrigated land to 1,772,500 acres by bringing into cultivation 607,000 acres of new land and by extending full water supply to 406,000 acres. This means that the rivers of Utah in their present state fail to irrigate 1,403,500 acres of the arable land (32 and 13).

Ground water in Utah is used on a very small scale. It either supplements or substitutes the streams' water. Land irrigated from ground water is only 0.8 per cent of the total irrigated area in the state.

Water rights. The right to get irrigation water in Egypt is subject to government control. At the same time, this right is given automatically to the owner of the land when the purchase is made and when taxes are levied. All public water canals are under the supervision and management of government engineers. Every year, these engineers prepare the schedules for rotating the irrigation water in the canals. These rotation schedules differ from area to area according to soils and crops. They also differ from year to year according to the amount of water expected in the Nile. Rotation periods are, as a rule, 5-10 in the late winter and spring, 7-14 in summer and fall, and 4-4 throughout the growing season in the rice areas. When vegetables and fruit trees are grown on a large scale in an area, a "day with water" is given at the middle of the "days without water." During the "days with water," the farmer is allowed to take as much water as the irrigation pipes allow him to take, either by pumps, other lifting machines, or by the natural flow of water. These pipes differ in diameter according to the field or acres they are designated to irrigate. In the southern part of Upper Egypt, the irrigation system used is called the "basin irrigation system." A basin is from 5,000 to 50,000 acres. Ordinarily, water is conducted into these basins in order to fill them, about the second week in August. The filling in the southernmost basins is completed by the first of October, when the escapes are opened and the water discharged back into the Nile ordinarily by the middle of October.

In Utah stream or river water of an area is owned by the "mutual

irrigation company" of that area. A mutual company derives its revenue from assessments upon the capital stock which is owned by the holder-farmers. When a stockholder fails to pay the assessments which are payable in cash, labor, or both, the company enforces the collection of such assessments by sale of the stock involved or by refusal of water service. It is obvious that only those who have land in the canal area of the company involved are eligible for purchasing the stock sold. Stocks were first distributed among water users according to the size of their land on the canal, but now a farmer can buy stocks whenever an auction is held for the above-mentioned reason. Irrigation works and water delivery in a certain area are controlled by the water master. The usual method of water delivery is to rotate irrigation streams among the stockholders according to a fixed schedule. Continuous deliveries are very uncommon in Utah, while deliveries on demand of the users are provided for whenever water supply is ample. Rotation periods differ from 7 to 21 days, according to the water supply, crops grown, and area irrigated.

In Egypt any landowner may drill wells in order to obtain ground water. He is only required to obtain a license for the machine that operates the pump on the well. This license is always given when the safety measures are taken care of and when the well is without the minimum distance from public canals, roads, and buildings. In Utah all ground water is subject to the same appropriative rights that apply to the stream waters. A farmer cannot drill a well to get ground water for irrigation unless he gets a permit from the state engineer. A permit is only given after surveying the ground water of the area and finding that a well will not affect other water rights.

Drainage

Drainage to Egypt is as important as irrigation. Its importance to the fertility of the soil was realized after shifting from "summer" and "basin" irrigation systems to the "perennial" irrigation system. Drainage is needed to keep the water table low enough for plants to survive, to remove harmful salts and alkali from the soil either for its reclamation or improvement and to enable the farmers to grow rice. Egypt had, in 1943, 231 miles of navigable drainage canals and 7,012 miles of non-navigable canals (3). All these canals are publicly owned and are taken care of by the Ministry of Public Works. More than that, the farmers have on their lands their private ditches which drain into the public drainage system. Most of this drainage net is in Lower Egypt. It drains about 4,947,000 acres. This net is drained into the Mediterranean by electrically driven pumps located at twenty-four stations.

In Utah the problem of drainage is not as great as it is in Egypt. The main purpose for drainage in Utah is to remove alkali and seepage from irrigation from the soil. Other purposes for drainage are the improvement of farmed land, reclamation of swamp land, and the protection against overflow. Utah has 1,886 miles of drainage ditches and tile drains. This system of Utah's drains 202,058 acres (13).

ECONOMIC AND SOCIAL CONDITIONS

Population and Man/land Ratio

The population in both Egypt and Utah is increasing at a very high rate. In Egypt this is more of a problem than it is in Utah. During the last few years, most of the growth in the population of Utah took place in the urban areas, while the rural areas of Egypt received most of the growth. (Table 6.)

Table 6. Population in Egypt and Utah over a period of year, the ratio of rural population to total population in both areas and their rate of increase

Egypt						Utah					
Year	Population 1,000		Increase in 20 years		% Rural total	Year	Population 1,000		Increase in 20 years		% Rural total
	Total	Rural	Total	Rural			Total	Rural	Total	Rural	
			Per cent	Per cent					Per cent	Per cent	
1907	11,287	9,994			88.5	1900	277	171			61.7
1927	15,933	12,241	41.1	22.4	76.8	1920	449	234	62.3	36.3	52.3
1947	19,091	15,436	19.8	26.1	80.8	1940	550	245	22.4	4.7	44.5

Sources (3 and 13)
In 1947 the estimated total population of Utah was 647,000, and the land population was 99,989 (36).

While the population of Egypt increased 19.8 per cent during the twenty years from 1927 to 1947, cultivated land increased only by 1.6 per cent in the period from 1929 to 1944. In Utah the total population increased during the '20's and the '30's by 22.4 per cent, while harvested crop land remained nearly constant. During the period from 1927 to 1947 Egypt showed an increase in rural population of 26.1 per cent, while Utah showed only 4.7 increase for a comparable period.

Table 7. Man/land ratio in Egypt and Utah

Item	Men per 100 acres	
	Egypt	Utah
Ratio of total population to 100 acres of total land	7.70	1.04
Ratio of total population to 100 acres of agricultural land	221.40	1.20
Ratio of total population to 100 acres of crop land	208.60	35.80
Ratio of rural population to 100 acres of total land	6.20	.46
Ratio of rural population to 100 acres of agricultural land	179.05	.51
Ratio of rural population to 100 acres of crop land	168.70	15.90

Sources, Tables 4 and 6

The ratio of land population to 100 acres of crop land in Utah is about 6.5. In Egypt that ratio is over 47 and below 168.7.

An acre of total land in Egypt is carrying 7.4 times as many people as an acre in Utah. A cultivated acre in Egypt is carrying 35 times more rural people than that in Utah.

Industries

In order to give a true idea about industries in Egypt and Utah, it is necessary to know their history as a whole in both areas.

History. In Egypt, the shortage of imports during the war of 1914-1918 brought into being many minor industries, some of which survived the war and gave the older ones a new lease on life. Nevertheless, up to the tariff of 1930, Egyptian industry remained depressed.

In 1930 the duties on imports were drastically increased, and although there is still much scope for differentiation between raw materials and finished goods, it is certain that industry enjoys a very substantial measure of protection. The last 15 years have seen the investment of relatively large sums in industry.

During World War II, again, the shortage of imports, the increase in demand arising from the presence of Allied troops in Egypt and the consequent rise in prices have had a very stimulating effect on Egyptian industry and oil drilling. The index of net profits from industry rose from 114 in 1938 to 154 in 1940 and 175 in 1941. Certain figures of output are also illustrative. The output of cotton yarn rose from 55,000,000 pounds in 1938 to 79,000,000 pounds in 1942. The output of the weaving industry, especially handlooms, rose from 190,000,000 yards in 1938 to 300,000,000 yards in 1944. Food industries have also benefited, the output of sugar rising from 160,000 tons to 200,000 tons, and that of cottonseed oil from 40,000 to 90,000 tons.

Compared with other countires, Egyptian industry shows a remarkable degree of stability. This stability is due to the fact that Egyptian industry produces entirely for the home market, is heavily protected, is monopolistic, has very low debenture charges, and, above all, to the fact that, in the main, it ministers to very simple and inelastic needs.

Utah industry and mining passed through three periods. These periods are:

1. The self-sufficing isolation period. This period started with the pioneers in 1847 and ended in 1869 when the transcontinental railway was completed. During that period, the Utahns were producing and manufacturing nearly everything they needed, from farm tools and weapons to soap and even cotton textiles.

2. The railway period. This declining period started in 1870 and ended in 1890. Although railways brought bankruptcy to most of the industries, it stimulated the shipping of gold, silver, lead, copper,

hides, beef, and wool. Those industries which ran out of business were the textile industry, except wool; the tanning industry; farm machinery industry; and iron foundries.

3. Twentieth-century period. After 1890, the Utahns started to arrange their house after settling their differences with the federal government. The people began to understand what industries they had and which could benefit them most. Out-of-state capital was brought into Utah for investing.

With the adequacy and the inexpensiveness of power and the large reserves of coal and raw materials, Utah industries started to develop. The tremendous demands during World War I had a stimulating effect on the industries. During the depression decade of 1930, mining and agriculture were both retarded, mining from production of 48 per cent of the state's annual wealth to about 24 per cent; agriculture from 17.22 per cent to about 13 per cent. However, manufacturing increased steadily. In 1929 it produced 21.94 per cent of the state's income, and in 1939, very nearly 40 per cent. (22) Since 1935 Utah industry, in spite of fluctuations, has steadily increased the volume and the value of its output.

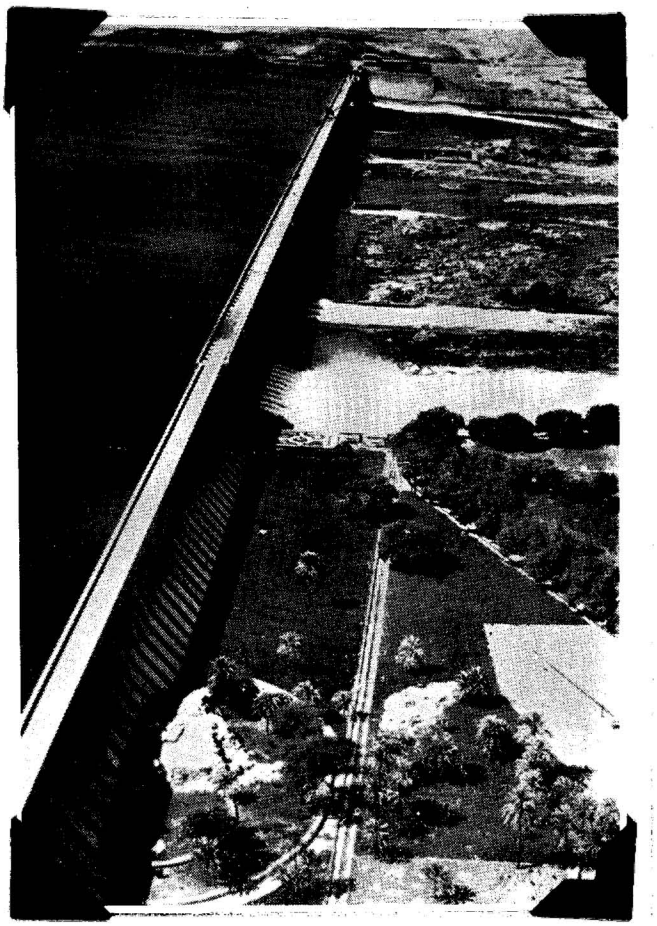
The major effects of World War II on Utah's industry and mining were the marked increase in the state's instruments of production, consisting mainly of new manufacturing plants filled with modern machinery and the finding of a number of important new mineral deposits.

The stability of Utah's industry depends on the stability of the industry of the United States. Since the United States' industry operates on a world wide scale, competes with the industries of other nations, and produces goods whose demand is elastic as well as goods whose demand is inelastic, the industry of Utah is not as stable as that of Egypt.

Main industries and mines. In Egypt, the old-established cotton ginning and pressing factories handle the whole of the cotton crop. This industry employs 40,000 men and women during the season, which lasts from October to April. Spinning and weaving is the branch of industry in which advance has been most marked. Nevertheless, there is still much scope for development, as may be seen from the fact that Egypt has only 250,000 spindles, i.e., one per 64 inhabitants, while the proportion in the United States is one per 5. In 1939, output of cotton piece goods was about six times as great as that of 1930. A little over one-fourth of the total output of 1939, which was 180,000,000 square yards, came from hand looms. Alongside the spinning mills and weaving sheds have grown factories making hosiery, underwear, and ready-made clothes. Although the cotton industry is highly protected by tariffs, it continues to be handicapped by the prohibition on the import of foreign cotton into Egypt. This means that the cotton industry is compelled to make low-priced goods with high-quality, expensive Egyptian cotton. (21)

The only other important branch of textiles is silk weaving (17,000,000 square yards), but there is a small production of woolen and linen goods. In 1942, a jute company was founded. (21)

The thirteen cottonseed presses work well below capacity, since only some 730,000 ardabs (Appendix) of seed, or 35-40 per cent of the crop, are usually pressed. Output of oil is about 40-50,000 tons, of which 30,000 are consumed within Egypt as oil, about 10,000 are exported, and 6,000 to 10,000 are used locally for making soap. Some 230,000 tons of cottonseed cake are left as by-products, 90 per cent of which is exported. (21)



Aswan Dam in Egypt. Every year, 2,936,525 million cubic feet of water flow through the gates of this dam. The electrification of this gigantic structure is now taking place. It will provide 354,000 horsepower.

Small quantities of linseed and olive oil are also produced. The soap industry works on local and imported oils. Output is about 45,000 tons, meeting 90 per cent of the local requirements. (21)

The 1930 duty on wheat and wheat products, which cut off practically all imports, has greatly stimulated the milling industry. Although twenty modern mills using cylinders have been set up, there are still 3,000 primitive stone mills. Rice mills have also grown in importance with the increase of the crop.

Sugar mills and refineries are concentrated in the Société des Sucreries, whose prices and profits are subject to government control. Output of sugar varies between 150,000 tons and 200,000 tons, of which 40,000 tons are exported. The bulk of the raw sugar is obtained locally, but some 30,000 tons are imported. Output of molasses is about 80,000 tons, of which some 20,000 are exported, the rest being used in the production of alcohol (5,000,000 quarts). (21)

Other main industries are: building, which employs 120,000 men; brewing, whose output was 200-250,000 gallons, covering 65 per cent of the local consumption; glass; metallurgy, consisting mainly of the transformation of half-finished imports; engineering, largely concentrated on the repair of ships and other engines; tanning and dyeing, which meet practically all local requirements; chemical industries, producing sulphuric acid, caustic soda, matches and varnishes; food canning; plastics and synthetic fibers. The only paper factory produces 20,000 tons of paper made of rice stalks. A new synthetic nitrate factory, besides the one proposed at Aswan, is under construction. Its annual output will be 300,000 tons of nitrate and can be doubled when needed.

The oilfields on the Red Sea produced 1,220,000 tons of oil in 1941.

This output is sufficient to cover all local requirements apart from kerosene. Nearly all the output of the Egyptian oil fields is refined in the two local refineries.

The output of phosphates has been over 500,000 tons. Nearly 90 per cent of this annual output is exported. The remaining 10 per cent is chiefly converted into superphosphates of which some 20-30,000 tons are produced annually.

Manganese is mined in Sinai, and 200,000 tons of low grade ore are exported each year.

Although the figure for the total production of salt has not been published, output - which is probably over 200,000 tons - not only covers all the requirements of the country but leaves a fairly substantial surplus to be exported. (21)

Cement production has attained 400,000 tons, but production capacity is estimated at 600,000 tons. Local production meets 90 per cent of the country's needs. (21)

Mention should be made of the quarries of marble, granite, basalt, and talcum. But what seems to be the largest of Egypt's mineral resources remains unexploited. In 1937 it was announced that iron ore deposits estimated at 1,000,000,000 tons had been discovered at Aswan.

