

54050



UNITED NATIONS ECONOMIC AND SOCIAL COUNCIL



Distr.
RESTRICTED

E/CN.14/INR/162
31 March 1969

Original: ENGLISH

ECONOMIC COMMISSION FOR AFRICA

INDUSTRIALIZATION AND ECONOMIC CO-OPERATION
FOR THE NORTH AFRICAN SUB-REGION
THE AGRICULTURAL SECTOR (1963 - 1980)
(Prepared by the ECA/FAO Joint Agriculture Division)

TABLE OF CONTENTS

<u>Chapter</u>	<u>Page</u>
I.	INTRODUCTION - - - - - 1
II.	THE PRESENT AGRICULTURAL SITUATION: ITS PROBLEMS AND FUTURE PROSPECTS - - - - - 2
III.	MEASURES REQUIRED TO SECURE HIGHER LEVELS OF PRODUCTION 21
IV.	MACRO-ECONOMIC STRUCTURE AND DEVELOPMENT OF AGRICULTURE - - - - - 27
V.	INTER-INDUSTRY RELATIONS IN NORTH AFRICA - - - - - 38
VI.	APPENDIX.- COMPONENTS OF CONSOLIDATED SECTORS USED IN ABRIDGED INPUT-OUTPUT TABLE 61
ANNEX	COMMODITY REVIEW AND PROJECTIONS - - - - - 63
	SELECTED AGRICULTURAL INPUTS - - - - - 154
	METHODOLOGY AND CRITERIA USED IN THE PROJECTIONS - - - 162

INTRODUCTION

1. The ECA/FAO Joint Agriculture Division has been requested to collaborate with the Industry and Housing Division in the preparation of a study on "Industrialization and Economic Co-operation for the North African Sub-region" by providing the relevant part of the study concerning "The Agricultural Sector, 1963-1980".

The Division has charged this task to three of its staff members, namely, Professor A.S.B. Wilson, Regional Adviser on Agricultural Development; Dr. A.Z. Sheira, Agricultural Economist and Dr. S.E. Shehata, Agricultural Marketing Economist.

The report is divided into six chapters and one annex. Chapter I deals with the problems and future prospects of agriculture while Chapter II deals with measures required to secure higher levels of production. Both Chapters I and II are prepared by Prof. Wilson.

Chapter III deals with macro-economic structure and development of agriculture, 1963-1980, while Chapter IV deals with inter-industry relations in North Africa. Both Chapters III and IV are prepared by Dr. Sheira.

Chapter V is divided into two parts. The first deals with projections of practically all agricultural commodities with respect to production, imports, exports and domestic demand for the period 1963-1980 in each of the six North African countries with aggregates for the Maghreb countries and the North African sub-region. While this part may be considered as a joint effort, the main responsibility for it remains with Dr. Shehata. The second part deals with commodity review and is prepared by Prof. Wilson.

Chapter VI deals with selected agricultural inputs while the annex deals with methodology used in the commodity projections. Both Chapters VI and the annex are prepared by Dr. Shehata.

CHAPTER I

THE PRESENT AGRICULTURAL SITUATION: ITS PROBLEMS AND FUTURE PROSPECTS

In view of the diversity of climates and local agricultural situations, current social structures, political philosophies and trends concerned in the economic development of the six countries which currently make up the North African sub-region, it is impossible to generalize on the overall agricultural situation, although there may be circumstances where collective appraisal may seem appropriate, but rather to consider each political unit, as an entity in itself.

The agricultural situation now outlined deals, therefore, with the current national situation, and where there is relevance, to the situation relating to the sub-regional structure as a whole.

Morocco

The objectives and policies of the Moroccan Government may be summarized as follows:

- 1) To modernize the traditional agricultural sector for the avowed purpose of import substitution in grains and livestock products.
- 2) Using irrigation where appropriate, to expand production and exports of agro-industrial crops.
- 3) To restore the fertility of Moroccan soils through approved methods of conservation, cropping and to reduce erosive tendencies in certain areas through re-forestation.
- 4) To combat under-employment effects in rural areas encouraged by policies of modernization through programmes of public works.

The chief obstacles to fulfilment of these policy outlines are primarily concerned with problems of land tenure, inadequacy of infrastructural arrangements which make it difficult to consolidate holdings, and to assure the benefits of modern agricultural technology at farm level, made possible through the agency of appropriate extension and advisory methods. The problem is largely one of the shortages of technically-trained staff.

A devolution of authority in 1966 bringing about the creation of semi-autonomous authorities for the several irrigation perimeters, by recruitment of expatriate staff, and by the employment of consultants, are temporary moves in the right direction. The position will also be further rationalized through assistance rendered by staff of the IBRD through compilation of priority projects and programmes which have economic merit from the point of view of future agricultural investment.

Agricultural investment possibilities are considerable in Morocco, especially if directed toward an intensification of production from the best soils in an overall situation, however, where water is a limiting factor. The relatively unimpressive agricultural performance during the past decade, approximately 1.5 per cent per annum (1952-60), must be tackled immediately to meet the challenge of the projected high rate of population increase during the next decade. Apart from known large resources of rock phosphate, Morocco at the moment does not possess resources of mineral and oil wealth which are a special feature in several other countries of the North African sub-region. Morocco, has, therefore, to depend on accelerated development of its agricultural and fisheries resources to meet also the challenges of an imbalanced trade situation. An annual increase of not less than four per cent in the level of agricultural production must of necessity be secured to satisfy both the needs of population growth and to reduce the current costly level of food imports.

This situation calls for an immediate improvement in the levels of productivity from rainfed agriculture, ("Operation engrais" is a welcome move in that direction) from the livestock industry, as well as from controlled irrigated agriculture. Failure to develop the potential of domestic agriculture will have an adverse effect on the expected performance of industrial growth which must depend in the first instance on an enlargement of the domestic market and a fostering of trade with other countries. Increasing trade with EEC countries is problematical for the foreseeable future, in view of the uncertainties implicit in a widening of the scope of this market through admission of Britain and certain other countries into the European community. To quote from E/CN.14/NA/ECOP.4 "Main Problems of Economic Development and Cooperation in North Africa", it is indicated "that in an eight per cent annual rate of growth for industrial output, the per capita value added would increase from about US\$45 in 1955 to US\$127 in 1985, or 2.8 times".

