THE ROLE OF SOCIOLOGISTS IN HOUSING PROJECTS

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Libyan society is confronting an acute housing problem as a result of a rapid growth of urban centres, heavy waves of migration, shortage of dwellings, low standard of facilities and lack of community buildings.

For all these reasons two years ago the Libyan Government decided to study housing conditions in the country in order to eliminate all slum dwellings in cities within the next ten years, and to provide all communities with the necessary land development works.

The main purpose of this paper is to show how sociologists can effectively contribute to housing projects. There is no doubt that housing projects are social phenomena with complicated histories. They pass through successive stages in which a process of malajustment between human beings and their habitat is taking place.

The most important stage is a psychological one, in which people are aware of the fact that housing conditions under which they live are not satisfying their needs. As a result, they feel restless and unhappy. They believe that amelioration of their housing conditions is a major target in life.

Several factors contribute to the rise of the psychological stage; e.g., rural-urban migration, lodging of the immigrants in the most deteriorated areas in the city, the complete absence or the lack of public facilities and social services : water supply, electricity, public baths, schools, dispensaries, markets, parks and other essential services.

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ducing perishables which could neither bear transport expenses nor maintain their freshness with long haulages.

Without taxing the marginal conditions of the environment in some localities to the point of depletion, a national land use management scheme is apt to give an impetus to the current phase of pioneering gaining momentum under the impact of both a national spirit and the availability of capital resources of the oil revenues.

1. Fantoli Amilcare : **Le piogge della Libia con particulare reguardo alle zone di colonizzazione,** Rome 1952, p. 304.

2. Stewart J.H.: Land and Water Resources of Tripolitania, USOM, 1960, pages 26-47.

N.B. All the tabulated statistical data quoted are those of **The 1960 Census of Agriculture,** United Kingdom of Libya. Tripoli Ministry of Agriculture, 1962, and those of the **Agricultural Statistics in Libya.** Kingdom of Libya, Ministry of Agriculture, Tripoli, 1963.

The corollary of this lenghthy discussion is that the regional differences could be utilized to the best advantage of the country as a whole by steering the agricultural development plans with the view of achieving two different but non-contradictory goals; viz the fostering of the regional economies for the sake of self-sufficiency in case it proves both feasible and desirable, i.e. the production of perishables and dairy products; together with the gradual merging of these local economic production systems on a progressive or expansive basis within a national economic plan. Thus, for instance, the recent trend aiming at the diversification of agricultural production in Cyrenaica, implying growing olive, almond, fig, vine and banana-trees on a large scale, should go hand in hand with the increase in the area under fodder, to offset the detrimental contraction of range lands gradually engulfed by the expansion in the cultivated area. Consequently the development of irrigation farming and the emphasis on animal husbandry to loosen the grip of cereal monoculture, besides the introduction of such commercial crops as linseed and chick-peas in Cyrenaica, serve as guidelines to achieve both the increase in the profitability of the farming industry by concentrating on such lucrative crops (dry-farming potatoes and onions in Beida followed by grapes and apricots; irrigated apricot trees followed by fig and pear trees in the same region in contrast to wheat and barley in terms of profitability) as well as the conservation of the productive potentialities of land. To allocate each strip of land to its proper land use is attainable only in the light of a land use survey undertaken with the view of adopting its recommendations to the benefit of the individual cultivator with due consideration being paid to the land and water resources of the area. Tripolitania could specialise in the production of industrial crops, without neglecting other already developed sectors such as animal husbandry, especially those based on irrigation but without pushing this suggested development too far, i.e. such as the over-development of Tripoli quadrangle irrigation resources to the point of exhaustion. The Fezzan and the southern oases of Libya could adopt a self-sufficient economy on purely local and regional grounds before venturing on pro-

per hectare in Cyrenaica and Tripolitania respectively. Cattle, on the contrary, reached a density which ranged from 5.0, 3.6 to 0.6 heads per 100 hectares in Tripolitania, Cyrenaica and the Fezzan respectively. The animal density in proportion to the number of population was the highest in Cyrenaica as regards goats (165 per 100 persons) and sheep (155 per 100 persons), followed by Tripolitania (103 sheep per 100 persons, 92 goats per 100 persons), with the Fezzan as the region of the lowest density (49 goats per 100 persons, 57 sheep per 100 persons). While as regards cattle the density in the Fezzan was but 0.3 head per 100 persons in contrast to 11 heads and 9.3 heads in Tripolitania and Cyrenaica respectively, the Fezzan had 29 heads of camels per 100 inhabitants.