The main basic industries, other than agricultural production, of Utah are mining; smelting; grain milling; processing of dairy products, fruits, and vegetables; sugar refining; meat packing; baking; processing of commercial livestock feed, textile-making; manufacture of steel; printing; transportation; and oil refining. Mining leads all other industries in importance.

Smelting, which is one of the leading industries in Utah, has made

its major development since 1910. Utah ranked fifteenth among iron-producing states from 1930 to 1940. In 1939 non-ferrous metals smelted in Utah were valued at $74,470,000.

Flour milling assumed commercial significance about 1890, when the practice of grading wheat was introduced. In the following decade, the development of dry-farm wheat provided Utah millers with raw meterial to make flour for export. Utah, in 1939, had thirty-four establishments in operation, with a combined output of about $6,400,000 worth of flour and $2,676,000 worth of livestock feeds. As a kind of step-child to flour milling, baking grew into economic significance after 1910. In 1939 the output of this industry was valued at $3,766,000.

Canning, a logical process for a region blessed with prolific truck-garden soil and distant markets, began in 1886 in a home plant at Ogden. By 1939, the industry was one of the state's most important industries, with an annual pack worth $6,393,000.

Beet sugar manufacture was first attempted in 1853 in Salt Lake City. The industry had seven establishments in 1939, with a combined annual production of about $8,300,000 worth of sugar. A generous portion of Utah-manufactured sugar is converted into candy. In 1939 there were nine candy and other confectionery establishments in the state, with a combined output worth $1,503,000.

Cheap and fast motor-truck transportation opened Pacific Coast markets to dairymen during the 1920's. About 1924, the dairymen began to practice cooperative marketing, and since that date they have steadily pushed to the front the dairy industry.

The meat-packing industry began modestly with smoked bacon in 1860, and was encouraged by improved refrigeration after 1900. In 1939 the

industry had an annual pack worth $10,065,000, including poultry dressing and packing.

In 1939 manufactured products of the machinery and printing industries were valued at $3,575,000 and $5,831,000 respectively.

Utah began commercial export of salt from Great Salt Lake in 1890, a business simplified by the great quantity of available salt, and by the relative simplicity of extraction from brine by evaporation. The annual export since 1930 has been consistently in excess of 80,000 tons.

Exploitation of mineral resources in Utah is governed primarily by transportation costs and the accessibility of mineable property. Most of the commercial ores are found in lode and bedded deposits, and in the case of metallic ores are frequently of complex or refractory nature, requiring elaborate equipment for concentration and separation. In general, minerals and ores are shipped as raw or semi-finished materials to refining and manufacturing centers outside the state. Copper, lead, zinc, silver, and gold are the most important metals mined in Utah. From 1939 to 1945, they contributed about 75 per cent of the state's mining output, while coal contributed about 12 per cent, and the rest of the mining activities contributed the remaining 13 per cent. (10)

The largest open copper mine in the world is located in Bingham, Utah. Although the ore is low in grade, the copper mining industry is of first importance among mining industries in the state. Utah copper mines produced in 1939, $35,753,000 worth of copper, almost 45 per cent of the total value of all mineral products during that year.

Coal mining is the second largest mining enterprise in Utah, and the faster expanding one. In 1939 coal mines produced $7,019,000 worth of coal. This figure was raised to $21,744,000 in 1946. (10)

Gold and silver, respectively, come third and fourth in importance. In 1939 gold's value was $9,721,000, while the value of silver was $7,303,000. (10)

The value of lead was $6,358,000 and that of zinc was $3,591,000 in 1939. The natural gas resources produced $1,033,000 worth of natural gas, while those of asphaltum produced $1,059,000 worth of asphalt. The value of raw clay and clay products was $780,000 and that of sand and gravel was $1,100,000. Petroleum was only produced at the $400,000 mark, while the stone business reached the $449,000 level. In 1939 iron ore was not a major mineral product, but in 1945 its value was $2,170,000.

In 1939 the total value of mineral products of Utah was $80,128,000, and it was $129,386,000 in 1945. The increase in the values of copper, coal, and iron ore was $25,368,000, $15,756,000, and $2,170,000 respectively. (10)

Employment and Wages

Egypt is a newly industrialized country, and most of its population is still living on farms and in rural areas. In Utah industry is more advanced, and relatively more people are engaged in industry and living in urban areas. Since urban people need more services than rural people, new jobs are available and more non-agricultural people are employed. Table 8 shows the employment situation in Egypt and Utah. In that table, numbers of persons not gainfully employed include children, students, old people, and housewives, as well as unemployed persons. Farmers' wives and children, both in Egypt and Utah, usually divide their time between farm work and other obligations. This fact lowers the numbers of those who are not gainfully employed and at the same time raises the numbers of those who are engaged in agriculture.

Table 8. Occupied persons in Egypt in 1937 and in Utah in 1940

Item	Egypt		Utah	
	Number	Per cent	Number	Per cent
Agriculture	4,308,000	26.8	36,000	6.7
Mining	610,000	4.0	11,200	2.0
Construction			7,900	1.4
Industry			19,500	3.5
Transportation	139,000	.9	15,800	2.8
Wholesale and retail trade	460,000	2.8	29,600	5.4
Finance, insurance, and real estate			26,100	4.7
Services	256,000	1.6		
Miscellaneous and government	322,000	2.0	17,100	3.1
Year's total	6,095,000	38.1	163,200	29.6
Total population	15,933,000		550,000	
Not gainfully employed	9,848,000	61.9	386,800	70.3

Sources (21 and 10)

Wages, anywhere, are influenced by the availability of work and services and the availability and productivity of labor. They also follow the general standard of living, which goes parallel with the degree of industrialization of the area in question.

Egyptian industry is still close to the starting line. More than three-quarters of the people are still living on agriculture, which is not capable of creating enough work for the total population. In Utah more than one-half of the people are living in urban areas. This group of people makes its living by working in the industry of the state or rendering services. Even the agricultural population of Utah handles more land per capita than that of Egypt.

In both areas, wages of farm laborers are less than those of the non-agricultural laborer. In Egypt they were less than fifty per cent of the average wages of non-agricultural labor during 1945 (11). In Utah the average wage of a farm laborer in 1946 was $150 per month (33), compared to $179 given to non-agricultural laborers.

Table 9. Average monthly wages of non-agricultural labor in Egypt and Utah in major industry groups

Major industry groups	Egypt 1948	Utah 1946
Mining	$36.39	$244.13
Construction	33.46	205.90
Manufacturing	20.92	188.91
Transportation and utilities	36.81	193.54
Wholesale and retail		165.36
Finance, insurance, and real estate		190.40
Services	21.33	137.54
Average wages	25.51	179.69

Sources (10 and 21)
LE. equalled $4.183 before devaluation and $2.871 after devaluation in 1949. In this table the higher rate was used. The given wages of Egypt do not include free medical care, food for less than cost, and low-rent houses, which big industries give to their labor.

Finance Conditions

The national capital of Egypt, as estimated in "Egypte Contemporaine" of March 1943, was LE.1,100,000,000. In 1940, the assessed value of Utah was $537,753,254. Table 10 gives the agricultural capital in both areas.

Egypt, like most agricultural countries, has the major part of its capital invested in agriculture; while Utah has only 36.9 per cent of its capital in agriculture. In Egypt, livestock are valued at 4.3 per cent of the total farm capital. In Utah, livestock are worth 16.3 per cent of the total agricultural capital. Although farm land in both areas takes a great portion of farm capital, it is given greater value in Egypt.

In Egypt and Utah the ratio of farm capital to national capital is much higher than is the ratio of farm income to national income. Table 11 gives the figures of the national income and the agricultural income in both areas.

Table 10. Total national capital and agricultural capital in Egypt and Utah in 1939 and 1940 respectively

Item	Egypt		Utah	
	Capital LE.1000	Per cent	Capital $1000	Per cent
National capital	1,100,000		$537,753	
Total value of farm capital	690,000	100.0	198,619	100.0
Value of farm land	660,000	95.7	118,301	59.5
Value of farm buildings	*		36,057	18.1
Value of farm implements	?		11,941	6.1
Value of livestock	30,000	4.3	32,920	16.3
Farm capital/national capital	62.7%		36.9%	

Sources (13 and 21)
* Included in the value of farm land
? Unknown

Table 11. Total national income and agricultural income in Egypt and Utah in 1939 and 1940 respectively

Item	Egypt		Utah	
	Income LE.1000	Per cent	Income $1000	Per cent
National income	221,652		$265,500	
Gross farm income	73,133	100.0	53,088	100.0
Cash from crops	39,133*	53.5	12,585	23.7
Cash from livestock and livestock products			34,016	64.1
Government payments			2,830	5.3
Value of products consumed on farm			3,652	6.9
Land rent	34,000	46.5		
Farm income/national income	33.5%		19.9%	

Sources (13 and 21)
* Income, excluding land rent, and not gross income
Gross farm income of Egypt in 1946 was LE.320,613,946, of which 25 per cent was from livestock and their products (7).

Table 12 gives the percentages of different incomes to their corresponding capitals.

Table 12. Percentages that national income, farm income, and non-agricultural income are to their corresponding capitals in Egypt and Utah

Item	Egypt Per cent	Utah Per cent
Per cent that national income is of national capital	20.5	49.4
Per cent that agricultural income is of agricultural capital	10.5	26.7
Per cent that non-agricultural income is of non-agricultural capital	36.4	62.6

Sources, Tables 10 and 11

Figures on Table 12 show the following facts:

1. The rate of capital turn over in Utah is higher than it is in Egypt.

2. Non-agricultural capital turns over at a higher rate in both Egypt and Utah than agricultural capital does.

Agricultural Finance

Financing facilities. Until 1930 there was no institution specializing in agricultural credit in Egypt except the Agricultural Bank. Farmers obtained their requirements from different sources. Growers of sugar-cane received advances from the Société des Sucreries; growers of cotton were sometimes financed by local merchants or branches of exporting firms, in return for a lien on the crop. Between 1920 and 1930, the government often granted loans to growers through the medium of the Agricultural Bank and the commercial banks.

In 1931 the Banque du Crédit Agricole was founded, with a capital of LE.1,000,000, of which the government supplied one-half and the principal banks the other. Moreover, the government advanced LE.3,000,000 at 2½ per cent, reduced to 1½ per cent in 1938, and guaranteed shareholders a minimum dividend of 5 per cent, in return for which it has

control over the bank's activities. The bank has been exempted from the provisions of the Five Feddans' Law (Appendix) and in addition utilizes the services of government tax collectors for the collection of instalments.

The original object of the bank was the financing of small growers. In view of the very reasonable rates charged (6 per cent for individuals and 5 per cent - later reduced to 4 per cent - for cooperatives) big land owners sought increasingly to make use of its services. At first, big land owners managed to get loans through the medium of dummy cultivators, but later the bank was induced to advance loans to owners of up to 200 feddans instead of only up to 40 feddans, thus covering 99.9 per cent of the landowners.

The bank grants short-term loans for buying fertilizers and seeds, which the bank buys and sells, and for other farm expenses. Short-term loans also include advances against crops deposited in the bank's shoonahs (storing areas). The bank also grants medium-term loans for the purchase of livestock or machinery and for land improvements.

In 1932 the government founded the Credit Hypothécaire Agricole, designed to help small farmers, advancing LE.3,000,000 for the purpose. Only growers paying under LE.50 in Land Tax may borrow from the bank, and loans must not exceed LE.1,200 (raised to LE.4,000). The bank manages some of the mortgage debts taken over from other institutions by the government in 1933 after reaching an arrangement by which the institutions reduced the annuities payable by debtors while the government took over two-thirds of the over-due interest. The present rate charged by the bank is 5½ per cent.

Agriculture Bank and the Crédit Foncier are interested in long-term

loans. They hold mortgages on the land as a collateral for their loans. Commercial banks are interested in short-term loans. They finance the cotton crop and make advances against crop deposits. Local cotton merchants and branches of cotton exporting firms advance loans to cotton growers. The Société des Sucreries makes advances to sugar-cane growers. Interest rates differ, but they do not exceed 8 per cent according to the law. Some individuals illegally manage to charge rates of 30 per cent or even higher.

Farm credit in Utah is diverse in types and sources. Short-term loans are usually obtained through the medium of commercial banks, Production Credit Administration, merchants, and individuals. Intermediate-term loans are secured from Production Credit Administration and Farm Security Administration. Long-term loans are available from federal land banks, life insurance companies, mortgage loan companies, and individuals.

The Federal Farm Loan Act of 1916 created the Federal Farm Loan System and authorized the establishment of the federal land banks, which are the principal units in this system. Other units are local farm loan associations, and the Land Bank Commissioner loans made with the assistance of the Federal Farm Mortgage Corporation. The act required that each federal land bank must have a subscribed capital stock of not less than $750,000 each. It provided that any part of the $750,000 not subscribed by the public within 30 days after the books of subscription for capital stock had been opened should be subscribed by the secretary of the treasury. As a means of protecting the federal land banks against losses and as a method of providing incentive for cooperative endeavor as well as transferring ownership of the capital stock from the government to associations composed of bank borrowers, it was required that 5

per cent of the amount loaned through the national farm loan associations be subscribed by such associations to the capital stock of the banks. After subscriptions by the national farm loan associations in each bank amounted to $750,000, 25 per cent of the sum thereafter subscribed by these associations was to be applied to the retirement of the original capital stock subscription by the United States. Every farm loan association requires that 5 per cent of the amount loaned to a farmer be subscribed by the borrower to the capital of the association. The federal land banks were empowered by the Federal Farm Loan Act to issue farm loan bonds. The income from these bonds was exempted from federal, state, municipal, and local taxation. In 1941 the previously existing tax exemption with respect to federal income tax laws was removed as to farm-loan bonds issued after March 1, 1941. As a consequence of an amendment to the Federal Farm Loan Act in 1933, federal land banks utilized consolidated bonds as a financing medium.

Loans of the federal land banks are made within 50 per cent of appraised value of the land and 20 per cent of the value of the permanent improvements but must not exceed $50,000. These loans must be secured by first mortgage on farm land located within the territory authorized to be served by the federal land bank. Loans from these banks may be used for the purchase of farming land, the purchase of livestock and equipment, for farm buildings and improvements, for paying farm debts, and for general farm uses. The interest rates on these loans is not more than 1 per cent above the interest rate on the bonds issued and does not exceed 6 per cent. The repayments are by amortization, usually over a period of 20 to 36 years. The interest and instalment dates customarily correspond with the time of farm receipts, either annually or

semiannually. Additional payments may be made on any interest date. The banks accept deposits from borrowers which can be used only to pay interest and instalments on the loan. The banks also allow interest on such deposits. Each federal land bank charges appraisal fees. The Federal Land Bank of Berkeley, to which Utah belongs, charges from $15 to $50 appraisal fee according to the size of the loan.

The passage of the Emergency Farm Mortgage Act of 1933 authorized the land bank commissioner loans. These loans are direct government loans made by the land bank commissioner in Washington, D. C., who has general supervision over the twelve federal land banks. The land bank commissioner makes second mortgage loans on farms that are partially financed by other institutions and first mortgage loans to some farmers who are unable to qualify for the federal land banks. The loans cannot exceed $7,500 or 75 per cent of the appraised "normal" value of the property, whichever is smaller. The interest rate on loans is 5 per cent, and the usual amortization period is 10 to 20 years. The repayment plan and privileges are similar to those for the federal land bank loans. The land bank commissioner was given in 1933 $2,000,000 to use in making loans.