The agricultural situation is most likely to advance in the next decade through particular concentration in the following areas:

- a) By improving average yields of cereals, and particularly wheat, through use of better varieties and selections.
- b) By more widespread use of balanced mineral fertilizer.
- c) By greater use of tractor-powered implements and harvesting equipment.
- d) By an expansion of irrigation perimeters calling for a much greater application of modern production techniques.
- e) By grazing control and expanded production of dry-season forage.
- f) By more critical selection of farm animals on the basis of their true functional role, including beef, mutton, and dairy animals.
- g) By intensification of poultry production based on use of home-produced cereal grains, domestic fish meal, etc.

The success of an accelerated drive in these directions would depend, however, on a substantial improvement in the numbers and quality of extension advisers available to the industry. This last requirement will call for a marked increase in investment in the institutional infrastructure, necessary not only to turn out increasing numbers of such officers, but also to ensure complete supervision of such services in the field, particularly as regards fulfilment of approved plans.

Improvement in the agricultural situation in Morocco will inevitably give rise to increasing demand for agricultural industries (agro-allied industries). The more obvious areas of expansion and

improvement in this sub-sector are likely to be concerned with:

a) Rationalization of the cereal milling industry to ensure greater efficiency (there are at present about 1,750 mills of various capacities in Morocco); and the more efficient use of milling by-products;

b) Improvement in facilities for collecting, processing, pasteurizing, and refrigerated holding of milk to meet an envisaged expansion in consumption;

c) Increase in facilities for the manufacture and assembly of farm machinery and equipment;

d) Increase in the manufacture of balanced mineral fertilizers, pesticides, and herbicides;

e) Provision of additional refrigerated meat storage at each principal abattoir, or alternatively, in principal centres of population.

Future prospects for agriculture in Morocco are unlikely to be encouraging unless some of the major deficiencies indicated above are dealt with expeditiously. Given reasonable investment support, however, coupled with an accelerated turn-out of agricultural extension personnel, additional returns from the subsistence sector might be expected to contribute to some of the needs of the current trade deficit situation and to assist in the creation of a climate in which the industrial sector might reasonably expand toward its target of eight per cent per annum.

If a healthy rural employment situation is to be maintained, the employment situation will require careful study and necessary measures to be taken to slow down or halt the very evident exodus of population from rural to urban areas. Such a situation can best be secured by a not inconsiderable investment in improved rural amenities, and in particular, improvement of the general standards of education offered.

Algeria

The agricultural situation in Algeria must of necessity be viewed against a land-use background in which approximately 80 per cent of the total land area is classified as unproductive and only some 18 per cent considered useful for agricultural purposes. The agricultural picture is further confused by disruptions which have arisen out of the recent war with France, resulting in the almost complete repatriation of a million French citizens. Also of consequence, are current political difficulties concerned with the setting up of a modern socialist State in a situation where the rural traditional sector is paramount.

Of the total land area available to agriculture, some 3.7 million ha are devoted to the production of crops of which cereals represent 80 per cent, and 0.7 million ha. to horticultural crops including dry legumes, vines and other tree fruits. Rough pastures are represented by 37.4 million ha. where livestock production is the chief agricultural pursuit.

In the early sixties, agriculture's share in national income amounted to approximately 26 per cent. It is now likely, however, accurate statistical information being unavailable, that with concentration on the extraction of mineral oil and development of industrialization, the share of agriculture in gross domestic product has declined in recent years, with a consequence that the rural sector is denied the capacity to save for reinvestment in agricultural industry.

Agricultural organization in Algeria is divided into three sectors, namely; Secteur socialiste, Secteur privé moderne, and Secteur privé traditionnel. Substantial increases in production are possible in the Secteur socialiste and Secteur privé traditionnel, providing current levels of manpower efficiency are greatly improved.

In Northern Algeria where most of the cropping and dairying is carried out, the main impediments to increasing production are the vagaries of climate, lack of trained manpower, in a situation where the active population is relatively "young", and shortage of credit facilities and working capital, which in the meantime are unobtainable through the national banking system.

The staple cereal in Algeria is wheat. Coupled with imports of wheat flour, a sizable deficit exists (in 1965, 305,000 tons) which by 1980 is expected to reach 950,000 tons, unless national production increases substantially. Algeria is also the major producer in North Africa of grapes destined for wine production.

Difficulty has been experienced in recent years in disposing of surplus wine stocks, due in part to the departure of one million French colons, and to an embargo placed on exports of Algerian wine to France. The latter situation has recently been relieved to some extent, however, by a partial lifting of the French embargo. Exports of wine on a reduced scale are again moving to the French market for blending with French-produced wines. Plans are also in process of development to convert surplus wine stocks into brandy (see commodity notes) which if successful in technical and marketing terms, could go a long way to relieving a situation of considerable economic embarrassment.

Citrus production in Algeria is one of the major agricultural enterprises, 415,000 tons being produced in 1965. The area planted with citrus is increasing slightly in a market situation dominated, however, by uncertainties concerned with demand from the EEC countries. Because of this situation, projection of future production levels have been calculated on the basis of population growth and income elasticity rather than on plans to expand the export market. Provision of facilities for juice extraction, canning and jam production are generally under-utilized but form a useful hedge when surpluses of fresh fruit become a disturbing factor. Yields could be substantially increased were irrigation facilities extended and mineral fertilizers applied more universally.

The main problems concerned with increases in arable production in Algeria are mainly the problem of an insufficiency of trained manpower, of shortages of the principal input factors, especially fertilizers, improved seeds and plants, of certain categories of agricultural tools and machinery, and of limitations imposed through lack of adequate irrigation facilities.