While the farm population on holdings under tribal tenure amounted to 23.2%of the total farm population for the whole country. it attained 38.3% in Cyrenaica as against 0.9% in the Fezzan and 20.7% in Tripolitania. On the other hand, the farm population on holdings under tribal tenure differed in the three provinces, for while it accounted for 65.6% in Tripolitania, it was 34.1% in Cyrenaica with the Fezzan claiming 0.3% of the total farm population on all tribal holdings. Regardless of the type of holding, the farm population amounted to 73.5%, 20.7% and 5.8% in Tripolitania, Cyrenaica and the Fezzan respectively. It is evident that the least proportion on holdings under tribal tenure occurred in the Fezzan followed by Tripolitania. Besides, the percentage of persons of 15 years and more engaged in agricultural pursuits on holdings under tribal tenure reached 1.1% in the Fezzan as against 40.9% in Cyrenaica. On the whole the divergence between the proportion of farm population on all holdings and that of persons of 15 years and more, could imply the outflux from the Fezzan and Tripolitania to urban centres and oil-fields.

Geographical Divisions	Horses		Donkeys		Mules	
	Tribal	Non-Tribal	Tribal	Non-Tribal	Tribal	Non-Tribal
Libya	27.0	73.0	28.0	72.0	23.0	77.0
Tripolitania	13.0	87.0	24.4	75.6	8.9	91.1
Cyrenaica	37.0	63.0	42.0	58.0	9.9	90.1
Fezzan	0.0	100.0	0.6	99.4	0.0	100.0

It is obvious that a relatively greater proportion of livestock in Cyrenaica was kept on tribal holdings in contrast to the corresponding conditions obtaining in the Fezzan, with Tripolitania occupying an intermediate position. However the importance differed from one animal to the other, with the camels for instance favoured on tribal holdings (56% of their total number kept on this type of holdings) in contrast to mules and cattle, thus depending on the uses they are put to. As for the average number of livestock per holding, Cyrenaica ranked first as far as the number of sheep, goats and cattle per holding was concerned, while the Fezzan led the other two regions as regards camels and donkeys. While in Cyrenaica the traditional reputation as a region of livestock rearing accounted for its ascendency, the Fezzan with its harsh conditions, put a premium on donkeys and camels for the use in transport and farm operations. The higher density of sheep and goats in Tripolitania and the Fezzan on holdings under tribal tenure in contrast Cyrenaica where the number of animals per holding on the whole was higher, demonstrates the relative importance of sheep and goats in the flocks of nomads in the first two provinces. Camels, however were invariably concentrated on the tribal holdings throughout the whole country. But the animal density could preferably be assessed relative to the arable land to indicate the degree of pressure on the cultivated land in general. Thus whereas there was one head of sheep and goats per hectare in the Fezzan, the animal density attained 0.6 and 0.4 head

It is evident that the number of camels reveals a more stable trend during the period, being more hardy and less prone to the vicissitudes of a harsh environment, besides the relative unpopularity of the camel meat, even though with the rise in the meat price, an increasing number was slaughtered (for instance 5,595 in Cyrenaica and 9,160 in Tripolitania in 1961), with the consequent reduction in their number in Tripolitania in particular. The number of slaughtered camels in the last two years in Cyrenaica, together with the relevant camel meat production in Tripolitania (4,430 tons in 1960 and 6,180 tons in 1961), emphasizes the far-reaching repercussions of such a trend in the long run as regards the number of this draught and farm animal par excellence. Perhaps the progressive mechanization of such agricultural operations as ploughing and dalu water-lifting in the swani, may involve a change in the mode of their utilization. The Fezzan which was unfortunately excluded because of the lack of the relevant figures with the exception of those concerned with 1960, demonstrates the particular conditions prevailing in the oases, such as the higher proportion of camels, besides the relative insignificance of cattle where the oppressive weather conditions and the scarcity of feed are unfavourable. If classified according to the type of holdings where livestock is kept, the following percentage distribution of animals in the holdings is revealed.

Percentages of Animals by Tribal Tenure and other Holdings for Libya in 1960

Geographical Divisions	Sheep		Goats		Cattle		Camels	
	Tribal	Non-Tribal	Tribal	Non-Tribal	Tribal	Non-Tribal	Tribal	Non-Tribal
Libya	34.3	65.7	37.0	63.0	13.0	87.0	49.0	51.0
Tripolitania	31.0	69.0	36.0	64.0	7.0	93.0	52.0	48.0
Cyrenaica	41.0	59.0	40.0	60.0	30.0	70.0	56.0	44.0
Fezzan	2.0	98.0	3.0	97.0	0.5	99.5	5.0	95.0

Cattle in Libya, 1954 – 1961

Years	Libya		Tripolitania		Cyrenaica	
	Number	Slaughtered	Number	Slaughtered	Number	Slaughtered
1954	142,000	—	57,000	—	85,000	—
1955	135,000	—	49,000	—	86,000	2,708
1956	105,000	—	45,000	—	60,000	5,119
1957	81,000	17,302	47,000	12,300	34,000	5,002
1958	111,000	16,063	51,000	12,100	60,000	3,963
1959	100,000	20,136	57,000	13,670	43,000	6,466
1960	111,232	22,190	84,095	14,630	27,137	7,560
1961	125,000	22,506	90,000	13,260	35,000	9,243