In 1934 the Congress created the Federal Farm Mortgage Corporation. It was formed to finance the commissioner loans and to buy federal land bank bonds. For these two purposes it was granted the power to issue bonds to a total of two billion dollars. The interest and principal of the bonds issued by the corporation were fully and unconditionally guaranteed by the government. Congress provided that the 200,000,000 appropriated for the commissioner loans should serve as capital even though it was invested in loans for the most part. In 1935 the Federal Farm

Mortgage Corporation took over the land bank commissioner loans. This was done by a Congressional amendment to the Emergency Farm Mortgage Act authorizing the land bank commissioner to make loans in behalf of the corporation. Corporation loans are made through the facilities of the federal land banks and by their personnel.

In 1923 the Congress created twelve federal intermediate credit banks. They are owned and controlled by the United States Government. These banks obtain their funds from investors in the money centers and lend them to agencies which lend to the farmers. They are allowed a spread of 1 per cent to cover costs of operations.

In 1933 Congress created twelve production credit corporations and provided for a nation-wide system of local production credit associations. This legislation was designed to correct the chief weakness of the intermediate credit system, the lack of local agencies. Both the federal intermediate credit banks and the Production Credit Corporation are less important to the farmers of Utah, judging by their lending activities in the state.

In 1937 the Farm Security Administration was created. The many functions of the administration are rehabilitation loans, tenant-purchase loans, and debt adjustment. Rehabilitation loans are made to farmers who are in need of credit to carry on or to expand their farming operations but who are unable to obtain credit from other sources. In order to qualify, the borrower must have land, owned or rented, to support his family and repay the loan under normal conditions. The funds are obtained from annual appropriations made by Congress, and repayments are returned to the federal treasury. Rehabilitation loans are made at 5 per cent interest for a period usually extending for five years.

The Bankhead-Jones Act of 1937 established the tenant-purchase loans by using government credit. These loans are to be used only for the purpose of making owners out of farm tenants. They are made on first mortgage security for a period of forty years at an interest rate of 3 per cent. The program allows for paying any part or all of the total of the loan after the first five years. It also allows for a variable payment plan, which is optional, under which a surplus above the required payment is to be collected in periods of above-normal production or prices and employed to reduce payments below the required payments in periods of sub-normal production or prices. Farm debt adjustment started in 1933. Its main feature is the county committees. The purpose of these committees is to assist in settling, without court action if possible, cases in which the indebtedness is clearly in excess of the ability of the debtor to pay and in which foreclosure action is threatened.

In 1933 banks for cooperatives were created under the Farm Credit Administration. The capital fund used to start the banks for cooperatives came from balances remaining in the revolving fund of the Farm Board. Other capital is provided by borrowing associations which are required to buy stock equal to 5 per cent of the amount borrowed. (31)

Loans, credit, and mortgages. In 1938, which was a poor year, the Banque du Crédit Agricole of Egypt sold on credit about 25 per cent of the total amounts of seed and fertilizers required by the farmers. The total value of such sales amounted to LE.1,538,000. The bank's advances to growers and cooperatives for meeting farm expenses other than seeds and fertilizers totaled LE.919,000, and in addition LE.695,000 was advanced against cotton deposits in shoonahs and

LE.887,000 against other crops. All these advances amounted to LE.4,039,000 which was about 4.1 per cent of the gross farm income or about 0.5 per cent of total value of farm capital.

In 1920 the farm mortgage debt was LE.29,000,000, and it remained around that figure until the outbreak of the war in 1939. The mortgage area represented 18 per cent of the cultivated area, and aggregate debts amounted to 5 per cent of the estimated value of the cultivated land of Egypt. The number of landowners involved was put at 160,000, or 6 per cent of the total. (21)

In 1940 the farm mortgage debt of Utah was $36,650,000, on 12,675 farms out of 25,411 farms. Acres in all mortgaged farms were 3,754,059 acres out of 7,302,000 acres in farms. The value of all mortgaged farms during that year was $91,251,836. The percentages of mortgaged farms, acreage in mortgaged farms, and the ratio of debt to value were 49.9 per cent, 51.3 per cent, and 40.2 per cent respectively. The average mortgage debt per farm was $2,892, and the average equity per farm was $4,308 (30).

The financing institutions which had outstanding mortgage loans to Utah farmers during 1940 and the amount that belonged to each institution are given in Table 13.

Table 13. Farm mortgage debt of Utah in 1940 and the financing institutions

Financing institution	Amount of debt
Federal Land Bank	$16,016,000
Land bank commissioner	5,453,000
Life insurance companies	573,000
Commercial banks	2,822,000
Farm Security Administration	94,000
Other	11,692,000
Total	$36,650,000

Source (10)

Land Tenure and Tenancy

Table 14. Number of land owners* in Egypt in 1944 and land operators# in Utah in 1945 and their holding

Size in Acres	Egypt				Utah			
	Owners		Acres		Operators		Acres	
	Number (1000)	Per cent	Number (1000)	Per cent	Number (1000)	Per cent	Number (1000)	Per cent
Less than 1	1,792	70.2	769	12.6				
1 to 4	600	23.5	1,262	20.4				
5 to 9	84	3.2	589	9.6				
Less than 10	2,476	97.0	2,620	42.9	4.02	16.8	12.646	1.1
10 to 29	53	2.1	883	14.4	4.13	17.2	51.919	4.1
30 to 49	9	.3	370	6.1	3.07	12.9	79.317	6.4
50 to 99	7	.3	471	7.7	4.34	18.1	186.744	14.9
100 to 999	5	.2	1,245	20.4	7.10	29.7	621.304	49.7
Over 1000	0.2	.0	507	8.3	1.27	5.3	295.783	23.8
Total	2,551	100.0	6,096	100.0	23.91	100.0	1,247.700	100.0

Sources (3 and 14)

* Owners in Egypt may operate their land, rent it to smaller farmers, or hire a manager to manage it.

\# Operators in Utah may be the owners of their holdings, part owners, or tenants. Given holding is that of harvested land only.

In Egypt, the average size of an ownership is 2.4 acres, while the average size of an operator's holding (farm) in Utah is 391.7 acres. One-third of the land of Egypt belongs to 94 per cent of the owners who have less than 5 acres, and almost one-third belongs to 0.2 per cent of the owners who have over 100 acres each. In Utah, the distribution of land is different than it is in Egypt. Thirty-five per cent of the farm operators of Utah have 73.5 per cent of the crop-harvested land. Each operator in this group has over 100 acres. Thirty-one per cent of the operators have 21.3 per cent of the land. Each operator in this group has between 30 and 99 acres. The remainder have less than 29 acres each.

In Egypt 30 per cent of the land owners can live on the produce of their land, while 1,792,000 owners who have less than one acre each

supplement their earnings by either working on the large estates or by renting land or by both. Issawi estimated the tenants of 1937 at 200,000 persons, and the landless male laborers at 650,000. He also stated that the majority of the big land owners are absentees. They prefer either to hire a manager for their estates, let their land directly to small tenants, or let it through the medium of one or more tenant-generals who sub-let.

In 1940 there were 25,411 farms in Utah; 17,310 were operated by full owners, 4,596 operated by part owners, 129 operated by managers, and 3,376 operated by tenants. The Utah Economic and Business Review, December 1947, estimated the employed persons in agriculture in 1940 at 36,000 persons, of whom there were about 7,000 farm laborers.

Conditions regulating the renting of farm land in Egypt and Utah vary widely in both areas. In certain cases the rent is paid in cash, in others in kind or in a combination of both. Cash rent in Utah in 1940 was $1.82 per acre of cropped and grazing land, or 6.26 per cent of the value of the farm (13). In Egypt the 1935-1937 Cadaster Commission had valued the average rent of land at LE.5.715, or about 5.27 per cent of the value of farm land and buildings.

Land tenants in Egypt are either tenant-generals or small tenants. A tenant from the first group rents a farm (see definition) or a large area of a farm. Usually he signs a contract for a year or more and pays the rent in cash. As a guarantee the tenant often pays the equivalent of 50 per cent of the annual rent when the contract is signed. This down payment is to be refunded when the period of his contract comes to an end and when all his obligations are met. A small tenant rents a small tract of land for a year or only for a season. He does not pay a down payment,

in fact he gets his seeds and fertilizers and other aid from the landlord. His contract is either written or verbal, usually verbal. The rent is either cash, a share of the crop, or both. In some cases landlords do not fix the cash rent at the beginning of the year; in such cases they collect the rent according to the prices and the yield. A small tenant usually works on the farm in order to pay a portion of his cash rent in the form of farm work.

Farm tenants in Utah are usually the relatives of the landowners. They either possess their machinery and livestock and tools or get these things with the farm when they rent it. Their rent is paid either in cash, crops, or a combination of both. In a few cases, the rent is fixed at a portion of the total profits of the farm. Very often tenants receive some financial aid from their landlords. Especially on dry farms, the land is rented for more than a year, usually two, four, or six years.

Farm Taxes

Farm owners and tenants of Egypt only pay land taxes; they do not pay any taxes on livestock, farm buildings, or for roads and schools. In their capacity as farm owners or tenants, they are not subject to income taxes on the income from their farms. Utah farmers are subject to property taxes payable to the local and state governments and income taxes payable to the federal and state governments. A portion of their property tax is levied for road construction and for running local schools.

In Egypt, land tax is readjusted every forty years. The last adjustment was made in 1939. The 1925-37 Cadaster Commission had valued the average rental value of all the land at LE.5.715 per feddan. The Senate and the Chamber of Deputies fixed the rate of taxation at 14 per cent of the rental value (21), or about 0.80 per cent of the land value. Starting

in 1940, some measures of relief for small landowners were taken. During that year, those landowners who had to pay LE.10 or less per annum in land tax were granted a certain measure of remission. In 1942 owners of land whose taxes were less than LE.0.50 were wholly exempted from land tax, while substantial remission (15-60 per cent) was extended to those assessed between LE.0.50 and LE.10. It was estimated in the Budget Speech of 1942 that about 2,426,000, out of a total of 2,497,000 landowners, would benefit from this reform, of whom 1,280,000 would enjoy total exemption. In 1945, Egyptian farmers paid LE.5,000,000 in taxes.

Property taxes in Utah are imposed on the value of these properties. The mean mills (1 mill = 1/10 cent) rate levied in 1942 was 26.08 mills per dollar of property. This rate changes from year to year according to the revenues needed by the government of the state and other local administrations. In 1942 Utah farmers paid $3,407,189 in taxes, or about $134 per farm. They paid $2,587,675 on their land, $397,770 on livestock, $421,744 on tools and machinery, and $84,170 on other items. Sources of land tax paid by Utah farmers are given in the following table.

Table 15. Land taxes paid by Utah farmers in 1941

Item	Acreage	Taxes	Tax per acre
Dry farms	447,205	$ 142,081	$ .318
Irrigated farms	872,565	1,111,229	1.274
Unimproved land	761,243	117,900	.155
Fruit land	7,244	17,654	2.437
Grazing land	5,686,175	296,506	.052
Total	7,774,432	$2,503,505	$ .322

Source (24)

Farmers in Utah are more heavily taxed than those in Egypt. They pay about 2.608 per cent of their capital value in property taxes, while the Egyptian farmers only pay 0.8 per cent of their land value. Farm property

taxes in Utah were about 7.9 per cent of the gross farm income in 1940. In Egypt land taxes represented 1.5 per cent of the total farm income in 1945.

Transportation and Markets

Egypt has 1,900 miles of waterways used for transportation. These waterways consist of the Nile and some navigable irrigation and drainage canals. Although this transportation system is the oldest in the country, it is still important, especially for the bulky goods. Railways of Egypt are 3,100 miles long, of which 2,200 miles belong to the government. There are 5,600 miles of highways, most of which are well kept dirt roads. With the exception of a few desert highways and railway tracks, the transportation facilities are in the populated areas. The center of the transportation system is Cairo. During the war, an oil pipe line was constructed between Suez and Cairo.

In Utah rivers have no transportation value. The state is served by four railway systems, which meet in Ogden and Salt Lake City. They link the state with the East, the West Coast, and the Northwest. These railroads, in their present condition, are satisfactory for Utah's needs. Federal and state highways are hard surfaced. They, with the county roads, are also satisfactory for Utah purposes. The center of the highway transportation is Salt Lake City, where most of the federal highways meet. Pipes, as a means of transporting oil and gas, are growing in importance.

Table 16. Miles of railroads, highways, and waterways per 100 square miles and per 10,000 persons of the population in Egypt and Utah

Item	Length in miles in		Miles per 100 square miles in		Miles per 10,000 persons in	
	Egypt	Utah	Egypt	Utah	Egypt	Utah
Waterways	1,900		1.5		1.0	
Railroads	3,100	1,854	2.4	2.0	1.6	30.6
Highways	5,600	17,000	4.4	18.7	2.9	288.9
Total	10,600	18,854	8.3	20.7	5.5	329.5

Sources (16, 20, and 21)

The prices of almost all farm products of Egypt are established in the local market. Minet el Bassal in Alexandria is the spot market for cotton. The prices in that market are influenced by the prices of cotton in Liverpool, England, and New York, New York. Rod el Farag and Atar el Nabi (both are in Cairo) are the markets of grain. The prices in these two markets are established according to the local demand and supply of grain. Mansura is the center of rice decortication industry and therefore is the central market of rice. Prices in that market are influenced to a small extent by the demand for rice in the neighboring countries. Most of the fruits and vegetables are marketed in the fruit and vegetable wholesale market at Rod el Farag. In addition to the above-mentioned marketing centers, weekly markets are held in almost every Markaz (a subdivision of the province). Livestock, livestock products, and other farm products are sold in these markets. Since deals are made by bargaining, a price is established with every transaction. However, these local prices do not deviate widely from the general prices of the country.

The main markets of the farm products of Utah are the West Coast, the East, and the Chicago and Mississippi Valley area. On the Coast, most of Utah's dairy products, as well as the fruits and vegetables are sold. The Eastern market attracts the early crops of Utah fruits and vegetables. Chicago not only establishes the price of livestock, but also receives a portion of Utah's meat livestock. Although some farm products are sold to the local processing plants, the prices of such crops are, for the most part, established in out of the state markets. The grain market is almost a local one, although it is influenced to a small extent by the central markets. The hay market is also a local one, but it responds to the demand and supply of hay in the neighboring states.

Standard of Living

Measures used in comparing the standard of living are the per capita income, education, the use of electricity, and the use of cars.

The average income per worker in Egypt in 1946 was $350 a year. In the United States, this average was $1,200, and in Utah it was $1,063. In other words, the standard of living in Egypt is about 25 per cent of that of the United States and about 32 per cent of that of Utah.

The average enrollment in schools in Egypt is estimated at 1,552,000 students, or about 14 per cent of the total population. In Utah the average number of students enrolled in elementary and secondary schools was about 142,000, or about 24.9 per cent of the total population of the state in 1944.

In 1937 the number of towns using electricity in Egypt was 58, with a population of 3,600,000 persons; but owing to the very low purchasing power, only a fraction - in Cairo under a third - of the inhabitants actually enjoyed its use. In 1936 the production of electricity was estimated at 288,000,000 kilowatts, or 18 per inhabitant. The bulk of that output was taken by the industries, and the rest was divided between irrigation and drainage plants and house consumption. The average consumption of electricity in Utah during 1941-1946 inclusive was 994,000,000 kilowatts, or 1,560 per inhabitant. Domestic use in the residential and rural areas was estimated at 176 million kilowatts, or about 274 kilowatts per capita. Farms connected on power lines in Utah were 19,700 farms in 1945, or 74.8 per cent of the total farms.