Considerable scope exists for improvement in the livestock industry, and while attempts are currently being made to improve the situation, particularly in the field of milk production, through importation of improved European breeds (see commodity notes on milk) the tempo is too slow, however, to effectively catch up with

the needs of a rapidly expanding population. In other sectors of livestock industry, considerable expansion in levels of production of mutton and lamb are not only possible but desirable in the central and southern areas of the country where rainfall is scanty. The traditional sector, while admittedly inefficient by modern standards, is deserving of considerable attention from Government to improve its production capabilities. Cereals and livestock constitute the chief productive effort from this sector which even at its low level of efficiency, contributes one third of the gross agricultural product. Inputs of fertilizer, better seeds, some agricultural equipment, and a drive to improve the general quality of the traditional farmer's livestock, could be expected to make a further considerable contribution to the Algerian economy were these improvements initiated.

Plans currently being developed by the Service pastoral to improve the grazing potential of the natural grasslands in the central and southern areas are likely in the long term to be of considerable benefit to the economy. The Barbarin fat-tailed variety of sheep is widely dispersed in Algeria but considerable improvement in its mutton and wool qualities are called for, through careful selection and betterment of the grazing environment. It is strongly recommended that an advisory group of specialists from Australia and/or New Zealand be invited to Algeria to advise on the problem.

The future prospects for agriculture in Algeria seem reasonably good, providing that shortages of skilled manpower are made good particularly in the Secteur autogéré, that irrigation facilities are expanded as quickly as possible, that support is maintained for the development work now being undertaken by the Service Pastoral and that modernization of the traditional sector is encouraged through a much higher level of essential inputs and market facilities.

Tunisia

Agriculture is the most important single economic sector in Tunisia, accounting for approximately 25 per cent of G.D.P. In addition, industrial activity is based to a considerable extent on the products of agriculture, approximately two-thirds of the Nation's exports having their origins in agriculture. Agriculture and fisheries employ approximately 56 per cent of the available labour

force while the agricultural processing industries employ a further 3.5 per cent. Because of the low technological status of agriculture, this sector has also become a main residual source of employment which other sectors are unable to absorb. There is currently a situation of considerable under-employment in the agricultural sector.

Of a total area of 16 million ha. in Tunisia, 43 per cent is classified as unproductive, and 57 per cent agriculturally productive. In this productive sector, 10 per cent is represented by forests, 40 per cent as range and esparto (alfa), and 50 per cent as arable and tree crops. The 4.5 million ha of arable and tree crops are further represented by 44 per cent cereals, 29 per cent fallow, 22 per cent tree crops and 5 per cent other crops.

In the more humid areas of Tunisia, for instance in the Tunis Cape Bon area, where precipitation normally lies between 400 - 600 mm per annum, cereals, grapes, tree crops and livestock (particularly dairy animals) are the main sources of agricultural production. In the arid or semi-arid areas, extensive grazing by cattle, sheep and goats, together with widely-spread olive groves represent the principal agricultural feature. In the arid desertic areas only nomadic grazing is practised. In the central and southern areas of Tunisia, where limited irrigation through well-boring is possible, fruit trees, including date palms, vegetable production and the growing of alfalfa (lucerne), makes transition easier for traditional farmers moving into a cash economy.

In Central Tunisia considerable areas of esparto grass are harvested to provide raw material for the Kasserine esparto paper mill. In the southern desertic region, the Government is giving some attention to oases development through minor improvements to local irrigation schemes. Increased plantings of dates of the Deglat Ennour type are also being undertaken.

Fulfilment of the objectives of the 1965-1968 Agricultural Plan have been achieved in part under general environmental conditions where the vagaries of weather conditions are inclined to have a much larger effect on production than use of improved techniques and expanded input factors.

During the Plan period an annual growth rate of 2.8 per cent in value added has been projected. It is too early as yet, however, to indicate whether the objectives have been fully attained.

The principal agricultural objectives of the Plan include the following:

- a) Priority is given to reducing imports of agricultural commodities and manufactures by increasing output from the traditional sector in the several areas of cereals, livestock, vegetables and forages, as well as provision of the raw products for industry including vegetables and sugar beet.
- b) To achieve increasing levels of exports of vegetables, olive oil, and fruits. Long term investments, such as the provision of irrigation facilities, are only likely to become viable after completion of the Plan period.
- c) It is planned to increase the area of fruit crops by an additional 250,000 ha (190,000 ha in Central Tunisia), bringing the total area under various fruit crops to 1.4 million ha by 1968.

Production targets for the Plan are ambitious. Cereal production, for instance, which represents 25/30 per cent of gross agricultural output, would have to increase annually by 11 per cent to ensure continuing exports of hard wheat at their present levels, while meeting the increasing demand of an ever-growing population. Vegetable prospects are good and have been increasing at some 6 per cent per annum since 1956. The target for olive oil, one of the principal exports of Tunisia, which is estimated to increase to 100,000 tons by 1968 is unlikely to be achieved on account of the increased tariff, now 17 per cent, for oil destined for Common Market countries. A further contributory factor, giving rise to a slackening of general demand for olive oil, arises from increasing availability of P.L. 480 Soya bean oil which to some extent in industry is an alternate to olive oil.

Export prospects for wine are far from good, unless fresh outlets become available. The plan envisages that by 1968 increased sugar production from sugar beet sources should be able to keep pace with demand, leaving an import balance at its present level of about 80,000 per annum. This may prove difficult to achieve,

in view of the modest increase in irrigation facilities forecast. Livestock products account for approximately 20 per cent of agricultural output. Future prospects for meat production are not encouraging unless fodder supplies can be increased through irrigation and improved pastures, and through conservation and better grazing management. Projected increases in dairy production, envisaged under the Plan, seem possible to achieve in view of plans to import large numbers of improved animals, principally from Holland, and to crossbreed these with local cattle to up-grade the milking qualities of their offspring.

Future prospects for agricultural exports from Tunisia will, to a considerable extent, depend on negotiations currently proceeding with EEC countries for preferential access to the Market of the Six. Algeria, for instance, has preferential access in respect of citrus fruits, but as Tunisian costs are competitive, the opening up of an expanding share of this market could have a considerable impact on the overall economy of Tunisia.

The three agricultural commodities which cause greatest concern to the economy are wheat, sugar, and meat, and every measure must be taken to substantially increase production in these areas.