While the general trend in the number of cattle in Tripolitania was upward during almost the whole period in spite of the higher proportion of the slaughtered to the total number of cattle, in contrast to that of Cyrenaica, the numerical evolution in Cyrenaica reveals a decreasing trend associated with wide-range fluctuations reflecting the repercussions of rainfall oscillations to which a considerable portion of the cattle population in Cyrenaica is subject particularly in the eastern dry farming part of the Jebel Akhdar on the third terrace. Besides, the proportion of the cattle slaughtered in Cyrenaica, even though relatively less compared with the corresponding one in Tripolitania, yet its steeply ascending trend constitutes a menace to the already decimated cattle population of the region. As for the camel population the following figures may disclose some of the salient trends.

Camels in Libya, 1954 – 1961

Years	Libya	Tripolitania	Cyrenaica	
	Number	Number	Number	Slaughtered
1954	158,000	79,000	73,000	—
1955	152,000	70,000	76,000	674
1956	156,000	74,000	76,000	1,028
1957	162,500	80,500	76,000	1,529
1958	177,000	90,000	81,000	1,244
1959	175,000	95,000	74,000	1,693
1960	243,619	191,079	46,540	3,521
1961	247,000	180,000	61,000	5,595

relegated stock-raising to a subordinate position, with the consequent decline of the livestock, as the professional shepherds desert the countryside seeking better employment opportunities with the oil companies. Besides, the rise in the rate of meat consumption with the increase of the purchasing power of the masses and the swelling foreign communities, especially those of the growing urban centres, has brought about a static animal population which has culminated to a virtual, even though gradual, decline in some cases. Besides, the use of farm and draught animals has become less popular with the increasing utilization of mechanical methods. The following statistical data bearing upon the livestock number af the slaughtered animals could indicate some trends in the evolution of the animal population.

Years	Libya		Tripolitania		Cyrenaica	
	Sheep	Sheep Slaughtered	Sheep	Sheep Slaughtered	Sheep	Sheep Slaughtered
1954	1,397,000	—	483,000	—	904,000	—
1955	1,471,000	—	429,000	—	1,032,000	82,674
1956	1,328,000	—	503,000	—	815,000	75,079
1957	1,129,000	254,572	574,000	186,600	545,000	67,972
1958	1,436,000	305,883	631,000	203,800	795,000	102,083
1959	1,220,000	320,870	700,000	215,600	510,000	105,270
1960	1,230,878	341,275	767,309	230,000	453,569	111,275
1961	1,026,000	346,235	500,000	180,000	516,000	166,235

Despite the unreliability of these figures one could not fail to notice that the fluctuations as regards the number of sheep are the more remarkable in Cyrenaica, which together with the steady increase in the number slaughtered, account for their decline from about a million in 1955 to about half a million in 1961. The following returns are concerned with the cattle.

it accounted for the overwhelming proportion of that area in the Fezzan (84% in contrast to 16% in Tripolitania and only 3% in Cyrenaica). Besides, this type of farming which is steadily developing, is more commonly practised in Tripolitania, followed by Cyrenaica, with the Fezzan as a region of limited area under irrigation (87.2%, 9.2% and 3.6% respectively). Not only did Tripolitania claim priority in terms of the irrigated area, but also as regards the progress achieved in the utilization of mechanical water lifting devices (74.6% of the irrigated area used pumps). However the use of modern motor-driven pumps is unadvisable in many areas in Cyrenaica and the Fezzan, to avoid water depletion readily reached in the commonly shallow well, as well as to escape salt water intrusion.

It is evident that the cattle and the camels are favoured by the settled farmers and the nomads or semi-nomads respectively in Tripolitania where 75.5% of the total number of cattle, and 74.9% of camels, were kept. The more intensively settled agriculture in the coastal oases and in the eastern portion of the Tripolitanian Jebel, as well as the ample pasture land in the Quibla and the Jefara, has afforded cattle in the first two regions on the one hand, and camels in the other two on the other hand, adequate fodder crops and grazing ground respectively. Despite the fact that the distribution of the different sorts of livestock could not reveal a clear-cut pattern owing to their extreme interpenetration, yet two successive belts could be distinguished: the cattle subregion of the coastal oases of Tripolitania and that of the camels of the Jefara plain, recurring further south, with the Tripolitanian Jebel, particularly the more humid eastern and central portions, constituting a wedge of the cattle subregion, besides the more extensive camel subregion in the Guibla. In Cyrenaica, the cattle and goat subregion of the coastal and the more humid forestclad terraces of the Jebel Akhdar, merges gradually southward into the semi-arid camel and sheep belt with its lateral extension, both to the east in Marmarica and to the west in Syrtica. The extension of irrigation farming achieved at the expense of the better grazing lands, as well as the indifference of the farmers to keep livestock as an integral part of a mixed type of farming, has

Beida-Messa region), while the table-grapes fare well in the coastal areas of Derna and Ez Zuetina-Magrun region. Citrus trees comprising oranges, tangerines, lemons and grapevines demostrated a marked concentration in Tripolitania with the exception of the latter which are largely the speciality of Cyrenaica. The limitations imposed by the scarcity of soil and irrigation water of a good quality, and the prevelance of the salt-laden sea winds, may account for this pattern of regional distribution.