In 1939 there were 34,000 cars in Egypt, or one car for every 470 persons. In Utah there were 111,371 cars during the same year, or a car for every fourth person.

FARM ORGANIZATION AND MANAGEMENT

Types of Farms

Types of farming is "the kind of farming followed on a group of farms having a high degree of uniformity in the kind, relative amount, and proportion of the crops and livestock handled, and in the methods and practices followed in production." (13) There are different methods of classifying farms into types of farms because of the different view points and the different measures used in making such a classification. Types of farms could be determined either by the productive man-work-unit engaged in each enterprise on the farm, the dominating or major crops grown, or by using the factors of production as a measuring stick.

Egypt is divided from the irrigation point of view into two general types of farming:

1. Dry farming. This type is only known in the northern part of the Libyan Desert and in some parts in Sinai. It is of no importance to the Egyptian economy since it is practiced on a very small scale and by the Bedouins.
2. Irrigated farming. This type is practiced in Upper and Lower Egypt wherever irrigation water is available.

The irrigated section is divided into two farming types. This division is also a result of irrigation. These two farming types are:

a. Basin area's type of farms. Basin area represents about one-fourth of the agricultural land of Egypt. It is located in the southern part of Upper Egypt where basins are not yet converted to the perennial irrigation system. The soil of this area belongs to the heavier soils, and crops grown are the winter field crops, such as wheat, broadbeans, flax, clover, and lentils.

b. Perennially irrigated areas' types of farms. These areas cover three-fourths of the agricultural land of the country.

Perennially irrigated areas are divided according to the soil into two farming types:

(1) Sandy soil area type of farming. These areas are on the east and west sides of the cultivated land of Lower and Upper Egypt and in some spots in the Delta. Crops grown on these soils are barley, fenugreek, peanuts, sesame, henna, and mango.

(2) The heavier soil area type of farming. These heavier soils cover the rest of the perennially irrigated land.

The heavier soil areas are divided, according to the plants grown, into three farming types. These types are:

(a) Rice area type of farming. This area is located in the northern part of Lower Egypt. It differs in width from year to year according to the government regulations which are based upon the amount of irrigation water available during rice's growing season. The total acreage of rice in 1939 was 566,000 acres. Most of this rice was grown in the rice area.

(b) Sugar-cane area type of farming. This area is in the southern part of the perennially irrigated area in Upper Egypt. The total acreage of sugar-cane in 1939 was 75,000 acres, most of which were in the sugar-cane area.

(c) Cotton and wheat area type of farming. This area is located between areas (a) and (b). Cotton and wheat are not only grown in area (c) but also in areas (a) and (b). In 1939 cotton and wheat were grown on 1,687,000 and 1,512,000 acres respectively.

Specialized vegetable, fruit, dairy, or livestock farms are of no

importance when the classification of farms by types of farming is attempted. They either engage small areas around the big cities or engage bigger farms which constitute a very small percentage of the total cultivated area of the country. The bulk of the vegetables, fruits, livestock and livestock products are produced on the diversified farms of the perennially irrigated areas.

As for Utah, it is impossible to divide the state into regional farming-types, due to the lack of uniformity of the effect of the factors of production in any given area. The only way to classify the Utah farms into types is by taking the state as one unit and studying each farm individually and then putting it into its group. The factors used in Utah to determine the farming types are either the value of farm products of each farm or the productive man-work-unit engaged in each enterprise within the farm. The farm products method is used by the Census, while the productive man-work-unit is used by the Agricultural Experiment Station. The following farming types were given in the 1945 Census (13):

1. Farms producing primarily for sale. They are 85.5 per cent of all farms, or 22,197 farms
   a. Fruit farms are 6.2 per cent, or 1,615 farms.
   b. Vegetable farms are 3.6 per cent, or 940 farms.
   c. Horticulture specialty farms are 0.3 per cent, or 86 farms.
   d. Dairy farms are 16.6 per cent, or 4,194 farms.
   e. Poultry farms are 10.9 per cent, or 2,838 farms.
   f. Livestock farms are 19.8 per cent, or 5,126 farms.
   g. Forest farms are 0.2 per cent, or 7 farms.
   h. All other crop farms are 14.4 per cent, or 3,872 farms.
   i. General farms are 12.9 per cent, or 3,519 farms.

2. Farms producing primarily for own household use. They are 14.1 per cent, or 3,647 farms.

Crop Rotation Systems

The growing season in Egypt is divided into three smaller seasons according to the lifetime of the different plants. These seasons are:

1. Shitwi (winter season). This season starts with the beginning of the agricultural calendar in October and ends in June. The main crops of this season are Egyptian clover (Trifolium alexandrinum), wheat, barley, flax, broadbean (Vicia faba), onions, potatoes, vegetables, and citrus fruits.
2. Siefi (summer season). This season starts early in January and ends with the end of the year in October. The main crops of this season are cotton, sugar-cane, peanuts, alfalfa, sesame, rice, potatoes, corn, henna, hemp (Hibiscus cannabinus), the sorghums, vegetables, and fruits.
3. Nili (flood season). This season starts in July and ends late in November. The main crops of this season are corn, rice, potatoes, sesame, vegetables, and fruits.

In Utah the annual growing season starts with the last frost in spring and ends with early frost in fall (Table 2). Main crops of this season are corn, small grains, alfalfa, wild hays, Irish potatoes, sugar-beets, vegetables, and fruits.

With the exception of the sugar-cane area, the biennial rotation system is the most popular system among small farmers of Egypt. On large farms - a hundred acres or more - the triennial rotation system is preferred. In the sugar-cane area, the quadrennial rotation system is very common.

When either of these two rotation systems given in Table 17 and Table 18 is used where rice is not grown, the portion of land reserved for rice is to be left idle for releveling or to be used for growing corn, vegetables, or melons. It is to be noticed that the portion of land used for growing clover increases or decreases according to the amount of livestock on the farm. The areas used for wheat (Table 17), and broadbeans (Table 18) increase or decrease inversely with the amount of clover grown.

Table 17. A biennial rotation system used in Egypt for the cotton areas in fertile soils

Year	Season	Crops grown on field	
		1	2
First	Shitwi Siefi Nili	Clover till January Cotton	Wheat Clover Corn Rice
Second	Shitwi Siefi Nili	Clover Wheat Rice Corn	Clover till January Cotton

Sources (3)
Field 1 and field 2 are equal in size; each one represents 50 per cent of the area of the farm.

Table 18. A triennial rotation system used in Egypt for the cotton areas in fertile soils

Year	Season	Crops grown on field		
		1	2	3
First	Shitwi Siefi Nili	Clover or idle Cotton	Wheat Barley Rice	Clover Bean Corn
Second	Shitwi Siefi Nili	Wheat Barley Rice	Clover Bean Corn	Clover or idle Cotton
Third	Shitwi Siefi Nili	Clover Bean Corn	Clover or idle Cotton	Wheat Barley Rice

Source (3)
Fields 1, 2, and 3 each represent one-third of the area of the farm.

Table 19. A biennial rotation system used in Egypt in sandy soil areas

Year	Season	Crops grown on field	
		1	2
First	Shitwi Siefi Nili	Barley till April Peanut	Clover, fenugreek, lentil Sesame
Second	Shitwi Siefi Nili	Clover, fenugreek, lentil Sesame	Barley till April Peanut

Source (3)
Fields one and two each represent 50 per cent of the area of the farm.

Table 20. The rotation system used in Egypt in the basin areas when artesian wells are not available

Year	Season	Crops grown on field	
		1	2
First	Shitwi Siefi Nili	Wheat, barley, flax, and oil lettuce Flooded with water	Bean, fenugreek, clover, chick-pea, and lentil Flooded with water
Second	Shitwi Siefi Nili	Bean, fenugreek, clover, chick-pea, and lentil Flooded with water	Wheat, barley, flax, and oil lettuce Flooded with water

Source (3)
When artesian wells are available on a farm in the Basin area, the manager of such a farm can grow early corn on one-half of his land during the Nili season.

Table 21. A quadrennial sugar-cane rotation system used in Egypt

Year	Season	Crops grown on field	
		1	2
First	Shitwi Siefi Nili	Clover or lentil Sugar-cane*	Small grains Idle
Second	Shitwi Siefi Nili	Sugar-cane#	Legumes Corn or idle
Third	Shitwi Siefi Nili	Idle	Clover or lentil Sugar-cane*
Fourth	Shitwi Siefi Nili	Legumes Corn or idle	Sugar-cane#

Source (3)
* Sugar-cane planted at the beginning of the season
# Sugar-cane growing from the roots of the crop of the previous year

In Utah regular rotation systems are not very common. The majority of farmers are either "specialists" or "opportunists." A specialist farmer keeps planting the crop in which he specializes on the same land for many years until pests and disease infest his land. The opportunist system consists in changing the crops on each field as often as necessary but not according to any plan. This "rotation" is used on many farms where specialist's continuous cropping system has recently become impossible. A short regular rotation system is only adopted where no long-lived crop, such as alfalfa or pasture, is needed. According to Pittman (23), a short rotation using familiar irrigated crops might be: "Sugar-beet ... Barley ... Sweet clover ... and repeat."

With so much barley to be fed, more hay would be needed. Alfalfa, being a crop that needs four or five years in the same place for greatest efficiency, cannot fit into a short rotation. In order to introduce alfalfa into a simple rotation, the Greenville Experiment Farm is using the following rotation where alfalfa is grown on half of the farm and left on the same place for five years (23):

> "Alfalfa..Alfalfa..Alfalfa..Alfalfa..Alfalfa..
> Potatoes..Sugar-beets..Peas..Sugar-beets..
> Wheat (or barley).and repeat."

The above rotation requires ten fields and ten years to be completed. Each year one-fifth of the alfalfa is broken up and an equal area seeded down.

On dry land, alternating wheat with fallow is the only feasible system. In some of the higher valleys, where there are no sugar factories and where the nights are too cold for corn to do well, some cultivated crop or bare fallow are introduced. In many cases the nature of the land constituting a single farm is so varied that the same crops cannot be

grown on all of the land. In such cases each different type of area is treated as a separate unit. Either there are two or more separate rotation systems or some parts of the land are left in permanent pasture or hay land, while the remainder is maintained in rotation. However, the same principles used by each individual farmer are applied to each area separately. (23)

Main Crops of the Two Areas

Acreage and average yield per acre. The main crops of Egypt and Utah, their acreage, and their average yield per acre are given in the following table:

Table 22. Main crops of Utah and Egypt, number of acres they engage, and their average yield per acre

Main crops	Acreage				Average yield		
	Egypt, 1939		Utah, 1943		Egypt 1939	Utah 1943	Unit
	Total	Per cent	Total	Per cent	Amount	Amount	
	1,000		1,000				
Cotton	1,687	19.0	000	000	1,03		Bale
Corn	1,608	18.0	29	1.9	39.50	25.3	Bushel
Sorghums	428	5.0	...	...	33.20		Bushel
Rice	566	6.0	000	000	71.60		Bushel
Wheat (winter)	1,512	17.0	171	11.5	31.30	18.7#	Bushel
Wheat (spring)	000	000	69	4.5		28.9#	Bushel
Broadbean	400	5.0	000	000	33.90		Bushel
Beans	...	...	11	.7		592.0	Pound
Barley	316	4.0	163	11.0	38.80	42.0	Bushel
Sugar-cane	75	1.0	000	000	32.70		Short ton
Sugar-beet	000	000	34	2.3		12.5	Ton
Clover	1,832	21.0	...	...	20.00		Ton
Hay, all tame	000	000	475	32.0		2.1	Ton
Rye	000	000	6	.4		10.1	Bushel
Alfalfa*	...	...	*		30.00	2.5	Ton
Potatoes	...	...	20	1.4	290.00	164.0	Bushel
Orchards	75	1.0	15	1.0			
Truck crops	178	2.0	32	2.1			
Other	176	2.0	461	24.7			
Total	8,853	100.0	1,486	100.0			

Sources (3 and 21)
(000) Crop is not planted.
(...) Crop is planted but on a very small area.
* Alfalfa acreage is included in tame hay.
# Winter wheat of Utah is mostly dry wheat, while the spring wheat is irrigated. All wheat of Egypt is irrigated.

Seeds and fertilizers required for the production of the main crops in Egypt and Utah. Amounts of nitrogen and phosphoric acid given in Table 23 do not include nitrogen and phosphoric acid in manure and other organic fertilizers. Compared with Utah, the consumption of fertilizers is high in Egypt. The reasons for this fact are:

1. Egyptian farmers grow almost two crops every year on the same field, while in Utah only one crop is grown.

2. Irrigated and drained lands need more fertilizers than dry land.

3. Most farmers in Egypt believe that high yields and profits go side by side, overlooking the law of diminishing return.

Table 23. Amount of seeds and fertilizers required in the production of selected crops in Utah and Egypt

Crop	Seed per acre		Nitrogen (N)		Phosphoric acid (P_2O_5)	
	Egypt	Utah	Egypt	Utah	Egypt	Utah
Cotton	2.5 bu.	...	.020 ton	...	.03 ton	...
Corn	.9 "	12.0 lbs.	.025 "	...	...	...
Rice	2.0 "	...	.020 "	...		...
Wheat, irrigated	2.5 "	2.0 bu.	.020 "	.004 ton	...	...
Broadbean	1.8 "	...	...	...	.02 "	...
Barley	2.5 "	2.0 "	.015 "	...	...	...
Sugar-cane	.5 ton	...	.035 "	...		...
Sugar-beet	....	15.0 lbs.	...	.002 "	...	.025 ton
Clover, alfalfa	.9 bu.	10.0 "	...	...	.03 "	
Corn, silage	...	15.0 "	...	...	...	.006 "
Potatoes	1.0 ton	.5 ton	.020 "			
Vegetables			.030 "	.012 "	.02 "	.040 "
Fruits			.025 "	.006 "		.003 "
Total area consumption (ton)			83,000	717	11,000	5,055
Per crop acre (ton)			.014	.002	.004	.01

Sources (2, 17, and 21)
A dotted space means that the item is not used, while a blank space means that the item is of no importance.
The per acre consumption of fertilizers is estimated.

Livestock of the Two Areas

Number of livestock. In Egypt cattle are kept on the farms for generating power, for traction, for their manure, and for their products. In Utah they are only kept for the production of milk or meat. Gamoose (buffaloes) are kept for the production of milk, while donkeys and camels are used for carrying burdens to and from the field. Specialized poultry farms are not known, and most of the chickens, geese, and ducks are kept by the wives of the small farmers and farm laborers. Although poultry farms in Utah were only 10.9 per cent of all the farms in 1945, nearly 50 per cent (10,435 farms) of all the farms reported poultry and poultry products sold.

Table 24. Main livestock of Egypt in 1939 and in Utah in the period from 1925 to 1935 inclusive

Kind	Number of livestock	
	Egypt (1000)	Utah (1000)
Dairy cattle	893	151
Beef cattle		304
Bulls	324	11
Total	1,217	466
Gamoose, females	884	000
" males	77	000
Sheep	1,842	2,574
Hogs	20	73
Goats	1,032	
Horses	40	92
Mules	25	3
Donkeys	1,056	000
Camels	167	000
Chickens	15,767	2,255
Geese	1,807	
Ducks	1,476	

Sources (8 and 16)

Feed. In Egypt livestock thrive on clover only from December to May. From May to December they live mainly on dry feed. Wheat, barley straws, and clover hay are the main fodders. Broadbeans and barley are the favorite concentrates. Recently, cottonseed cakes came into the picture of livestock feeding. Some farmers grow a small patch of corn in the summer to be given as a green fodder, especially to milking cows and sheep. Those who cannot afford to grow corn for fodder pick corn leaves and corn tops from their fields and feed them to their livestock.