While the Plan proposed to employ a further 20,000 effective by 1968, under-employment is the most serious factor in the agricultural employment situation. The major employment objective of the current Plan period is to increase the effective working year for each adult from 130 to 150 days per annum.

Eventually cooperative farming will constitute the basic structure of Tunisian agriculture, but this will call for increasing institutional involvement toward the provision of extension personnel and moniteurs to supervise cooperative projects and to fulfil the functions of management.

The need for considerable numbers of trained personnel in the agricultural field is seen to be the chief strategic bottle-neck in plans to increase production in Tunisia, where inadequate rainfall calls for every strategy to conserve and utilize scarce natural resources.

Libya

Libya has five distinguishable climatic zones; the Mediterranean zone, the Steppe zone, the Jebel zone, the pre-desert and the desert zones. The pattern of agriculture practiced follows these climatic divisions.

The coastal or Mediterranean zone is narrow and receives precipitation varying, according to locality, between 100-600 mm per annum. Rain is largely precipitated during the winter months from October to March. In the Steppe zone rainfall is erratic and is mainly precipitated during the winter months, the agricultural pursuit in this zone is largely concerned with livestock raising. The Jebel zone is characterized by a lower total precipitation, and more moderate temperature ranges. The main products are cereals, olives and figs. The pre-desert and desert zones are characterized by very low rainfall (70 mm) and low R.H., diurnal temperature changes are substantial and may average 350C.

Agricultural production is limited to the wadis where some palms, cereals and vegetables are grown for local use. Wind erosion is a continuing problem in all of these zones, but is obviously most damaging in areas of minimum ground cover.

The total land area in Libya is indicated as 1.76 million square kilometres of which 1.667 million are classified as desert. Total agricultural land is estimated at approximately 3.8 million hectares, and grazing areas to approximately 10 million ha. Permanently cropped land in Libya is probably no greater than 150,000 ha.

In 1960, the census indicates that there were about 140,000 farm holdings and that 800,000 people were connected with them. Development of the mineral oil industry has in the interim led to considerable rural de-population and many of the small farming units are now worked by members of families having non-farming occupations. The majority of farmers, however, still follow a traditional subsistence style of agriculture.

A factor of some importance to Libya's future is emerging as the result of over-exploitation of the many thousands of wells used for irrigation and other purposes. This exploitation, in certain

areas, has resulted in the exhaustion of the underground aquifers and a general lowering of water tables. The problem of water conservation in a country where average rainfall is probably no greater than 300 mm. per annum, is therefore of considerable consequence, unless de-salination costs can be lowered and brought within the range of economic feasibility for agricultural purposes.

Most of the population in Libya is concentrated on the northern (Mediterranean) fringes of Tripolitania (which has 70 per cent of the population) and Cyrenaica. Population density in these areas is approximately 45 per square mile.

The entire economy of Libya is now influenced by the situation created by substantial oil revenue. Oil wealth enables basic food to be purchased wherever available, and there are evidences that the agricultural situation is stagnating. While it is recognized that agriculture must receive a large share of oil revenues, the country lacks planners, administrators and technicians in the agricultural sector, which in the circumstances, could lead to a great deal of ill advised expenditure. The value of food imports in 1964 was \$116 million, only a little below the annual value of total agricultural output. The agricultural economic situation is understandably confused as a result of this new-found oil wealth, and inflationary price tendencies are noticeable. While the agricultural potential of this arid country is not spectacular, it is generally agreed that Libya, given a reasonable input of fertilizers, agricultural machinery and greater concentration on sprinkler-irrigated vegetable and fodder production, could feed its own population and still have an exportable surplus of certain crops for some time ahead.

The future for agriculture in Libya will depend on achieving a substantial increase in rural literacy, and an expansion of the agricultural extension service, particularly in the fields of dairy, poultry, vegetable and fruit production.

As livestock provide approximately 30 per cent of the agricultural revenue, exclusive of oil revenue, there is particular need to secure a much higher level of production efficiency than exists at present. (See commodity notes on Libya).

U.A.R.

The land area of the U.A.R. is approximately 1 million square kilometres or nearly 238 million feddans (1 feddan = 1,038 acres), of which only about 3 per cent is cultivated at present. Because of the favourable climate and the possibility of water control, double and triple cropping is possible, according to cropping circumstances. It has been estimated that in respect of all the cultivable land available, some 1.68 crops per annum are currently obtained per feddan, which in effect ensures to the U.A.R. the equivalent of 10 million feddans of cropped area per annum. This area is approximately equivalent to the total area currently irrigable, but does not include the new lands to be irrigated by the High Dams which are based on an economic water lift of 20 metres.

The climate of the U.A.R. may be divided into two distinguishable zones. The first zone, located in the Mediterranean coastal area, which includes the Delta, is characterized by a mild rainy winter and a hot dry summer. The second zone covers the rest of the U.A.R., principally to the south of Cairo. This zone is characterized by a winter period with little or no rain, warm during the day with cool nights, and a dry summer period, which, typically, is hot during the day and warm at nights. The climate of the narrow strip extending along the borders of the Nile is modified locally by vegetation and irrigation effects which in the main are concerned with evaporation and evapo-transpiration phenomena.

In the Nile Valley and the Delta, the density of population, based on today's population estimates, averages approximately 750 persons per sq. km. Population in the U.A.R. is classified approximately as follows: rural 60 per cent, urban 39 per cent, Beduin 1 per cent.

The industrial programme, initiated in 1958, has made rapid advances since that time, in terms of capital investment and industrial production. Despite this expansion, and its repercussions on the general economy, agriculture continues to play a key role in the economic life of the U.A.R. Approximately 60 per cent of the population and 52 per cent of the active labour force derive their livelihood from agriculture. Agriculture provides almost 27 per cent of national income, and about 70 per cent of total exports, of which cotton and its manufactured products contribute 80 per cent.

Future projections however indicate that by 1980 agriculture's share of G.N.P. may be reduced to about 16 per cent.

Industrialization has increased the demand for agricultural raw materials, and in reverse, industry is now required to provide an increasing level of inputs, which include fertilizers, farm machinery, and the technical requirements inherent in food industry processing.