Soft fruits which are less hardy, are relatively less important, even though some, such as apricots, figs and peaches have proved drought-resistent and brackish water tolerant. The following figures reveal the same tendency, namely the occurrence of the majority of trees in Tripolitania, being favoured by the plantation farmers mostly settled in that region where irrigation agriculture is predominantly practised.

Percentages of productive fruit trees in each region in proportion to their totals in Libya in 1960

Geographical Divisions	Pear Trees	Apricot Trees	Peach Trees	Plum Trees	Bananas	Fig Trees	Pomegranate Trees
Libya	100	100	100	100	100	100	100
Tripolitania	74.3	82.6	87.1	91.8	77.6	86.3	88.9
Cyrenaica	25.7	16.9	12.6	7.6	21.9	13.6	8.8
Fezzan	—	0.5	0.3	0.6	0.5	0.1	2.3

These percentages are apt to convey a rather exaggerated idea, because, for instance, the total number of productive plum trees in Cyrenaica amounted to 28 trees only in 1960, while in the Fezzan the pomegranate trees, the most numerous kind of soft fruit trees, were estimated at 20 trees only. The monopoly of Tripolitania is uncontested with the exception of pear trees and bananas (28,52 trees respectively in Cyrenaica) which have found suitable conditions to prosper in some areas of Cyrenaica, namely in the Massa-Beida region and Derna plain respectively.

Even though irrigation agriculture is insignificant in contrast to that of dry farming in the whole country (13% of the cultivated area),

small farmers familiar with it since a very long time, and the recent establishment of large plantations where olive-trees figure as the most important sort of tree. Its economic value is further enhanced by the higher proportion of the productive olive-trees on the whole, besides those producing oil in Tripolitania. It seems that there is a recent trend to establish compact plantations of olive-trees in Cyrenaica to replace those abandoned.

Date-palms, either grow in the coastal oases of Tripolitania, on the sides of the wadis on the Western Jebel, or in the remote oases of the interior of the Libyan desert, besides the coastal strip along *the* Cyrenaican peninsula. In the Fezzan where they grow in discontinuous strips on a large scale, whether alongside irrigation channels or where the water table becomes accessible to their roots around the so-called "hataia" depressions, they are seldom found in scattered dense stands. Where they congregate in clusters in the vicinity of uninhabited "hataia", their origin is debatable, some regarding them as vestiges of old plantations, while others consider them as spontaneous trees. The date-palms are neglected especially in the Fezzan and Cyrenaica where the non-productive trees accounted for 31.9% and 31.4% respectively, while in Tripolitania they were both more compact and more productive, thus Tripolitania, the Fezzan and Cyrenaica claimed 60.4%, 31.3% and 8.3% of the productive trees in the whole country, respectively.

Almond trees which are suitable to the mediocre soils and precarious rainfall are often intercropped with olives in Tripolitania. In this region 91.6% of the area devoted to such trees occurred, with 92.9% of their total number, besides their more compact pattern of distribution and the higher percentage of the productive trees (94.1%). Perhaps the re-establishment of the old plantations of fruit trees in Cyrenaica, now only in the initial stage, is likely to give an impetus to the tree planting in this region. Grape vines demonstrate a more remarkable concentration and compactness especially of the productive trees in Tripolitania, which even though immune from a variety of plant diseases, are damaged by sparrows and ghiblis. Varieties grown for wine production concentrate on the third terrace of Jebel Akhdar (Shahat-

in the long run, besides not incurring more labour. The growing credit facilities help the arboculturists to tide over the lean years which elapse before trees reach the maturity stage. The preponderance of winter cereals especially barley, is but the outcome of the popularity of rain-fed cereals with the exception of the Fezzan where both the availability of irrigation resources all the year round and the dietary habits of the people favour the relatively more extensive production of millet and sorghum (30% of their total acreage in Libya).Barley is relatively more favoured in Tripolitania (79.34% of the land under cereals as against 68.9% in Cyrenaica) because of its suitability to wadi culture which contributes substantially to the barley crop especially in the so-called Gattis area of the Jefara and the network of Soffegin wadi in the Quibla.