Pasture and range are the main sources of feed in Utah. Hay comes second to them. Concentrates such as wheat, beet pulp, beet molasses, skim milk, and corn grains are used in feeding lots and on dairy farms. In winter, alfalfa, wheat and oat hays, and silage are used for feeding. Winter range is also available for feeding in some parts of Utah. During the rest of the year, pasture and range land are wide open for livestock.

A cow in Egypt requires about half of an acre of clover during the clover season, while a bull or a buffalo needs two-thirds of an acre. When that season is over, any of the following daily diets are used:

Diet 1 (4)		Diet 2 (3)	
Broadbeans	3 lbs.	Broadbeans	3.0 lbs.
Barley	3 lbs.	Cottonseed cake	3.0 lbs.
Corn	3 lbs.	Bran	1.5 lbs.
Corn green	15 lbs.	Wheat straw	12.0 lbs.
Wheat straw	15 lbs.	Salt	
Cottonseed cake	1 lb.		

The proportions of the above ingredients vary according to the availability of these ingredients to the farmer, and according to the

Rice fields in Egypt have to be leveled. This job is done exclusively by cattle-drawn scrapers. In the above picture, a bull, to the left, and a buffalo are pulling the scraper.

In Utah horses and mules are the only livestock used for farm work. On many farms tractors are replacing the horses and the mules.

amount of milk the cow is giving, the amount of work the bull or the steer is performing, and also according to the weight of the animal. Sheep graze almost the year around. In winter and spring they have clover. During the rest of the year they graze the harvested land between cropping. When harvested land is not available, they live on wheat straw, hay, and/or green corn. Camels, donkeys, and mules take a dry diet similar to that of cows. After clover season, horses are given only barley as a concentrate and wheat straw for a fodder.

In Utah there are 40,000,000 acres of public range, 6,000,000 acres of private grazing land, 166,000 acres of farm pasture and 600,000 acres in the production of hay. The annual average production of hay in Utah is 1,225,000 tons of hay, enough for 288,235 animal units. The carrying capacities of pasture and range were in 1939, 525,000 and 7,722,201 animal-unit-month. The average consumption of the 948,630 animal units of Utah is 1,228,000 tons of hay, all the available farm pasture, and 8,070,455 animal-unit-month worth of range. This means that Utah livestock owners import 3,000 tons of hay and 348,754 animal-unit-month of range. Since range could not be imported, livestock owners - sheep owners in particular - send their herds to Colorado, Wyoming, and Idaho to get part of their annual range. Speaking in terms of acres, an animal unit in Utah has a share of 42 acres of range land, 0.17 acres of pasture land and 0.63 acres of hay land. (16)

Since hay and grazing are not enough for feeding Utah livestock, concentrates are used in completing the diets. Table 25 shows the estimated annual quantities of feeds which are fed in addition to usual grazing.

Table 25. Estimated quantities of feeds fed per animal per year under Utah average conditions*

Kind of livestock	Grain	Hay	Other concentrates#
	(lbs.)	(lbs.)	(lbs.)
Mature horse	500.0	4,500	
Milk cow	750.0	7,500	150
Beef cow	10.0	1,900	10
Other cattle and calves	35.0	1,700	15
Fattening cattle	500.0	1,500	500
Sheep	15.0	100	12
Fattening sheep	50.0	250	50
Hens	62.5	4	13
Turkeys raised to market	84.0	5	25
Hogs per cwt. of net production	400.0	25	125

Source (17)
* Usual grazing in addition
\# Estimated dry weight basis of such feeds as beet pulp, beet molasses, skim milk, garbage, etc.

Livestock production. As mentioned before, the primary reason for keeping male cattle in Egypt is to generate power. Milk and meat production, although important, come in the second place. Sheep and goats are kept for the production of meat and milk and not for their wool, which is of inferior quality.

El Kheshen estimates that a herd, consisting of 100 milking cows, 25 less-than-a-year calves, 25 less-than-two-years calves, 20 heifers, and 4 bulls, gives, in normal times, such as of 1938 and 1939, a net profit of 14 per cent of the capital or LE.2 ($10) per 1 milking cow. A similar herd of gamoose gives a net profit of LE.5.55 ($27.75) per milking head, or about 19 per cent of the capital. A flock of sheep of 200 head gives a net profit of 20 per cent of the capital or LE.0.50 ($2.50) per head. In El Kheshen's estimation, the price of milk is 4 milliems (2¢) per pound, and the price of wool is 40 milliems (20¢) per pound. (The

In Utah, dairy cows are kept loose on the pasture. The average milk production of a Friesian cow is 10,000 pounds a year. The fat content in that milk is about 3.5 per cent.

In Egypt, buffaloes are kept tied to their mangers. An average buffalo produces 4,000 pounds of milk a year which has an average butterfat content of 8 per cent.

rate of exchange during the '30's was $5 to every Egyptian pound.)

Table 26. Milk, wool, and egg production in Egypt in 1939 and the producing number of head and birds

Kind of livestock	Number of the producing units	Produced amounts
Milking cows	532,146	543,905,000 lbs. milk
Milking gamoose	387,302	858,237,000 lbs. milk
Milking ewes	1,340,041	11,167,000 lbs. milk
Milking goats	575,140	5,226,000 lbs. milk
Total milk produced		1,418,535,000 lbs. milk
Sheep	1,896,618	4,765,328 lbs. wool
Laying hens	10,712,628	749,883,000 eggs

Source (8)

Cattle in Utah perform no muscular work. They are kept for meat and milk production. Sheep are kept for their meat and their wool. Although some horses are sold to slaughterhouses, their main function - as well as that of mules - is drafting.

Table 27. Average meat, milk, and wool production in Utah and the number of the producing units, 1928 to 1934

Kind of livestock	Number of the producing units	Produced amounts
Milk cows	105,800	549,000,000 lbs. milk
Sheep	2,605,000	81,918,000 lbs. meat
		217,000 sheep
		923,000 lambs
		18,795,905 lbs. of wool
Goats	60,149	189,500 lbs. of mohair
Swine (all ages)	76,000	15,859,000 lbs. of meat
Hens and pullets	2,044,000	223,500,000 eggs
Cows (milk and beef)	466,000	84,940,000 lbs. of meat

Source (16)

The average gross income from livestock in Utah from 1924 to 1933 was $32,559,000; gross income from livestock presents 98.7 per cent of the capital invested in livestock. The gross return from the sheep

business is 37.6 per cent of the total gross from livestock - 21.8 per cent from lambs and sheep and 15.8 from wool. The share of milk is 22.8 per cent, and that of cattle and calves is 19.5 per cent. Eggs and chickens contributed 11.4 and 3.4 per cent respectively. Gross income from hogs is 4.3 per cent of the total. The balance (1.1 per cent) is the share of horses and mules.

Farm Labor of the Two Areas

Farm labor in Egypt is classified into three groups: paid permanent labor, paid daily labor, and the unpaid labor, such as the farmer's wife and children. In the 1939 General Agricultural Census, small land owners, their wives, and children were classified under permanent labor, although most of them work as daily labor on large farms too. Permanent laborers of a farm are the managers, bookkeepers, cowhands, shepherds, tractor drivers, foremen, watchmen, and expert men in ploughing and leveling. They differ in number from farm to farm according to size of farm, type of farming, rotation system, and methods of operating the farm. Their number in the census is 3,977,000 persons - about one-fourth of the population. Daily laborers are only called when they are needed. They usually do the major work on the farm, such as preparing the seed bed, planting, seeding, weeding, irrigating, harvesting, and threshing. Their daily wages differ according to the demand for them and according to the general price level. This group of laborers constitutes the major part of small landowners, tenants (200,000 persons), and landless laborers (650,000) persons.

Most of the farm work in Utah is done by farm operators, their wives, and their children. The average number of farm laborers per farm is 1.46 persons. In 1945 the total number of farm workers was 31,893

persons, of whom 3,293 were hired workers, 7,544 were unpaid workers, and 21,056 were the operators (14).

During 1943, all farm work required 326,000 man-work-months. Although this amount of man-work-month could be furnished by the operators and the members of their families, hired labor was needed. The reasons for needing hired labor were, and still are:

1. Farm work during May, June, July, August, and September needs more man-work-month than could be furnished by the operators and their families during these months.

2. Members of the operators' families cannot handle all kinds of work on the farm.

Labor required for the production and harvest of the main crops in Egypt and Utah. The amount of labor required per crop acre in Egypt is about 15 times as much as it is in Utah. In my opinion, the reasons behind this fact are:

1. High degree of mechanization on the farms of Utah.

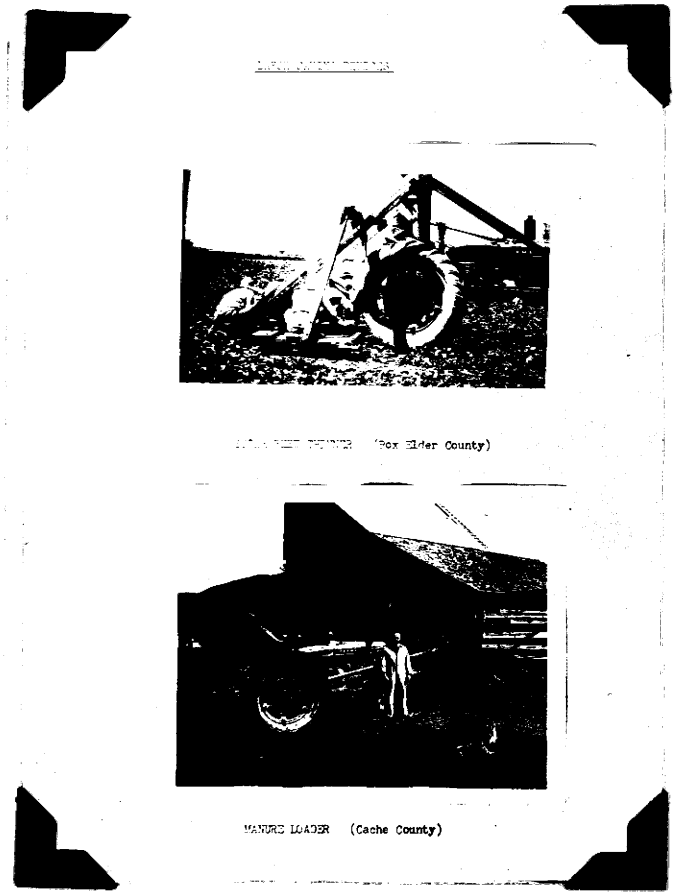
2. PMWU equals 10 hours of work, while the hired laborer in Egypt works less than 10 hours a day.

3. Cotton and rice are devoted to hand labor, and they need about four-fifthsof the total labor of boys and about one-half of the total men.

4. In the process of producing a given crop, each of the two areas has its own jobs and its own methods of handling these jobs. The different jobs and methods account for some of the difference in the amount of required labor.

5. The Utah farmer is more efficient as a result of better education, better health, and better living conditions.

A group of boys and girls seeding down cotton. Sand, for covering the seeds, is brought to the field on donkeys' backs. The boy next to the white donkey is about to unload the sand.



(Box Elder County)

MANURE LOADER (Cache County)

Labor in Utah is very expensive; therefore power machines and labor-saving devices are gaining popularity among Utah farmers.

Table 28. Productive man-work-unit required for the production and harvest of the main crops in Egypt and Utah

Crop	Egypt			Utah
	Boys	Men	Total	
	(PMWU)	(PMWU)	(PMWU)	(PMWU)
Cotton	55.0	27	82.0	...
Corn (for grain)	10.0	15	25.0	8.0
Corn (for silage)		...	...	6.0
Sorghums	7.5	26	33.5	
Rice	16.0	30	46.0	...
Wheat (irrigated)	0.5	10	10.5	3.0
Wheat (dry)		...	...	0.4
Broadbean	0.5	12	12.5	...
Beans			...	6.0
Barley	0.5	11	11.5	3.0
Sugar-cane	36.0	55	91.0	...
Sugar-beet		...	...	12.0
Clover*	1.5	12	13.5	1.0*
Hay		...		2.0
Potatoes				11.0
Oats		...		3.0
Onions	44.0	30	78.0	40.0
Tomatoes				20.0
Peas (canning)				6.0
Peas (pod)				50.0
Peaches				24.0
Berries				50.0
Total# in man-work-month	5,000,000.0	6,000,000	11,000,000.0	160,000.0
Per crop acre	0.5 MWM	0.7 MWM	1.2 MWM	.11 MWM

Sources (2, 16, and Table 22)
* Clover for seed needs 1 PMWM while it needs .8 PMWM per cut.
# One boy equals $\frac{1}{2}$ a man.

Labor required for tending livestock. According to the 1939 Census of Agriculture of Egypt, there were 58,264 paid persons engaged in taking care of about 2,838,000 animal units of cattle, horses, mules, donkeys, goats, sheep, and camels. This means that each of these persons takes care of about 48 animal units, which is higher than it is in practice.

The Census only counted those who were paid and did not consider the amount of work of those who were not hired for taking care of livestock. In practice, one person can take care of a herd of 10 work bulls, 10 milk cows, or from 25 to 50 sheep.

Labor required in taking care of Utah's livestock is given in the following table.

Table 29. Productive man-work-units required to care for one head of livestock and the total productive labor required in the livestock production in the State of Utah

Kind of livestock	Man-work-units per head	Man-work-months total
Dairy cow	16.00	67,200
Dairy heifer	2.00	
Dairy bull	5.00	
Beef cattle (farm)	2.00	14,000
Beef cattle (range)	.80	
Beef cattle (fattening)	1.20	
Sheep (farm flocks)	.50	
Sheep (range flocks)	.60	50,000
Sheep and lamb (fattening)	.15	
Hogs (broad sows, pigs to weaning)	3.00	8,040
Hogs (other raised during year)	.50	
Hens per 100 birds	15.00	15,168
Turkeys raised per 100 birds	16.00	8,224
Pullets per 100 birds	3.50	3,420
Cockerels per 100 birds	1.50	
Total		166,052

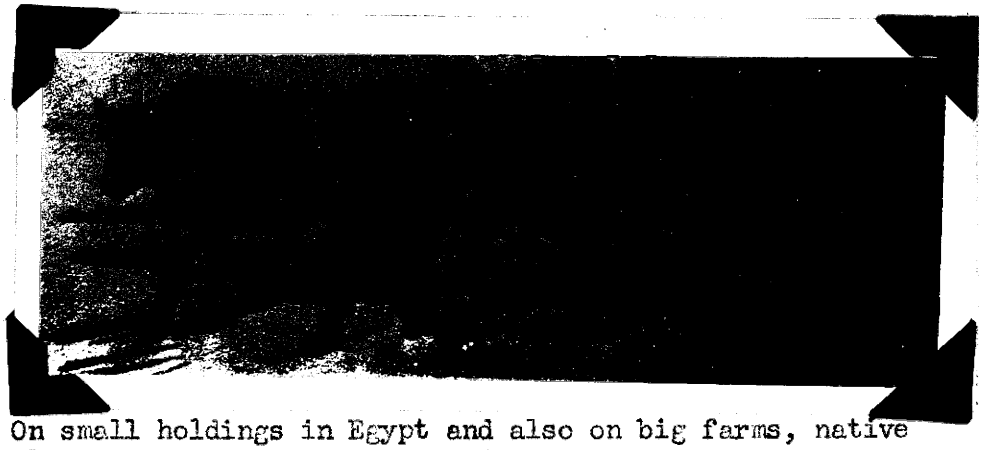
Sources (16 and 12)

Farm Machinery and Tools

In Egypt modern power farm machines are not as popular as they are in Utah for the following reasons:

1. All modern machines are imported, mostly from the United States; therefore they are more expensive in Egypt than they are in Utah.