In the highly specialized circumstances in which agricultural production prevails in the U.A.R., agriculture to date, has successfully managed to meet a substantial part of the food and agro-industrial requirements of the country.

Certain challenging areas of food production become obvious, however, from study of the food import situation, notably; wheat and wheat flour, dairy products, sugar and meat. Much is expected of new irrigated land (1.2 million feddans) soon to become available in a new area served by the High Dam at Aswan, coupled with the conversion of a further 700,000 feddans from basin to perennial irrigation.

Development in the New Valley, and use of non-saline underground water in other selected areas, will ensure a reserve of exploitable land which may fulfil the agricultural needs of the U.A.R. for possibly two further decades.

While the U.A.R. in the technical sense, is the most progressive agricultural country in the North African sub-region, scope still exists to further exploit the available irrigated areas to ensure additional increases in yield.

The current agricultural plan recognizes the competitive requirements between crops and animals for scarce irrigated arable land, and wisely, has decided to increase animal and poultry production, through disease control and an improvement in the overall genetic qualities of the indigenous farm animals and poultry, rather than to allocate considerable new areas for such production purposes at existing low levels of efficiency. This programme is being accelerated through the introduction of improved breeds of animals from Europe so as to cut short the more tedious and possibly less rewarding enterprise of selecting better animals from within local breeds.

Friesian cattle have been found best suited for the purposes of milk and meat production, and propagation of this breed and its crosses is proceeding through the development of herds of pure-bred animals and by crossing the Friesian with native breeds such as the Damietta.

The water buffalo contributes more to the indigenous milk supply in the U.A.R. than ordinary cattle, and vigorous attempts are currently being made to improve the situation through selective breeding and artificial insemination, the latter practice being essential in a situation characterized by small herds, where herd size averages between 1-4 animals.

In the Western Desert, and in other semi-desert areas, sheep husbandry is the principal form of agriculture which is commercially feasible. Current development programmes are oriented toward improvement of the mutton and wool qualities of the Ossimi and Barki types of fat-tailed sheep.

The contribution of poultry to the gross output value of agriculture is estimated at approximately £E18 million or 3.1 per cent and there would appear to be considerable further potential in this area of production.

Attention at the moment is being focused on provision of improved strains and breeds of poultry for distribution to small farmers. Breeds which find favour are the Fayoumi, Dandarawi (both native breeds), Dokki 4 (a new hybrid, resulting from a cross between the Fayoumi and the Barred Plymouth Rock, Rhode Island Red and White Leghorn). Supplies of balanced poultry feed are becoming increasingly available through more efficient utilization of milling and other by-products.

Among the major problems facing the productive capacity of the agricultural sector in the U.A.R. is the shortage of good agricultural land and the considerable investment input necessary, through irrigation, to make these areas productive. There would appear to be some urgency to develop new plans designed to substantially increase the production of wheat (imports of wheat grain and wheat flour currently assuming a magnitude of 1 million tons of wheat annually), to increase the production of sugar cane and rice to

satisfy not only domestic demand, but to increase exports of these commodities to less favoured North African countries, and to substantially increase the production of berseem and other fodders for livestock, to meet demand during the dry summer periods, when no rainfed pastures are available. In this connexion, research concerned with the preservation of these fodders for summer use and the development of shelters for feedlot beef cattle enterprises and for dairy production is urgently required and hopefully translated into practice as quickly as possible.

Future prospects for agriculture in the U.A.R. in the short to medium term are reasonably good, although capital inputs must of necessity be substantial for a continuing period of time. At present levels of population growth and agricultural efficiency, and with the growing demand for industrial crops for processing, it will be necessary every two decades to develop fresh resources equivalent to those now to be provided through the irrigation potential of Lake Nasser. In all of the countries of the North African sub-region, family planning, and a sustained drive to provide improved living standards which generally has the same net effect, would appear to be most critical in the U.A.R.

To sustain the necessary level of inputs which will be so urgently required, a long period of uninterrupted peaceful development and careful planning will be necessary. However, longer term prospects for agricultural development in the U.A.R. are of formidable proportions, influenced primarily by the explosive tendencies of projected population numbers (46.5 million people by 1980) in a physical setting which can offer only limited possibilities of accommodation and development resources.

Sudan

The total land area of the Sudan is estimated to extend to 237,600,000 ha. of which desert represents 29 per cent, Semi-desert (75-300 mm annual rainfall) 19.6 per cent, forest and savanna (280-1800 mm annual rainfall) 41.3 per cent, flood region (700-1600 mm annual rainfall) 9.8 per cent, Mountain vegetation (500-2000 mm annual rainfall) 0.3 per cent.

In such a wide range of ecological zones, and with the overriding influence of the valleys and flood plains of the two Niles, agricultural production in the Sudan is highly diversified and

potentially of great significance to North Africa. Cotton production, however, occupies a position of paramount importance in the Sudanese economy as a whole, and in the agricultural economy in particular.

Consideration of a selected list of agricultural exports averaged over the ten year period (1956-1965) indicates the importance of these commodities in relation to the agricultural economy viz: cotton seed, 146,596 M.T., cotton ginned, 121,356 M.T., groundnuts, 96,928 M.T., pulses, 10,863 M.T., melon seed, 7,571 M.T., dried dates, 2,527 M.T., maize, 1,775 M.T., and millet, 1,772 M.T.

Cotton ginned, groundnuts, sesame, cotton seed, gum arabic and sorghum, in that order, contribute most in F.O.B. values to the agricultural economy.

Study of the agricultural imports situation, suggests the growing importance to the economy, and in particular domestic demand, of wheat, wheat flour, sugar, coffee, tea and cocoa, fruits and nuts, tomato sauce, lentils and potatoes, fats and oils, cereal products, and dairy products.

Many of these commodities, it should be noted, could be produced in the Sudan provided irrigation was made available. For more detailed appraisal, see commodity notes.

Large areas of the Sudan are eminently suitable for the production of cattle, sheep and goats. The current level of livestock numbers vis-a-vis the human population is very favourable, but could be considerably augmented through organized systems of ranching and the development of feedlot fattening using locally-produced fodders and improved pastures, milling by-products, and oilseed cake residues. The current situation would also appear to be favourable for the establishment of one or more meat canning factories providing the requirements of veterinary and quality control could be complied with.