The area devoted to leguminous crops was comparatively more extensive in Tripolitania, with a marked regional specialization in specific crops; such as the dry beans in Tripolitania (97.9% of the total area in the whole country), chick peas in Cyrenaica (69.9%) and dry peas in the Fezzan (4.6%). As far as the area under tuber and root crops is concerned, Tripolitania devoted a proportionately larger area to such crops, with Cyrenaica lagging very much behind (90.8% as against 6.3% respectively). Not only this, but Tripolitania grew a greater variety of these crops, in contradistinction to the Fezzan where dry onions and carrots represented the exclusive root and tuber crops cultivated, presumably because of its limited consumptive capacity. The discernible trend towards the diversification and commercialization of agriculture in Tripolitania was corroborated by further evidence furnished by the high proportion of land under industrial crops (97.93% of their total acreage in the whole country), even though the esparto grass, a wild sort of grass, accounted for 90% of their total area. While 203 ha. were cultivated with industrial crops in Cyrenaica, foremost of which was the ground-nuts, 23 ha. only were devoted to such crops in the Fezzan, with the tobacco claiming pride of place.

The olive-tree, the second most popular tree planted in Libya, is largely the monopoly of Tripolitania, thanks to both its popularity with

greater emphasis on cereals and vegetables is discernible in Cyrenaica and industrial and fodder crops in Tripolitania. This contrast reveals the predominance of a more intensive and more commercialized type of agriculture in Tripolitania in association with the difference in the traditional type of farming, perhaps further emphasized by the Italian development plantation schemes. Thus the traditional tree culture, particularly of fig and olive trees besides the extensive ex-Italian farms in Tripolitania, stands in contrast to the traditional cereal monoculture in Cyrenaica, little modified by the ex-Ente farms following the same line of production, besides the minor role played by irrigation agriculture favouring the production of the more remunerative vegetables in great demand in the urban centres, particularly those of Benghazi, Beida, Marj and Derna.

Cereals which provide the main diet are naturally favoured by the traditional self-sufficient system of production, besides the feasibility of raising a crop of winter cereals under the prevailing rainfall condition of scarcity and unreliability, concomitant with the shifting cereals culture. While the area under cereals in Tripolitania accounted for 69.3% of the total for the whole country, it amounted to 30.3% in Cyrenaica, a fact which implies a relative concentration of these crops in Cyrenaica where the greatest part of acreage is in small patches of land selected for planting amid a vast area unsuitable for cultivation. But, besides the dry farming methods adopted in cereal monoculture; irrigation agriculture is the exclusive system practised in the Fezzan (0.3% only of barley was a dry farming crop) for the production of cereals. In Cyrenaica 0.4% of the barley and 0.5% of the wheat acreages in 1960 were under irrigation corresponding to 0.8% and 0.7% respectively in Tripolitania. This minor fraction of winter cereals produced with only light irrigation is often encountered as an under-culture or an inter-crop either with olive and almond trees in the modern plantations in Tripolitania, or with date-palms in the coastal oases in both Tripolitania and Cyrenaica. This practise is bound to decline under the competitive impact of the less expensive dry farming system for cereal production as well as the growing popularity of tree-crops, considered more lucrative

subsidiary crop, are confined to those requiring the least care and labour i.e. carrots and turnips. The higher proportion of land under vegetables in the Fezzan could be attributed only to the widespread utilization of the commonly grown summer vegetables as fodder. In fact the scarcity of water within short intervals in some areas i.e. at Es Kida in the wadi el Shati, the lack of appreciation on the part of the people of the nutritional value of vegetables and the limited marketing opportunities, however, are bound to hinder the extension of the area under vegetables. The relative importance of the different land use types in various territories could be better revealed by the study of the following percentages :-

Geographical Divisions	Total Arable Land	Under Temporary Crops	Under Temporary Meadows	Under Vegetables	Temporarily Fallow
Libya	100	100	100	100	100
Tripolitania	67.6	70.1	78.5	58.9	65.1
Cyrenaica	31.2	29.5	19.5	39.2	33.1
Fezzan	1.2	0.4	2.0	1.9	1.8

Perhaps because of the broader basis of irrigation agriculture in Tripolitania including feed, leguminous and industrial crops besides vegetables, the latter crop occupied a relatively less important position. However, the actually cultivated land in 1960 could preferably be used as a proper criterion for the assessment of the agricultural production as illustrated below :

Percentages of different groups of crops cultivated in 1960 in Libya

Geographical Divisions	Total Cultivated Land	Cereals	Vegetables	Industrial Crops	Temporary Fodder Crops
Libya	100	86.1	2.4	11.0	0.5
Tripolitania	100	82.1	2.2	14.9	0.5
Cyrenaica	100	96.4	2.7	0.8	0.1
Fezzan	100	62.0	9.6	0.4	28.0

These census figures indicate that both Tripolitania and Cyrenaica fall in the same category of land use system, even though a relatively

This is further corroborated by the fact that a relatively larger proportion of arable land is left temporarily fallow in the Fezzan (80.5%).