Tractors are replacing horses and mules in Utah farms. In Egypt, tractors are also widely used, especially on farms of 200 acres or more.

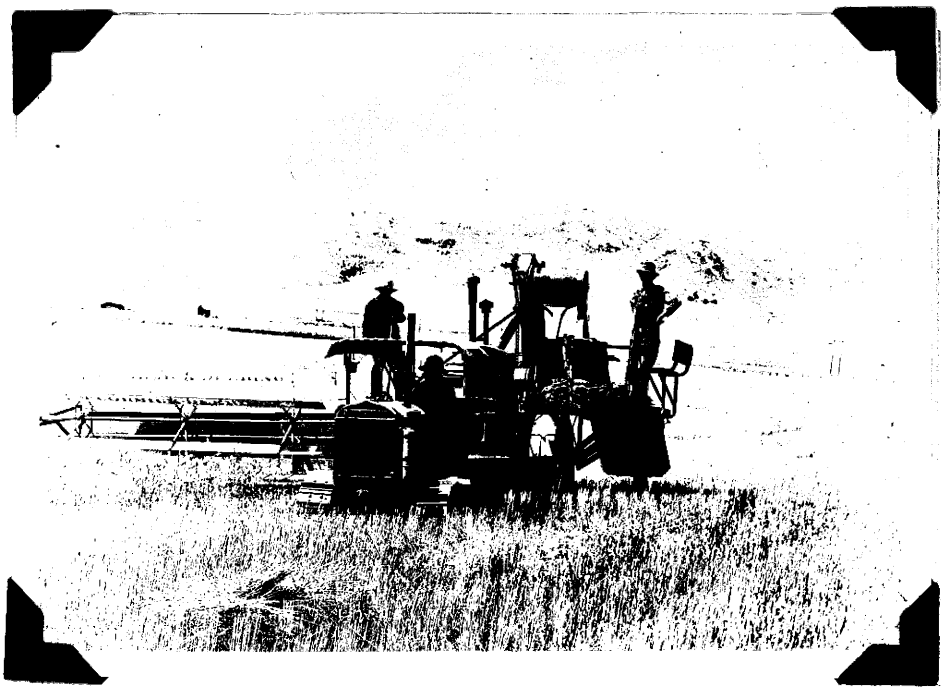


On small holdings in Egypt and also on big farms, native ploughs drawn by oxen are used.

2. Farm labor in Egypt is cheaper than it is in Utah. For the price of a $1,500 machine, the Egyptian farmer could hire 7,500 man days of labor, while the Utah farmer could only hire 750 days of man labor.

3. Expert mechanics and quick repair service are not always available in Egypt as they are in Utah.

4. Farm machines are usually made to meet the requirements of the farmers where these machines are manufactured. The requirements of the Egyptian farmer are different from those of the American and European farmer. This is due to the differences in farm practices and farming methods. Therefore, farm mechanization in Egypt is taking place slowly.



A combine harvests and thrashes a field of wheat in Utah. The use of such a machine in Egypt is not economical. Using a combine means losing the straw, which is needed as a summer fodder.

In Egypt, after thrashing wheat and barley, the grain is separated from the thrashed straw by the wind blower. The basket in the foreground is used for stacking the straw. This basket is made of henna sticks.

ORGANIZATION AND MANAGEMENT OF A 100 ACRE FARM

In order to make the comparison and the contrast of farm management and organization in Egypt and Utah as accurate and as close as possible to the reader's mind, one farm from each area is chosen. The farm from Egypt is an assumed 100 acres from the cotton and wheat area. The owner of this farm follows the biennial crop rotation system, and he does not rent any part of this farm. All the figures concerning this farm are taken from Gannam (5) and Albolkaini (2). Gannam's figures are based on his study of a 100 acre farm. Albolkaini figures are based on the cost of production of an acre of the different crops grown in Egypt. Prices and wages are those of 1937. The Utah farm is also a hypothetical 100 acre field crop farm in Utah County. Figures given about this farm are based upon the actual study made by Fuhriman (18), and the unpublished records compiled for that study. The figures published in Fuhriman's study are those of the average farm which is less than 100 acres; therefore, they are raised to the level of a 100 acre farm in order to fit into the comparison. Prices given in that study are those of 1935.

It is to be noticed that the Egyptian farm fairly represents every 100 acre farm in the cotton and wheat area. The Utah farm also represents, to a great extent, the average field crop farm in Utah County, and, to a less extent, the field crop farm of the state.

Differences in Farming Methods and Practices

In order to familiarize the reader with the two farms, the major differences in farming methods and practices adopted in Egypt and Utah are given.

In Egypt cattle are kept for more than one purpose. They provide drafting power, produce milk or meat, and furnish the farmer with manure.

In Utah they are kept for production and not for work. They also furnish manure, but its value to the Utah farmer is less than it is to the Egyptian farmer. Donkeys and camels are used for carrying loads to and from the field. In Utah this job is done by carts drawn by horses.

On the Egyptian farm, cows, bulls, camels, and donkeys are always tied to their mangers in the barn or tied to small movable posts in the clover field. In Utah the livestock are kept free on the pasture or in a fenced area. Milking cows are tied, part of the time, to their mangers.

Dry straw is used in Utah for bedding. In Egypt bedding differs according to the different animals. For cattle, sheep, and donkeys the bedding is dry dirt; for horses, it is dry rice straw. Camels need no bedding. Almost every day the Utah farmer puts dry straw in the barn and takes out the wet. When the straw becomes useless for bedding, he piles it till it is time to spread it in the field. The Egyptian farmer keeps putting fresh dirt in the barn till the layer of manure is 2 feet or more in depth; then he takes it to the pile. From the pile he reloads the manure on donkeys' or camels' backs and takes it to the field to be spread.

There are also differences in cultivating grain crops and clover. In Egypt the field is usually ploughed and harrowed twice for wheat and once for other grains and clover. Before seeding, the field is divided into small basins 15 by 30 feet. These basins are made to make irrigation as complete as possible. The ridges between basins make the use of seeders, mowers, and harvesters very difficult. In Utah no divisions are needed, since the fields are not flat.

There is also a great difference in the methods of threshing. In Utah thrashing is either done by combines or by thrashing machines. On a 100 acre farm in Egypt, thrashing is done by the "norug." A norug is

a sort of vehicle with 16-20 wheels. The diameter of each wheel is about a foot and the edge is sharp. Thrashing is done by the passing of the norug over a layer of the harvested crop. Thrashing an acre of wheat requires a day's work of 3 norugs, 3 teams of oxen, 3 boys, and 2 men.

In Egypt weed control is done by hand, while in Utah it is partially done by machines and partially by hand. In general, all the farm work on the 100 acre farm of Egypt is done by hand tools and locally made equipment drawn by livestock. In Utah the major part of the farm work is done by machines.

Land Resources

In Egypt about 100 per cent of farm area is cultivated; while the cultivated area of the Utah farm is only 65.5 per cent. In Egypt the land is cultivated twice during the year; therefore, the cropped area of the Egyptian farm is between 150-200 acres. In Utah that area is only 65.5 per cent since the double cropping system is almost unused. The irrigated area on the Egyptian farm is 100 per cent of the total farm area. In Utah irrigated crops are grown on 60 per cent of the farm area, dry crop land is 5.5 per cent, and the rest of the area is either idle, pasture land, or range land.

Table 30. Land resources per 100 acre field crop farm in Egypt in 1937 and Utah County in 1935

Item	Egypt	Utah	
	100 acre farm	Actual study	100 acre farm
	(acres)	(acres)	(acres)
Total land area	100	65.6	100.0
Acres of crops	150-200	43.0	65.5
Irrigated area	100	39.4	60.1
Dry crop land	-	3.6	5.5
Non cropped land	-	22.6	34.6
Fallow and idle	0-50	8.5	13.5
Pasture	-	6.9	10.5
Range	-	3.4	5.5
Farmstead and other	about 2	3.8	about 5.0

Sources (5 and 18)

Farm Capital

Fixed capital. The fixed capital invested in the Egyptian farm is 4.8 times as much as that invested in the Utah farm. (Table 31.) In Egypt 91.3 per cent of the fixed capital is invested in land, 4.3 per cent in buildings, while in Utah 70.9 per cent is invested in land and 19 per cent is invested in buildings. Livestock on the Egyptian farm account for 3.5 per cent of the fixed capital. In Utah they account for 5 per cent. The Egyptian farmer owns 97.2 per cent of his capital, while the Utah farmer owns only 55.2 per cent.

Table 31. Fixed capital invested in a 100 acre field crop farm in Egypt in 1937 and Utah County in 1935

Item	Egypt		Utah	
	100 acre farm		100 acre farm	
	Amount	Per cent	Amount	Per cent
Total fixed capital	$57,550	100.0	$11,869	100.0
Land value	52,500	91.3	8,410	70.9
Building value	2,500*	4.3	2,255	19.0
Livestock	2,000	3.5	596	5.0
Machinery	500	0.9	608	5.1
Indebtedness	1,600	2.8	5,314	44.8

Sources (5 and 18)
* This figure does not include the value of the farm owner's house.

Working capital. Total working capital of the Egyptian farm is 4.7 times as much as that of the Utah farm. Hired labor and custom work take 44.4 per cent of the working capital in Egypt. They only take 28.3 per cent of that capital in Utah. Fertilizers cost the Egyptian farmer 18.5 per cent of his working capital. The Utah farmer does not make any provision for this item. Since the Egyptian farmer keeps more livestock and grows less feed on his 100 acre farm than the Utah farmer, he pays 16.4 per cent of his working capital for the purchase of feed,

while the Utah farmer only pays 5.2 per cent.

Table 32. The working capital required for a 100 acre field crop farm in Egypt (1937) and Utah County (1935)

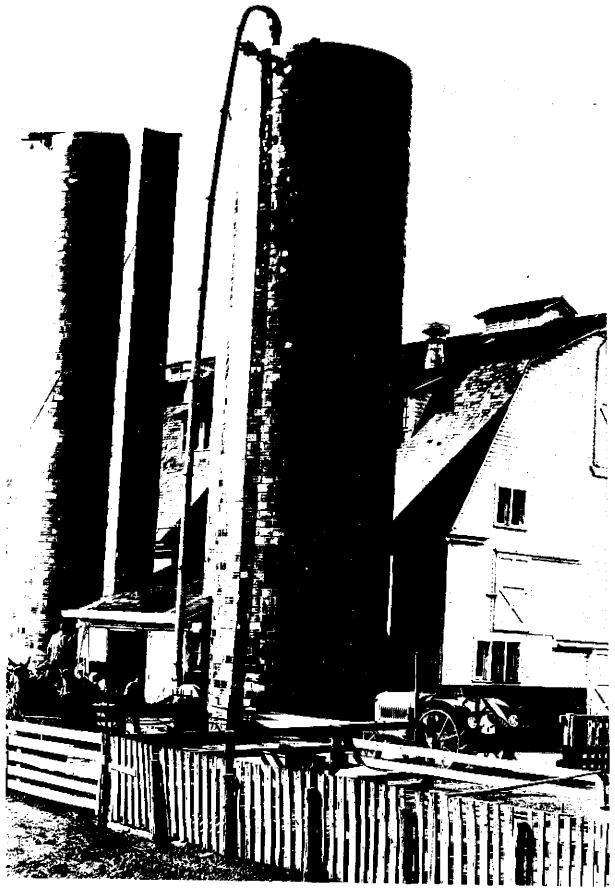
Item	Egypt		Utah	
	100 acre farm		100 acre farm	
	Amount	Per cent	Amount	Per cent
Hired labor	$ 900	18.5	$ 195	19.2
Custom work	1,240*	25.5	92	9.1
Feeds	800	16.4	53	5.2
Seeds and plants	290	6.0	118	11.6
Taxes, inc. water's	450	9.2	279	27.5
Building and machinery	200	4.1	91	9.0
Supplies and services			58	5.8
Fees and stock pasture			19	1.9
Fertilizers	900	18.5		
Auto, truck, and tractor			73	7.2
Other	70	1.0	33	3.2
Total working capital	$ 4,850	100.0	$ 1,015	100.0
Fixed and working capital	$62,370		$12,731	
Ratio of fixed capital to working capital	11.8:1		11.6:1	

Sources (5 and 18)
* This figure represents the total amount paid to permanent labor and farm staff.

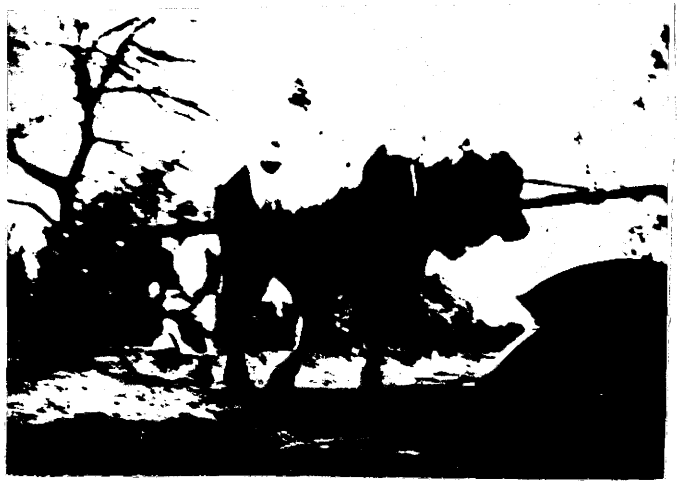
Farm Buildings

Farm buildings, excluding the owner's house, cost the Egyptian farmer about $25 per acre, or about 5 per cent of the real estate capital. In smaller farms this cost is higher than it is in larger farms. Farm buildings for a hundred acres consist of:

1. One house for the land owner
2. Two three-room houses for farm staff
3. Warehouses for crops, seed, fertilizers, and tools
4. Stable and barn
5. Office building
6. Six to eight two-room houses for permanent farm labor.



A Utah barn. The silos are filled with green alfalfa or corn which is brought on a mule or horse-drawn cart. The tractor provides the power which is used in blowing the alfalfa up through the pipe.



Livestock, especially bulls, are kept on the Egyptian farms to perform many jobs. Turning a water-wheel is one of them.

7. Two central wash and rest rooms

These buildings, excluding the owner's house, are worth about $2,500 and are built of mud bricks, dry cotton bushes for roofing, and lumber for doors and windows. Residents of these houses do not pay rent or any up-keep cost.

Farm buildings of the 100 acre farm of Utah are: the owner's house, a barn for sheltering livestock and storage of feed, a shed for farm machinery, and a hog pen or chicken coop, depending on which is kept. The average value of these buildings is about $2,255 or 22 per cent of real estate value.

Farm Labor

In Egypt a hundred acre farm such as the one used in this comparison requires the following staff:

1. One bookkeeper. He keeps the books and the warehouse. His monthly salary is $15.

2. One foreman. He supervises hired laborers. His monthly salary is $15.

3. Two cow-hands. They look after the livestock in the barn and at the pasture (clover fields) and prepare their daily feed. The monthly salary of a cow-hand is $5.