The possibility of exporting chilled or frozen carcasses as sides or as boneless beef to the major Western European markets is still some way off. Embargo will last just as long as contagious or endemic diseases exist such as rinderpest, contagious pleuro-

pneumonia, and foot and mouth disease. The canning of meat, involving heat treatment, removes such disease hazards to other livestock, but chilling or freezing does not necessarily ensure complete safety.

Proposals to establish large scale ranches are favourably viewed, providing such proposals include fencing to ensure disease and organised grazing control.

Current estimates of take-off for cattle herds in the Sudan are indicated as between 3-10 per cent with an average of about 6 per cent. Great scope to improve this situation in settled or semi-nomadic areas therefore exists, through greater institutional supervision of animal health problems, and through the extension service, particularly in respect of the development of modern grazing management principles and techniques, segregation of breeding animals from animals destined for fattening, and probably most important of all, provision of carefully sited watering points coupled with provision of mineral supplementation.

The Sudan has probably the greatest reserves of potentially useful agricultural land in the North African sub-region, provisionally estimated at 20 million acres. It is technically possible to bring water to at least a portion of this area through pumping, which would make possible a considerable expansion of agricultural production. Among such crops which study of the import situation indicates as being most important for the purpose of import substitution, are wheat and sugar cane. Hopefully, as far as the Sudan is concerned, a considerable expansion of production in both these crops would relieve not only the current outflow of foreign exchange, but, in time, would be of considerable significance to the North African commodity situation as a whole. It is obviously of importance to the agricultural economy of the Sudan to continue exploiting suitable areas for increased production of long-staple cotton, for which there would appear to be a good demand for several years ahead.

Future prospects for the main crops grown in the Sudan, with the possible exception of groundnuts on account of other oil substitutes becoming increasingly competitive, appear to be good, and if capital inputs for increasing the area under irrigation can be ensured, the future prospects are extremely good.

The agricultural situation in the Sudan is such that institutional education and training will play an increasingly important part in the development requirements of the country. Such training in the next two decades should concentrate on technical and hydrological aspects of irrigation farming, on plant breeding and seed multiplication, on crop protection and improvements in animal health and husbandry. With these priorities in mind, the manpower situation should now be carefully reviewed and reassessed.

Little has been recorded of the agricultural potential of the moist tropical region in the South of the country in Equatoria Province. Funds invested in a survey at this point in time would be of considerable value in providing indicators of possible crop and livestock diversification projects.

CHAPTER II

MEASURES REQUIRED TO SECURE HIGHER LEVELS OF PRODUCTION

7. The productive capacity of agriculture in North Africa is essentially the business of five groups of entrepreneurs, namely: traditional (essentially subsistence) farmers, Private modern farmers, government agency farmers, cooperative farmers, and Corporation farmers.

In North Africa, the traditional farmer and his family unit constitute, in terms of numbers, the most important group of farmers. In several countries, but particularly in Morocco, Algeria, Libya, and the Sudan, the traditional private farmer has responsibility for approximately 75 per cent of the agricultural land available, but contributes probably less than 30 per cent to the gross agricultural product. Traditional farming is directed toward a subsistence form of agriculture, only part of its productive capacity finding its way to the market sector.

Cooperative farming enterprise is well developed in Tunisia, and to a lesser extent, in Algeria, Morocco, U.A.R. and the Sudan. The Gezira Scheme in the Sudan might well be described as government agency farming, which is organized, however, on the basis of cooperation. Large scale cooperative farming enterprise, with capital and credit inputs and marketing facilities supplied under supervision and control, where tenants may operate as individuals or in concert with others, is tending to increase through North Africa.

Higher levels of agricultural production must be viewed, therefore, against such backgrounds and varying occupational circumstances, if production capability and opportunity is to be rationally assessed and discussed.

Manpower

Future productive capacity in the agricultural sector as a whole should also be considered against the current phenomenon of a rural population which is growing steadily smaller, in 1963 75 per cent, 1970 72 per cent, 1975 68 per cent and 1980 65 per cent.

Underlying causes giving rise to this movement, which may be assumed to be widespread, not only in North Africa, but in many other areas of the world, are generally suggested as being the result of dissatisfaction with lower standards of rural facilities and amenities compared with smaller or larger townships, with lower levels of formal and technical education available to rural societies, and job opportunity in towns, obtainable at terms more favourable than can be secured through farming or in other areas of rural employment.

Rural youth in particular, finds urban life and amenities more to its liking, offering freedoms not so readily accepted in backward rural areas.

With ever-growing demand for increased food production, those who remain in rural areas to farm will require to make increasing use of agriculture machinery and implements to enable output to expand from a shrinking labour force. Draft animals will require to give way to tractors to enable timely attention to cropping and cultivation needs on agricultural holdings which inevitably must increase in size. The traditional farmer will increasingly adopt the methods of the modern farmer and gear himself more closely to a money economy.

It is difficult to determine how soon and how fast evolutionary changes of this nature will take place in North Africa, but change in this direction is inevitable, if a progressive rural society is to contribute successfully in a modern economy.

Land tenure

It is frequently suggested that productive agricultural capacity would increase in developing societies, were security of tenure assured to the farming community, particularly in the traditional sector. Tenant farmers assume occupancy of land through tribal custom and arrangement, through arrangement with private landlords or as tenants of government or government agency. Under a benevolent association, all such forms of tenancy or occupation can be made to operate satisfactorily. The least satisfactory arrangement generally being that which involves a landlord (who frequently is an absentee) and tenant in a share-cropping arrangement involving payment in kind, which frequently operates against the primary interests of the tenant. On the other hand, such arrangements may often operate

to the advantage of the tenant, where the landlord supplies a major portion of the necessary inputs, such as a pair of work oxen, seeds, fertilizer and so on.