Percentage of different land use types of arable land in 1960

Geographical Divisions	Under Temporary Crops	Under Temporary Meadows	Under Vegetables and Flowers	Temporarily Fallow
Libya	41.7	3.3	1.0	54.0
Tripolitania	43.3	3.9	0.6	52.2
Cyrenaica	39.4	2.1	0.9	57.6
Fezzan	12.6	5.7	1.2	80.5

It is manifest that the proportion of land under temporary or annual crops, largely winter cereals, was more intensively grown in Tripolitania than it was in Cyrenaica where the temporarily fallow land accounted for as much as 57.6% of the total arable. It is rather surprising to notice that the proportion of land devoted to vegetable was higher in Cyrenaica, which is known to satisfy a considerable part of its consumptive requirement of vegetables from Tripolitania, a fact which may be partially ascribed to the relative extensiveness of the absolute total land area under vegetables in Tripolitania which amounted to more than one and a half times as much as that devoted to this kind of land use in Cyrenaica. In the Fezzan where the annuals consist largely of cereals, the land under temporary crops is rather substantially reduced because of the common practice of fallowing for a longer period. In the Fezzan where water is scarce and more brackish, and the soils are more sandy and saline, barley which occupies normally one third the area planted with wheat, is preferred. Summer cereals especially sorghum or gafouli are commonly cultivated on the same land occupied by winter cereals, but on a smaller scale, being heavily irrigated. However the higher proportions of land under temporary meadows and vegetables in the Fezzan, could be ascribed in the first case to the poverty of the natural pastures, largely limited to the hataia, with the consequent popularity of clover with farmers wherever artesian water is available, whilst vegetables considered as a

Fezzan with its extensive date-palm groves claimed a relatively large area under permanent crops, together with the total absence of woods and the insignificance of the area devoted to natural meadows and pastures, thus virtually exemplifying a typical oasis agricultural pattern of land use; Cyrenaica by virtue of its vast woods of the Jebel Akhdar, the relatively extensive areas sown to winter cereals, besides the excluding of the permanent pastures largely lying outside holdings, being common tribal lands, differs in the degree of emphasis as regards the relative importance of the various land use types. Tripolitania embraced a relatively large area devoted to permanent crops where both the traditional Arab tree culture particularly of olive trees, fig trees and date-palms had been given a further impetus through the development of ex-Italian modern plantations; besides the unexpectedly, vast lands under forests and woods owing to its legal status as holdings incorporated in the Census returns in contrast to the above mentioned Cyrenaican woods, lying outside holdings, which were excluded or partially under-rated. Further evidence could be gleaned from the following classification of different land use types in each territory.

Percentages of land use types in different regions in 1960

Geographical Divisions	Total Land	Arable Land	Land under Permanent Crops	Permanent Meadows & Pastures	Wood & Forest	All Other Land
Libya	100	61.4	3.4	29.4	1.6	4.2
Tripolitania	100	53.1	3.9	37.1	1.1	4.8
Cyrenaica	100	92.0	1.0	1.8	3.6	1.6
Fezzan	100	76.1	18.1	0.6	—	5.2

The apparently high proportion of arable land in Cyrenaica is the outcome of the under-estimation of both land under permanent meadows and that under woods and forests outside the holdings. It is presumed that the proportion of arable, which implies all land generally under rotation, indicates the relative intensiveness of agriculture practised in Tripolitania and Cyrenaica in particular.

hydrostatic pressure to become increasingly exhausted, or the less prolific wells with their deep water of poor quality. The extreme aridity and the severe or trying climatic conditions are not conducive to the practise of labourious methods of cultivation with the resultant indifference on the part of the cultivators.

The foregoing short review is but introductory to the commentary on the returns of the Agricultural Census of Libya 1960, the only one available, in an endeavour to suggest the trends instrumental to fostering an overall development in the field of agricultural production, proceeding hand in hand with regional specialisation.

Libya falls squarely into the category of agricultural countries, either by virtue of the percentage of its active population dependent on agricultural production (80%) or by the proportion contributed by this productive sector of the economy, in contradistinction to the extractive petroleum industry with its unique nature, to the national economy. Most of the agricultural area was claimed by Tripolitania (78%) followed by Cyrenaica (21.1%), while the Fezzan ranked as an insignificant third (0.9%). A further classification of these areas by type of land use, reflects the preponderance of Tripolitania in this respect.