4. A shepherd. The shepherd's job is to take care of the sheep, feed them, and take them to the pasture. His monthly salary is $4.

5. Two watchmen. Their job is to guard crops on the field, in the farm yard, livestock, and other things on the farm. A watchman's salary is $5 a month.

6. Two camel tenders. Each one feeds a camel, cleans his box, and puts the loads on the camel's back. His monthly salary is $5.

7. Ten permanent laborers. They handle different jobs like stacking hay, digging ditches, driving carts, loading dirt to the barn or manure to the field, helping the foreman or the watchmen. In short, they take care of all the odds and ends on the farm. The monthly salary of each of them is $4.50.

Most members of this staff liye on the farm, while the rest live in the nearby village.

The major part of farm work is not done by permanent labor. It is done by laborers who are hired by the day when they are needed. The daily laborers for such a farm amount to 2,765 days of man-labor and 6,620 days of child-labor. Considering 2 days of child-labor as the equivalent of 1 day of man-labor, the labor requirement of this farm is 6,075 men-work-days of daily laborers and 6,935 man-work-days of permanent labor, the total of which is 13,010 man-work-days. These daily laborers are paid by the day and usually at the end of the week.

Daily hired laborers are called for work by a labor contractor. The labor contractor gets his instructions from the foreman concerning the number and kind of workers needed on the farm the next day. He hires the required number of laborers from the nearby villages. The contractor is paid between 5 and 10 per cent of the total wages paid to laborers hired by him.

Studies in Utah County show that the average field crop farm used 450 man-work-days plus the labor involved in the custom work. The operator and members of his family furnished 375 man-work-days, and hired labor furnished 75 man-work-days. A hundred acre farm required 685 man-work-days, of which 300 man-work-days were furnished by the operator, 100 man-work-days were furnished by the family, and 285 were furnished by hired labor.

Due to the effects of the local conditions and practices, the above figures are not adequate for a comparison. In order to eliminate the local factors of the two areas and put the figure on a comparable base, the average man-hours required for the production of the different crops in the United States is used in the following table.

Table 33. Man-hours work required for a 100 acre farm in Egypt and Utah County operated under the average conditions of the United States

Item	Total man-hours on the farm of	
	Egypt	Utah
Cotton	5,720*	
Corn	450	8
Wheat	305	165
Alfalfa		460
Clover"	250	
Sugar-beet		500
Oats		17
Other crops		950
Livestock	2,120'	825
Total in man-work-days	884.5#	292.5#
Man-work-days under local conditions	13,010	685

Sources (32)

* This is according to the California average, since cotton yield in California is almost as high as it is in Egypt.

" The average of the U. S. is 5.8 man-hours for the first and second crop. In Egypt three crops are taken from clover, therefore, 8 man-hours are used in the table.

' Donkey's and camel's man-hours are estimated at 20 and 75, respectively.

\# Assuming that a man-work-day equals 10 man-hours.

Under the conditions of Egypt, the Egyptian farm requires 87 man-work-days per crop acre, while the Utah farm, under its own conditions, requires 7 man-work-days. By using the United States' averages, the Egyptian farm requires 884.5 man-work-days or 5.9 per crop-acre. Using the same averages, the Utah farm requires 292.5 man-work-days or 4.5 per crop acre.

When each farm is under its local conditions, the ratio of man-work-days of the Egyptian farm to that of the Utah farm is 12:1. When the United States averages are used, the ratio of man-work-days required for the Egyptian farm to that of the Utah farm is 1.2:1. By using the same averages as a standard, the efficiency of labor in Egypt is 14 per cent, while it is 42 per cent in Utah. This great difference is due to the following reasons:

1. Farms in the United States are mechanized, while in Egypt farmwork is done by hand and animal power.

2. In Egypt there are farm practices and methods of farming which do not exist in the United States. The amount of labor engaged in these practices and methods is eliminated when the United States' averages are used.

3. Part of this difference is due to the natural difference in the efficiency of labor in Egypt and in Utah.

Farm Machinery and Tools

All farm machines used on the Egyptian farm are locally made and could be safely called tools. These tools could be classified into three groups. The first group consists of 6 ploughs, 1 harrow, 2 scrapers, and 4 norugs. These tools are drawn by bulls. Tools of the second group are those items used in loading, unloading, and transporting crops, dirt, and manure. These tools are made from fibers taken from palm tree tops and leaves. The third group consists of those articles used for storing, weighing, and measuring crops. Shovels, rakes, and hoes are also used, but usually they belong to the laborers.

An average field crop farm in Utah County has a share in a car, a set of harnesses, tillage tools, planting tools, harvesting tools, and

dairy equipment. Seeders, combines, thrashers, and balers are also owned, but by very few operators. The value of farm machines and tools used on the average size field crop farm in Utah County in 1935 was $399. For a hundred acre farm, this value would be $608, compared to $500 for the Egyptian farm.

Livestock

In Egypt hens, turkeys, geese, and ducks are kept on almost every farm. Since they are usually kept by the residents of the farm, they do not appear in the comparison. Hogs are not kept on the majority of the farms because it is against the Moslem religion to keep, trade, or eat hogs. Horses, when kept on a farm, are only kept for the operator's personal use and pleasure. Cows and female gamoose are kept for their milk and working ability and bulls and steers for drafting ploughs, harrows, scrapers, norugs, and carts; while camels and donkeys are kept for carrying loads.

In Utah cattle are kept for the production of milk or meat, according to the kind of cattle kept. Horses are used in drafting farm tools used in ploughing, seeding, and harvesting and also in drafting wagons. Livestock kept on the Egyptian and the Utah farms are listed in Table 34.

Before comparing the prices of the crops, livestock, and livestock products of the two areas, it is worth knowing the index number of prices of all farm products. In Egypt for the year 1937 it was 94 (1939 = 100). In Utah that index number for 1935 was 96 (1935-39 = 100).

Sales of livestock and livestock products constituted in 1937, 1.6 per cent of the total cash receipts of the Egyptian field crop farm. In Utah County in 1935 they constituted 7 per cent. Prices of livestock and livestock products are given in Table 35.

Table 34. Average number of livestock kept and that of livestock sold at a 100 acre field crop farm in Egypt in 1937 and Utah County in 1935

Kind of livestock	Egypt		Utah	
	100 acre farm		100 acre farm	
	Kept	Sold	Kept	Sold
	Head	Head	Head	Head
Dairy cows			2.4	.26
Other dairy cattle			1.2	.56
Beef cows			1.2	.10
Other beef cattle	*		1.6	.61
Draft bulls	10.0			
Other draft cattle	2.0			
Gamoose (buffaloes)	1.0	1		
Sheep	25.0	15	.8	
Horses			3.8	.30
Colts			0.5	
Hogs and sows			3.2	3.15
Hens and baby chickens			24.7	4.57
Donkeys	8.0			
Camels	3.0			
Total (a.u.)	28.7		11.0	
Producing animal units	6.5		7.1	

Sources (5 and 18)

* The owner may keep feeding calves during clover season whenever he has a surplus of clover.

Table 35. Price per head of livestock in Egypt in 1937 and Utah in 1935

Kind of livestock	Price per head	
	Egypt	Utah
Dairy cows	$ 50.0	$40.00
Heifers over one year	18.0	30.00
Heifers under one year		10.00
Dairy calves	25.0	10.00
Beef cows		25.00
Heifer over one year		12.00
Steers over one year		21.00
Heifers and steers under 1 year		12.00
Beef bulls		60.00
Horses		60.00
Sows	8.0	16.00
Hogs		6.50
Hens	0.6	0.65
Gamoose	100.0	
Heifers under one year	25.0	
Donkeys	15.0	
Camels	100.0	
Draft bulls	100.0	

Sources (5, 18, and 35)

Table 36. Prices of livestock products in Egypt (1937) and Utah County (1935)

	Unit	Price	
		Egypt	Utah
Eggs	Dozen	6¢	22.9¢
Milk	Pound	2¢	1.4¢
Wool	Pound	20¢	17.0¢

Sources (4 and 35)

Crops Grown

The two leading crops on a field crop farm in Utah are alfalfa and wheat. They respectively engage 23.2 and 19.2 per cent of the farm area. The two leading crops on the Egyptian farm are cotton and corn. Although corn engages 50 per cent of the farm area, it is of less importance to the owner of the farm. On such a farm, small tenants rent most of the corn area to grow their own corn. The landlord only grows corn on whatever is left and sometimes he keeps the land idle. Therefore, from the owner's viewpoint, the leading two crops are cotton and wheat.

Table 37. Acreage of crops grown, yield per acre, and total production on a 100 acre field crop farm in Egypt (1937) and Utah County (1935)

Crop	Egypt			Utah		
	100 acre farm			100 acre farm		
	Acres	Yield	Total production	Acres	Yield	Total production
Alfalfa				23.2	2.3 ton	53 ton
Wheat	35	32.60 bu.	1,141 bu.	19.2	36.0 bu.	690 bu.
Oats				2.0	50.0 bu.	99 bu.
Barley				4.4	45.0 bu.	267 bu.
Sugar-beet				5.5	12.2 ton	67 ton
Cotton	50	1.03 bales	51 bales			
Clover	30*	5.40 bu.#	81 bu.			
Corn	50	43.50 bu.	2,175 bu.	0.3	26.0 bu.	7 bu.
Other				11.7	--*	

Sources (2, 18, and 35)

* 50 per cent is kept to produce seed after the third crop; the rest is only cut once.

\# 5.4 bu. of seed + 20 tons of green clover are taken from the permanent clover, which gives three crops and the seed.

* Other crops are tomatoes, peas, and onions. The average yield of tomatoes is 5.6 tons, of peas is 1.5 tons, and that of onions is 356 bushels.

Crop yields in Utah were affected by the drought of 1934 and of 1935. The degree of this effect is shown in the following table.

Table 38. Average yield and yield index of different crops in Utah in 1935

Crop	Average yield		Yield index
	in 1935	1935-39	1935
Wheat	20.0 bu.	17.80 bu.	112
Sugar-beet	12.3 tons	13.40 tons	92
Alfalfa	2.0 tons	2.10 tons	95
Yield index of all crops (1935-39 = 100)			96.8

Source (35)

Table 39. Prices of different crops and total value of crops sold at a 100 acre field crop farm in Egypt in 1937 and Utah County in 1935

Crop	Unit	Egypt			Utah		
		Price per unit	Value of crop sold	Portion of total production sold	Price per unit	Value of crop sold	Portion of total production sold
				(per cent)			(per cent)
Alfalfa	ton				$7.40	$ 149	4
Wheat	bu.	$ 1.37	$1,563	100	.79	356	65
Oats	bu.				.39	16	41
Barley	bu.				.51	61	45
Sugar-beet	ton				4.50	309	100
Cotton	bale	100.00	5,150				
Corn	bu.	0.90	1,957	100	.91	3	49
Clover	bu.	2.75	225				
Other						612	
Total value of crops sold			$8,895			$1,506	

Sources (5, 2, 18, and 35)

Wheat and sugar-beets are the main source for the cash receipts of a field crop farm in Utah County. In Egypt cotton and corn bring the biggest amount of cash receipts to the landlord.

Income

On the Egyptian farm, sale of crops is almost the only source of income. It contributes 94.1 per cent of the total cash receipts. In

Utah crop sales contribute only 79 per cent of the total cash receipts. Livestock and livestock products in Utah bring a cash income of 7 per cent of the total cash receipts.

Table 40. Cash receipts from crops, livestock, and livestock sales of a 100 acre field crop farm in Egypt in 1937 and Utah County in 1935

Item	Egypt 100 acre farm		Utah County 100 acre farm		Ratio Egypt to Utah
	Amount	Per cent	Amount	Per cent	
Crop sales	$8,895	94.1	$1,506	79	5.9:1
Livestock sales	140	1.5	100	5	1.4:1
Livestock products sales	15	0.1	38	2	.3:1
Miscellaneous	400	4.3	270	14	1.4:1
Total cash receipts	$9,450	100.0	$1,914	100	4.9:1

Sources (4, 5, and 18)

Table 41. Summary of total investment, total receipts, total expenses, expenditure, and operator's income and earning on a 100 acre field crop farm in Egypt (1937) and Utah County (1935)

Item	100 acre field crop farm in		Ratio of Egypt to Utah
	Egypt	Utah	
1. Total investment	$60,195	$12,048	4.9:1
2. Total receipts	9,450	1,952*	4.7:1
3. Total expenditure	4,850	1,074#	4.5:1
4. Farm income (item 2 - item 3)	4,600	878	5.2:1
5. Value of unpaid labor		181	
6. Real farm income (item 4 - item 5)	4,600	696	6.6:1
7. Interest on investment (5%)	3,000	602	5:1
8. Operator's income" (item 6 - item 7)	1,600	94	17:1
9. Farm privileges	670	454	1.5:1
10. Operator's earning (item 8 + item 9)	2,270	548	4.1:1
11. Family's earning (item 10 + item 5)	2,270	730	3.1:1
12. Farm income for man-work-day	0.35	1.28	0.27:1
13. Real farm income per crop acre	30.60	10.70	2.9:1

Sources (4, 5, and 18)

* This amount includes inventory increase ($25).

\# This amount includes livestock purchase ($39).

" Since the operator in Egypt does less work than the operator in Utah, the amount of $1,600 is the operator's income plus a return on capital.

Table 42. The percentage that farm income is to total expenditure, receipts and investment and that real farm income, operator's earning and family's earning is to investment in Egypt (1937) and Utah County (1935)

Item	100 acre field crop farm in	
	Egypt	Utah
Per cent that farm income is of farm expenditure	94.8%	81.7%
Per cent that farm income is of farm receipts	48.6%	44.9%
Per cent that farm income is of investment	7.6%	7.2%
Per cent that real farm income is of investment#	7.6%	5.7%
Per cent that operator's earning is of investment	3.7%	4.5%
Per cent that family's earning is of investment	3.7%	6.0%

Source (Table 41)
Real farm income = farm income - unpaid labor.

Total investment, total receipts, and total expenditure of the Egyptian farm are respectively 4.9, 4.7, and 4.5 times as much as those of Utah farms. Real farm income of the Egyptian farm is 6.6 times as much as that of the farm of Utah. Family earning from the former farm is 3.1 times as much as that from the latter farm. These ratios show that the operator of the Egyptian farm does his best to get the highest possible profit from his farm, while the Utah farmer does his best to get the highest pay in return for his work as well as his family's work, too. In other words, the Egyptian farm is a source for investing capital, while the Utah farm is a source for creating work for the operator and his family. Members of the operator's family in Utah contribute to the family's earning. In Egypt they do not contribute to the family's earning.

SUMMARY AND CONCLUSION

Natural Resources

1. The cultivated area of Egypt is 2.4 per cent of the total land, or about 5,914,000 acres. There are also 1,768,000 acres that could be cultivated if irrigated and drained. The rest of the area, a sand plateau, lacks irrigation water; therefore, it is impossible to cultivate. In Utah there are 1,536,000 cultivated acres, or 2.9 per cent of the total land area, and 45,841,000 acres of grazing land; while the rest is unsuitable for cultivation because of the nature of its soil.

2. Arable land of Egypt is flat, and in quality it does not vary greatly. In Utah the arable land is neither uniform in quality nor flat; in fact most of the crops are grown on the slopes of the mountains, on small hills, and in the bottoms of the valleys.