It is a fact, however, that the ultimate aim of most tenants is to achieve independence through ownership. Pride of ownership almost invariably leads to a changed mental attitude towards care of land and the build-up of soil fertility, in contrast to the all too frequent process of soil extraction which leads finally to exhaustion. In North Africa, for instance, the area of fallow, which is a means of reversing the process of total exhaustion, is estimated to represent approximately 50 per cent of all land available to agriculture. Applications of modern agricultural science and technological processes will almost certainly demonstrate that the traditional system of fallowing is now largely outdated, and acts as a deterrent to the expression of full productive capacity.

As a means of securing the necessary attitudes toward modernization of agriculture, it is strongly advocated that cadastral surveys be carried out at once, where this has not already been done, and that legal tenancy and ownership agreements be drawn up and registered with the State.

Education and training

Illiteracy and lack of progressive agricultural thinking, with several notable exceptions, is widely exhibited in most rural areas of the several North African countries.

Progressive development towards an enlightened agricultural community commences with the provision of facilities for general education in rural areas, based in part on a curriculum where agricultural science and appreciation is offered as a major subject.

The problem of organizing general education in the rural areas of developing countries is one of considerable magnitude and complexity in terms of provision of school buildings, rural communications, and provision of the number of teachers qualified to teach in the rural setting.

As a follow-on to the formal educational process in rural areas, it is also necessary to provide facilities in almost all North African countries for technical education, relating to the needs of agri-

culture, which should include wood working, metal working, and tractor and machinery servicing. The projected needs for, and increased use of, tractors and farm implements, will call for increasing numbers of such specialists in the next two decades.

Agricultural extension services

The value of extension work in farming areas is now widely recognized as one of the more positive means of raising standards of husbandry and of increasing production. The numbers of trained personnel available in the several agricultural disciplines is woefully inadequate to achieve the impact required in most North African countries for meeting the urgent needs of increased production.

Depending on the compactness of an extension area, the strength required to supervise the general field advisory work is sometimes indicated as 500 agricultural holdings per extension officer, who of necessity must be mobile.

In addition, specialist advisory officers must be available to cater for the needs of livestock and dairy farmers, farm mechanization, pasture development, fodder utilization and animal nutrition.

The current strength and planned establishment of the various types of extension officers, their standards of education and training, the area of responsibility required of each, and the facilities available for training are difficult to determine in North Africa. In this connexion, it is strongly recommended that the position be clarified as soon as possible, and recommendations put forward to considerably strengthen this key field of endeavour.

Capital inputs

It goes without saying that substantial capital investment in agriculture in North Africa is essential if certain major production deficiencies are to be overcome. The situation is relatively straight-forward where necessary capital inputs are required by private enterprise; where limited government funds are involved, however, a balanced view of the economy as a whole must be taken, and funds allocated to some estimates of priority and cost-worthiness. Investment of capital inputs is urgently required in two major areas, namely, in expanded irrigation schemes and in feeder road communica-

tion leading to market facilities. Expansion of irrigation facilities calls for critical cost benefit analysis, to determine which crops can carry the weight of operating expenses and capital amortization. Soils with the greatest irrigation potential only may be used. All countries have such areas, but it is felt that the Sudan possibly offers the most favourable possibilities for major expansion of this form of intensive agriculture. Construction of feeder or access roads, while expensive to construct and maintain, is a suitable medium for long-term credit investment, providing such plans are considered in concert with other planning requisites inherent in balanced rural development.

Short-term credit facilities

One of the most significant ways in which arable and tree crop agricultural production may be increased in North Africa is through extended use of agricultural credit.

Credits for short-term production needs are generally made available through government agency or through Agricultural Development Banks. The former system is most frequently utilized having proved responsive to field and supervisory control which banks are generally unable to offer.

Credit may be awarded to individual farmers in a position to pledge collateral or alternately to those who bind themselves under solemn agreement to market the crops so aided through a system of produce marketing which enables scope for deduction of the input costs advanced from the sale of crop or crops benefitted by such inputs.

More usually, credit facilities are offered in kind in the form of improved seeds, fertilizers, or possibly as agricultural equipment. Such schemes frequently involve cooperative organization and collective responsibility for repayment of credits so advanced.

Experience in the credit-awarding field has been mixed in North Africa, depending on the degree of supervision available and on full and complete understanding of the function and responsibilities inherent in the advance of credit. Too often in the past has the award of credit been mistakenly interpreted as a government gift, or where adequate supervision has been unavailable, to dishonest practice.

Short-term credit facilities are likely to be most successfully applied where corporate responsibility for repayment is secured, where extension advisers work in close liaison with credit-awarding

agencies, and where marketing facilities are closely associated with the field officers concerned, whether they be agricultural officers specially concerned with the policing of bank or of government loans.

Cooperative farming enterprise is a fertile area in which to award short-term credits, and in some instances, cooperative societies accept full responsibility for the issuance and repayment of loans so awarded by banks and/or government.

The problem of operating credit schemes among traditional farmers offers problems of some magnitude, in view of the large numbers of farmers involved who come within this class. It is in this sector, however, that the greatest need for help and assistance is evident. Successful credit schemes in the traditional sector have frequently demonstrated the possibility of converting traditional farmers into modern farmers.

In the short run, fertilizer credits would appear to offer the greatest potential for increasing levels of production and capital formation at farm level.

Considerable scope exists for the issuance of credit to agriculture, through private enterprise banks staffed with field officers who understand the basic needs of the agricultural development programme of their country, and who in addition possess the necessary agricultural background and equipment to enable them to rapidly process requests for credit advances. As an aid to the banks in North Africa, it is recommended that special courses be instituted at universities, agricultural colleges and business training centres to enlarge the cadre of credit specialists who can function effectively in the agro-credit field.

CHAPTER III

MACRO-ECONOMIC STRUCTURE AND DEVELOPMENT OF AGRICULTURE

I. The present and future place of agriculture in the economies of the North African countries

Agriculture occupies a prominent place in the economies of the North African countries in terms of its role in providing the livelihood of the majority of the population, of its significant share in the gross national product and the foreign trade and of its supply of raw material as well as its demand for the products of the non-agriculture sectors especially those of food processing and the agro-allied industries. However, due to the oil discovery and production in Libya, agriculture is important only if measured in terms of providing the livelihood for the majority of the population.