Percentages of the different types of land use in Tripolitania and Cyrenaica and the Fezzan in 1960

	Arable Land	Land under Permanent Crops	Permanent Meadows & Pastures	Wood & Forest	Others
Tripolitania	67.6	88.8	98.6	54.3	90.5
Cyrenaica	31.2	6.2	1.3	45.7	8.3
Fezzan	1.2	5	.1	—	1.2
Libya	100	100	100	100	100

The regional specialisation is evident when the percentage of the agricultural land of each territory is contrasted to the proportion of land devoted to a specific type of land use. Consequently, while the

11,383 sq. km. The semi-desert zone where agriculture is hardly feasible does not exceed 11,530 sq. kms. But the rainfall effectiveness is twice or three times as great in Tripolitania as in Cyrenaica, thanks to its light sandy soils, with the consequent reduction of the minimum rainfall satisfying the requirements of cereals and fodder crops. Besides, the frequency and severity of variations from the average seasonal rainfall is more or less uniform throughout the agricultural zone, a fact which accounts for the alleviated adverse effects of seasonal maldistribution from year to year, often noticed in the low rainfall zones in other areas. During a twenty-year period on the average, three years witness a moderate drought, involving 15% reduction of the average rainfall, besides 4 years occur when severe drought is associated with the diminishing of rains by 30%[2]. The remaining 13 years include four years when the deficiency of less than 15% occurs with little significance, besides nine years when the rainfall surpasses the average. There is some type of symbiosis between two contrasting regions with complementary economies, such as the Jebel with its tree and cereal types of culture and that of the Guibla and Jefara where wadi culture and livestock raising are widely practised. The settled cultivation of vegetables and the tree culture in the coastal oases, together with the rise of an irrigation farming system including the production of such commercial crops as ground-nuts and the castor oil plant, has developed a reciprocal relationship between the cereal cultivators in the Jefara steppe and the oases agriculturalists in the coastal strip.

However, the Fezzan which is fundamentally distinct from the bulk of the two other regions rather epitomizes the far-flung Saharan oases. Thus its agricultural economy precariously hinging on the underground sources of water is limited to the ENE - WSW trending so-called wadis or depressions, foremost of which are Wadi el Shati and Wadi Ajal; besides some isolated oases in the east, north east and south west. Remoteness, isolation, and depopulation militate against the limited productivity of its exclusively irrigation agriculture which fights against heavy odds of invading blown sands, lack of soil fertility; often sandy, ill-drained and saline, and either uncontrollable artesian waters which soon lose the

fall less effective, with the result that the area with less than 300mm. is usually classified as semi-desert where the concentrated run-off in the widely diffused wadis provides the only type of shifting cereals cultivation feasibly undertaken in this subregion. But because the less the average annual rainfall is, the less secure it becomes, the rainfall zone (300-400 mm.) is subject to a decrease below the 300 mm. about twice every five years; while in the rainfall zone (500-600 mms.) rains decrease to less than 300 mm. only once every 25 years on the average. In fact 400 mm. of well distributed rains stored in the root-zone without involving any run-off loss, could meet the requirements of a profitable crop of wheat year after year. So long as the area could secure adequate total rainfall, the distribution of rain comes to the fore among the factors determining the crop yield, which is more noticeable in the case of annuals rather than in the perennials i.e. orchard crops, and even so in the case of pastures.

Unfortunately the area comprised within the high rainfall zone (500-600 mm) is not only limited, being restricted to a belt 50 kms. long by 10 kms. wide located on the third terrace, but its agricultural value is further substantially curtailed by ruggedness of the land. The second zone (300-500 mm.) is of greater extension, and its wider plains of the second terrace affords agriculture wider scope for development. The third rainfall zone (300-150 mm.) constitutes a sub-region of marginal productivity, whether in the coastal area extending from Agedabia to Tocra and beyond to the east, or further inland on the southern slopes of the Jebel Akhdar. Besides, the abundant rainfall of the first two zones coincides with the advantageous length of the rainy season, where spring rains claim some significance, even arousing the hope to produce two crops a year, the second presumably fodder which could be raised as late as March.

In Tripolitania a narrow belt of land running along the coast from Tripoli to Khoms for 100 kms. long and 15 kms. wide, receives more than 300 mm. of annual rainfall, besides a small "island" in the vicinity of Gharian in the Jebel, with a total area of 1,657 sq. km., while a second zone where rainfall varies between 200-300 mm amounts to

scattered groves in the more arid western portion of the Tripolitanian Jebel, besides the recent trend of descending to the adjoining Jefara to transform this new landscape into a zone of pioneering tree culture, but also the hydrographic conditions here are conducive to the more efficient control of the surface waters. These tracts of northern Tripolitania with their light and easily drained soils emphasize the feasibility of irrigation on a larger scale considering the availability of more abundant ground water of fair quality as well. The Jebel Akhdar which largely depends on rainfall, except in few localities, such as the case of the western coastal plain as well as in the vicinity of the copious springs such as those of Derna, Ras el Hillal and Lathrun, with the rest of prolific springs being unutilizable owing to the scarcity of flat areas in their proximity, could not compare favourably with Tripolitania in this respect. No wonder that the Cyrenaican Jebel has achieved but little in the way of the development of its agricultural potentialities for a large portion has remained a grazing ground for successive generations of the semi-nomads, and consequently is still considered as virtually a frontier country in many of its areas.