3. The climate of Egypt permits a year around growing season. In Utah the growing season varies from place to place. Most of the cultivated crops are grown in areas with a growing season of between 125 and 175 days.

4. In Egypt moisture from natural precipitation is so meager that it is useless for agriculture. In Utah precipitation varies from less than 5 inches to over 20 inches a year. It helps the vegetation and furnishes the river and streams with their annual flow of water. Irrigation in Egypt depends entirely on the Nile, whose water is available and adequate all the year. In Utah there are few rivers and streams, and, although their water is always supplemented by rainfall, it is not fully adequate for irrigation.

5. Irrigation and drainage rights in Egypt are automatically given to the landholder. They are inseparable from the land. In Utah water

rights are separable from the land, and a land operator can increase his share of water by purchasing additional stocks in his irrigation company when they are available.

6. Drainage in Egypt is as important as irrigation, especially in the lower part of the country; therefore, it is widely used. In Utah drainage is not widely known, although it is needed to prevent the formation of the hardpan subsoil, to lower the water table, remove alkali, and to protect the land against overflow.

Economic and Social Conditions

1. The population of Egypt is 19,091,000, of which 75 per cent live on agriculture. In Utah the population is 750,000 persons, of which only 15 per cent live on agriculture.

2. In Egypt there are 221.40 persons for each 100 acres of agricultural land, and 168.7 rural inhabitants for each 100 acres of crops. In Utah there are only 1.2 persons for each 100 acres of agricultural land, and 15.9 rural inhabitants for each 100 acres of crops.

3. The main Egyptian non-agricultural industries are those engaged in processing farm products, such as cotton and sugar. Although processing farm products is an important industry in Utah, mining, smelting, and manufacturing are the most important industries in the state.

4. At the present time, the average monthly wage of a farm laborer in Egypt is $12, or about 50 per cent of the monthly wage of non-agricultural laborers. In Utah the average monthly payment for a farm laborer is $150, or about 83 per cent of the average monthly wage of non-agricultural laborers.

5. Agricultural capital of Egypt represents 62.7 per cent of the country's national capital, as against 36.9 per cent in Utah.

6. Gross farm income in Egypt is 33.5 per cent of the national

income, while in Utah it is only 19.9 per cent.

7. In Egypt in 1937 each person engaged in agriculture operated an investment of $800 and contributed $85 to the gross agricultural income. In Utah in 1935 the value of agricultural investment was $5,517 per person engaged in agriculture and the contribution was $1,474.

8. The rate of turn over in national, agricultural, and non-agricultural capital in Utah is higher than it is in Egypt.

9. The average size of an ownership in Egypt is 2.4 acres, as compared to 391 acres in Utah. Almost all the land in farms in Egypt is cultivable; while in Utah only 1/8 of the land in farms is cultivable.

10. In Egypt 3 per cent of land owners hold 58 per cent of the land. In Utah there is a more uniform distribution of land among owners.

11. Different financing systems are set up respectively in Egypt and Utah by the Egyptian and the United States Federal governments in order to aid farmers.

12. The mortgaged area in Egypt represents 18 per cent of the cultivated area, and the debt amounts to 5 per cent of the value of the land. In Utah the mortgaged area is 51.3 per cent of the farm land, and the debt is 40.2 per cent of the land value.

13. Farmers in Utah are more heavily taxed than those in Egypt. They pay about 2.6 per cent of their capital value in property taxes, while the Egyptian farmers only pay 0.8 per cent of their land value. Moreover, the Utah farmers are subject to income taxes on their farm income.

Farm Organization and Management

1. Soils, precipitation, irrigation, climate, topography, markets, and transportation determine the farming types in Egypt and Utah. In

Egypt there are five farming type areas: basin area, rice area, cotton and wheat area, sugar-cane area, and sandy soil area. In Utah there are three dominating farming types: irrigated, dry, and range farming types.

2. In Egypt growing two crops a year, one after the other, on every field is a common practice. This double cropping system increases the acreage of crops harvested to about 150 per cent of the area of cropland. In Utah double cropping of land is not a common practice.

3. The Egyptian farmer follows a more rigidly planned cropping system than the Utah farmer does.

4. The main crops of Egypt are clover, cotton, corn, and wheat. They engage 75 per cent of the cropped acres. Other crops are rice, sorghums, broadbeans, barley, sugar-cane, truck crops, and citrus fruits. In Utah the main crops are hay, wheat, and barley. They engage 60 per cent of the cropped acres. Other crops are sugar-beets, beans, potatoes, truck crops, and orchards.

5. The per acre consumption of fertilizers in Egypt is the highest in the world. Fertilizers are used in Utah but to a far less degree than in Egypt.

6. Cattle are kept on the Egyptian farm for work, milk, and meat production. In Utah they are kept either for milk or for meat production, while horses do the drafting. Buffaloes are not known in Utah.

7. In Egypt loads are carried to and from the field on donkeys' and camels' backs. In Utah these loads are hauled by horses, tractors, and trucks.

8. Utah farmers kept more sheep and hogs than the Egyptian farmers do. Sheep business is more advantageous in Utah because of cheap feed

which grows on the range land; while in Egypt there is almost no vegetation on the desert plateau. Hogs are not kept by the majority of the Egyptian farmers for religious reasons.

9. In Egypt clover is the only feed in winter and spring, and during the rest of the year, livestock thrive mainly on broadbeans, barley, cotton-seed cakes, and wheat and barley straws. In Utah livestock live on hay, commercial feed and grains, including wheat and corn in winter. During the rest of the year, they live on pasture and range.

10. Egypt exports only eggs and imports meat and some dairy products. Utah sells most of its livestock and livestock products to the out-of-state consumers.

11. A crop acre in Egypt requires 36 man-work-days. In Utah that acre requires 3.3 man-work-days, which is about 1/10 of that of Egypt.

12. Although tractors, thrashing machines, and steam engines are used in Egypt, most of the farm work is done by hand and livestock power. In Utah power machines and horses do the major part of the work, while manual work is confined only to a minor portion.

Organization and Management of a 100 Acre Farm

1. This comparison is based on actual study made in the cotton and wheat area of Egypt in 1937 and the field crop farms of Utah County in 1935. All the figures and practices are taken from these studies with the exception of the size of the farm (100 acres), which is hypothetical. Changes are made in the figures of costs, receipts, labor, etc., in order to make them fit a 100 acre farm. The Egyptian farm fairly represents every 100 acre farm in the wheat and cotton area and, to a less extent, other 100 acre farms in the country. The Utah farm fairly represents the average field crop farm in Utah County.

2. The Egyptian farm follows the biennial crop rotation system, while there is no double cropping on the Utah farm. The cropping system increases the cropped area of the Egyptian farm to 150-200 per cent of its actual area. Only 65 per cent of the Utah farm is cropped, and the rest is in pasture, range, and fallow.

3. The Egyptian farm is 100 per cent irrigated, while only 60 per cent of the Utah farm is irrigated and 5 per cent is in dry-farming.

4. In Egypt 91.3 per cent of the fixed capital is invested in land, 4.3 per cent in buildings, while in Utah 70.9 per cent is invested in land and 19 per cent is invested in buildings. Livestock account for 3.5 per cent on the Egyptian farm and 5 per cent on the Utah farm.

5. The Egyptian farmer owns 97.2 per cent of his capital, while the Utah farmer owns only 55.2 per cent.

6. Hired labor and custom work take 44.4 per cent of the working capital in Egypt and only 28.3 per cent in Utah.

7. Fertilizers cost the Egyptian farmer 18.5 per cent of working capital, while the Utah farmer does not make any provision for this item.

8. The Egyptian farmer pays 16.4 per cent of his capital for the purchase of feed, while the Utah farmer only pays 5.2 per cent.

9. Farm buildings on the Egyptian farm are: a house for the land owner, 8-11 houses for laborers, warehouses, stable and barn, office building, and two central wash and rest rooms. Farm buildings on the Utah farm are: the owner's house, a barn, a shed, and a hog pen and chicken coop.

10. The Egyptian farm requires 13,010 man-work-days, of which 6,935 man-work-days are furnished by permanent laborers and 6,075 by daily hired laborers. The Utah farm requires 685 man-work-days, of which 400

man-work-days are furnished by the operator and his family and 285 by hired laborers.

11. Under the average conditions of the United States, the Egyptian farm requires 884 man-work-days, and the Utah farm requires 292 man-work-days. By using these two figures as standards for measuring the efficiency of labor of the two farms, labor efficiency on the Egyptian farm is 14 per cent, while it is 42 per cent on the Utah farm.

12. Farm machines of the Egyptian farm are hand tools and other tools drawn by livestock. In Utah most of the farm machines are horse and power machines.

13. On the Egyptian farm there are 28.7 animal-units, of which 22 per cent are producing. On the Utah farm there are 11 animal-units, of which 64 per cent are producing.

14. Crops grown on the Egyptian farm are cotton, wheat, corn, and clover; while those grown on the Utah farm are alfalfa, wheat, barley, sugar-beets, oats, corn, and truck crops.

15. Prices of livestock and livestock products in Egypt vary greatly from those of Utah, while there is very little variation in wheat and corn prices.

16. Wheat and sugar-beets are the main source for the cash receipts of the Utah farm. In Egypt cotton and corn bring the biggest cash receipts.

17. Fixed capital, working capital, and cash receipts of the Egyptian farm are respectively 4.8, 4.7, and 4.9 as much as those of the Utah farm.

18. Farm income of the Egyptian farm is 5.2 times as much as that of the Utah farm, while the family's earnings in Egypt are only 3.1 times as much as those of the Utah family.

General Conclusion

1. In Egypt agriculture is blessed with a year around growing season, adequate water supply, and fertile soil. These three factors enable the Egyptian farmer to grow two successive crops a year on every field he has. In Utah the climate does not permit double cropping, and irrigation water supply is not adequate for the state's agriculture.

2. With the exception of cotton, all farm products of Egypt, or at least the major part of them, are locally consumed. The major part of the farm products of Utah are shipped to out-of-state markets. This requires the Utah farmer to produce those items which could be packed, preserved, or which are not bulky; while the Egyptian farmer produces bulky products as well as concentrated goods. The Utah farmer consumes the major part of his bulky products by feeding them to his livestock which are kept for the production of milk or meat. Shipping expenses of livestock and livestock products are less than those of hay and grain. The major part of the non-bulky products which are consumed in Egypt is imported.

3. Land in Egypt is the most scarce factor of production, while labor is the least limiting factor, since the country is over-populated and most of its population seeks employment in agriculture. Capital is also scarce but not as scarce as land, especially after the government made it available through its financing establishments. The proportion to which these factors are available compels the Egyptian farmer to try to get, first, the highest yield per acre; second, the highest return on his capital, and finally to make the best use of his labor. Labor is more scarce in Utah than it is in Egypt, while land is less scarce. Capital, which is available through the federal government and private

establishments, comes in between land and labor. This situation requires the Utah farmer to put his labor to the best use in order to get the highest return on each dollar paid for labor.

4. Because of the very small land holdings, cheap labor and certain farm practices, most of the farm work in Egypt is done manually and by livestock power. On big farms and when the owner can afford the price, only ploughing and thrashing are done by power machines. In Utah the expensiveness of labor and the relatively bigger land holdings justify the use of power machines on a very large scale.

5. The livestock business in Utah is more advanced than it is in Egypt. Livestock are kept by the Utah farmer for either milk or meat production. In Egypt they are kept for work, milk, and meat production. In Utah, the business is more advantageous than it is in Egypt because of the availability of range land, which is not found in Egypt. The previously mentioned marketing factor gives livestock and livestock products a more important position in Utah farming than it gives them in Egypt.

6. In Utah farms are family sized; they provide enough work for the operator, his wife, and his children. This is also true with small holdings in Egypt; but for the majority of the land owners, farming is an investment, not a job. Big landowners of Egypt seek the maximum return on their capital and not the maximum employment time which the Utah farmers seek.

APPENDIX

Weights and Measures Used on Farms in Egypt and Utah

Linear measure

Egypt		Utah	
1 meter	= 1.09 yards	1 rod	= 5.5 yards
"	= 3.28 feet	"	= 16.5 feet
1 khassaba (rod)	= 3.55 meters	1 mile	= 320 rods
"	= 3.87 yards	"	= 5,280 feet

1 khassaba = .69 rods
1 rod = 1.43 khassabas

Square measure

Egypt		Utah	
1 feddan (acre)	= 333.3 sq. khassabas	1 acre	= 4,840 sq. yd.
1 kerat	= 24 sahms	1 acre	= 160 sq. rods
1 feddan	= 24 kerats	640 acres	= 1 sq. mile
1 feddan	= 4,201 sq. meters		

1 feddan = 1.038 acres
1 acre = 0.96 feddans

Dry measure

Egypt		Utah	
1 ardab	= 12 kelas	2 pints	= 1 quart
"	= 96 khadahs	8 quarts	= 1 peck
"	= .198 cu. meter	4 pecks	= 1 bushel
"	= 6.99 cu. feet	1 bushel	= 1¼ cu. feet
1 kentar	= 100 rotls		
"	= 99.5 pounds		
"	= 36 okkahs		
"	= 45 kilograms		
1 dariba	= 945 kilograms		

1 ardab = 5.444 bushels
1 bushel = .18 ardab
1 kentar = 0.044 tons

Liquid measure

Egypt		Utah	
1 Imp. gal.	= 4.546 liters	4 fluid oz.	= 1 gill
1 kela	= 16.5 liters	4 gills	= 1 pint
"	= 0.454 bushel	2 pints	= 1 quart
		4 quarts	= 1 gallon
		7½ gallons	= 1 cu. ft.
		30½ gallons	= 1 barrel

Monetary units

Egypt		Utah	
1 Egyptian pound LE.	= 100 piastres	1 dollar	= 100 cents
" "	= 1000 milliems	"	= 1000 mills

LE. 1 = $4.94 before World War II
LE. 1 = $4.183 before September 1949
LE. 1 = $2.871 after September 1949

Standard Weights of Farm Products

Egypt		Utah	
Ardab of wheat	= 150 kgs.	Bushel of wheat	= 60 lbs.
" barley	= 120 kgs.	" oats	= 32 lbs.
" broadbeans	= 155 kgs.	" barley	= 48 lbs.
" alfalfa	= 162 kgs.	" corn, shelled	= 56 lbs.
" corn on cob	= 170 kgs.	" corn on cob	= 70 lbs.
" corn, shelled	= 140 kgs.	" potatoes	= 60 lbs.
" peanuts	= 75 kgs.	" onions	= 52 lbs.
" sesame	= 120 kgs.	" beets	= 56 lbs.
Dariba of rice	= 945 kgs.	" tomatoes	= 50 lbs.
Ardab of cottonseed	= 270 lbs.	" peas (in pod)	= 50 lbs.
Kentar of cotton (not ginned)	= 315 lbs.	" peas, dry	= 60 lbs.
Kentar of cotton (ginned)	= 100 lbs.	" apples	= 48 lbs.
Hemle (load) of wheat straws	= 250 kgs.	" peaches	= 48 lbs.
Ardab of bran	= 67.5 kgs.	" cherries	= 40 lbs.
Ardab of beans	= 144 kgs.	" alfalfa seed	= 60 lbs.
Ardab of peas, dry	= 150 kgs.	" grass seed	= 14 lbs.
		" bran	= 20 lbs.
		" corn meal	= 48 lbs.
		" salt	= 80 lbs.

The Five Feddans Act.

In 1912 and 1913, two acts were passed. These two acts are known now as the Five Feddans Act. This act protects the owners of five acres or less against the foreclosure on their land.

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