Because of the universal interest of rainfall, it has served as the primary criterion in delimiting the agricultural regions in both territories even though second order factors such as relief, slope, soil, ground water resources, labour force, capital, markets and means of transportation should be taken into consideration as well. Thus Barca peninsula lying to the north of the line Soluk-Timimi constitutes the only agricultural land, besides the less important coastal tributary regions of Syrtica and Marmarica, the former comprising an area of a little more than 20,000 kms.^{2} while the latter two do not exceed 15,000 kms.^{2} But if 150 mm. are considered the minimum rainfall which could sustain plant life the Cyrenaica territory which receives this amount of rains is estimated at 12,894 kms^2: including 4,410 kms^2 falling in the rainfall category 200-300 mm; 4,343 kms^2 comprised between 300-400 mm, 2,815 kms^2 ranging from 400-500mm, while 855 kms^2 receive rainfall ranging from 500-600 mm whereas only 473 kms^2 receive more than 600 mm.[1] However the compactness of the soil renders the rain-

eventually contrasting land use regions. Thus the coastal plain with its shallow brackish wells, sandy or light soils, its repellent sebchas, with the impinging of the fringing Jebel from the south to reduce its width to a minimum at Khoms in Tripolitania and east of Tolmeitha in Cyrenaica, nevertheless differs in many respects as an agricultural region in the two provinces. Its southward extension in Tripolitania as it merges into the Jefera expanses, especially round Tripoli where the rich underground water resources tapping two water-tables provide the bigger market of Tripoli with the produce of irrigated and semi-irrigated perishable products from one of the rainiest part of Tripolitania, contrasts with the less fortunate coastal plain of the Jebel Akhdar, as a consequence of the petering out of the plain where rainfall becomes abundant, besides the relative aridity of the greater part in its southwestern portion. Furthermore,the soil is more patchy and less suitable to irrigation in Cyrenaica, being predominately of the terra rossa heavy type, besides its limited ground water resources which could be tapped at variable depths, depending on the nature of the water-bearing cavernous limestones. The semi-arid strip of land where the shifting monoculture of winter cereals and livestock herding affords the nomads of the steppeland; in the Jefara and Quibla of Tripolitania, the Sirwal and el Batnan of Cyrenaica, a wider field for the cultivation of cereals particularly in the wadi beds and fans, and in the flooded areas of Batlas and Seghifas to the south and east of the Jebel Akhdar respectively. But the numerous wadis with their convenient slope in the Jefara claim more importance in the local economy than the corresponding ones on the southern slopes of the Jebel Akhdar. The more extensive Cyrenaican massif of the Jebel Akhdar, comprising two summit areas, is handicapped by both its compact soils and its more fissured limestones which predominate in the whole region. However, the seaward protrusion of the peninsular plateau of Cyrenaica has brought about more abundant rainfall than that of the more remote Jebel of Tripolitania, which nevertheless has been able to develop its middle and eastern rainy portions by the establishment of olive, fig and vine plantations on a large scale.Not only could the traditional skill of the Jebel farmers account for such development which manifests itself in the

Syrtica, severing the territorial continuity of the habitable Libya, creating some sort of lacuna or gap, closing gradually now under the impact of the growing "emporium" of petroleum substituting the emporium of trade, both the product of location and accessibility to the sea to a great extent, has induced the territories lying on both sides to base their economies on competitive rather than integrative grounds. Not only has the significance of the distance across Syrtica, no longer deterrent to the rise of a complementary economy on either side attenuated, thanks to the availability of economical transportation media running through this productive corridor, but also the intrinsic environmental and locational differences afford ample scope, not only for the regional economies to evolve divergently under the influence of these basic differences, but also for the co-ordinating of the development plans on a national basis, thus eventually fostering the merging of the two economic entities. Consequently, the economic dependence of any one region emerges as the product of allowing the factors of production to play their full roles in the diversification of the economies of the regions concerned, rather than through the suppressing or elimination of certain economic activities, or in short by combining regional development schemes with a unitary national development plan. With this conception in view, the broad lines of the agricultural production in the different regions of Libya are discussed, largely based on the latest and only Agricultural Census of Libya undertaken in 1960.

Despite its incompleteness and unreliability, the census returns when discussed with proper reservations, could provide a proper basis for the furtherance of certain tendencies in production or otherwise discouraging them, in the light of their importance as instrumental to regional diversification within the framework of an integrated national economy.

The basic agricultural possibilities of the three regions of Libya, emanate for the first instance, from first order environmental factors, such as the relief of land, its soils and climate besides the natural vegetation, ground water resources as well as a multitude of human factors, inextricably interwoven with the first set of factors to produce