As indicated in Table 1, rural as percentage of total population amounted to 64 per cent in U.A.R., 73 per cent in Algeria, 76 per cent in Morocco; 79 per cent in Tunisia; 81 per cent in Libya and 96 per cent in Sudan. The average percentage of rural population to total population was 76 per cent for the Maghreb countries compared with 75 per cent for the North African sub-region in 1963 as indicated in Table 2.

The share of agriculture in the GDP varied from 7 per cent in oil exporting Libya to 56 per cent in Sudan, and in the rest of the North African countries it varied from 23 to 30 per cent in 1963.

Agricultural exports accounted for a substantial portion of total exports; it varied from 45 to 90 per cent of total exports in Morocco and Sudan respectively, with the exception of Libya, the percentage for which was only one per cent in 1963.

Imports of agricultural products, as an indicator to the economic importance of agriculture in terms of its potential import substitution capacity and/or its expansion possibilities, accounted also for a large portion of total imports.

Table 1 : Economic indicators of the importance of agriculture in North African countries, 1963

<u>Economic indicators</u>	<u>Morocco</u>	<u>Algeria</u>	<u>Tunisia</u>	<u>Libya</u>	<u>U.A.R.</u>	<u>Sudan</u>
Rural population ^{a/} as percentage of total population	76%	73%	79%	81%	64%	96%
Share of agriculture ^{a/} in the GDP	30%	23%	24%	7%	27%	56%
Share of agriculture ^{b/} in the total exports	45%	50%	47%	1%	83%	90%
Share of agriculture ^{b/} in total imports	25%	15%	20%	20%	25%	25%

Sources: For (a) see Tables 2 and 3.

For (b) see ECA, Sub-regional Office, Tanger, Le développement agricole - September 1965 (mimeographed in French), p. 2.

The share of agriculture in total imports amounted to 15 per cent in Algeria, 20 per cent in each of Tunisia and Libya and to 25 per cent in each of Morocco, Sudan and the U.A.R. in 1963.

However, the relative importance of agriculture will decline from its current level up to 1980 although the absolute number of rural population and the value added in agriculture will both continue to increase substantially.

Rural population will decline from 76 to 63 per cent and from 75 to 64 of total population in the Maghreb countries and the North African sub-region respectively during the period 1963-1980 as indicated in Table 2. The decline in the proportion of rural to total population will occur, of course, in each country in the North African sub-region. But, it is important to note that even by 1980 the majority of the population will still be rural, wavering from 54 per cent in the U.A.R. to 93 per cent in Sudan. In the meantime the number of rural population will increase from 21.9 to 30.2 million

persons and from 52.3 to 73.7 million persons in the Maghreb countries and in the North African sub-region respectively. In no North African country will there be a decline in the absolute number of rural population. Rural population will increase from 21.8 to 30.3 million persons and from 52.1 to 73.8 million persons in the Maghreb countries and in the North African sub-region respectively during the period 1963-1980.

The share of agriculture in the gross domestic product will also decline by 1980 as indicated in Table 3. For the Maghreb countries this share will decline from 23.5 to 13.6 per cent compared with a decline from 28.1 to 18.9 per cent of total GDP in the North African sub-region during the period 1963-1980. It is to be noted that the share of agriculture in Libya will amount to only 2.4 per cent of the GDP while that for the Sudan will still exceed 50 per cent of the GDP by 1980.

	1963	1980	1963	1980
Algeria	11	10	14.2	10.8
Libya	11	10	14.2	10.8
Morocco	11	10	14.2	10.8
Tunisia	11	10	14.2	10.8
Maghreb	11	10	14.2	10.8
North Africa	11	10	14.2	10.8

Table 2 : Number and percentage of rural to total population : North African countries, 1963, 1970, 1975 and 1980

	1963		1970		1975		1980	
	Rural population	% of total	Rural population	% of total	Rural population	% of total	Rural population	% of total
1. Morocco	9.6	76	11.2	71	12.5	67	13.8	63
2. Algeria	7.5	73	8.9	69	9.6	64	10.2	59
3. Tunisia	3.5	79	3.9	75	4.3	73	4.6	69
4. Libya	1.2	81	1.4	79	1.5	76	1.7	73
5. Maghreb countries (1+2+3+4)	21.8	76	25.4	71	27.9	67	30.3	63
6. U.A.R.	18.0	64	20.8	61	23.0	58	25.3	54
7. Sudan	12.3	96	14.5	95	16.2	94	18.2	93
8. North African sub-region (5+6+7)	52.1	75	60.7	71	67.1	68	73.8	64

Source: Computed from UN World Population Prospects (Sales No. 66 XIII.2) and estimates of rural population by the Demographic Unit of ECA.

For Tunisia and Algeria this share will amount to about 15 per cent compared with about 20 per cent for U.A.R. and Morocco by 1980. This implies and requires the achievement of a high rate of industrialization, an efficient as well as a modernized agriculture and an expansion of the food processing as well as the agro-allied industries. Unless vigorous measures are taken to achieve these objectives, then it will be difficult to attain the projected targets.

II. Projection of gross and net agricultural output

(1) Note on methodology

27 Estimates of gross agricultural output i.e. value added plus intermediary inputs, are available for the North African countries from various sources for the base year 1963. However, time series of gross output and value added of agriculture are not available for most of these countries. Thus it is impossible to rely on past trends in projecting gross output while it is possible to project value added in agriculture by assuming certain rates of growth for the agricultural sector consistent with the projected model for the whole economy. Given the projected value added in agriculture, its relationship to gross output, i.e. the level and trend of efficiency of agriculture, has to be determined in order to project gross output. For this purpose the ratios between the two aggregates have been calculated for the North African countries for the base year 1963 as follows:

<u>Country</u>	<u>Percentage of gross output to value added</u>
Morocco	117
Algeria	119
Tunisia	119
Libya	124
U.A.R.	134
Sudan	109

The above ratios indicate the level but not the trend of efficiency of agriculture. Data on the trend or changes in the level of agricultural efficiency which require the analysis of the series of gross and net agricultural output, are available only for U.A.R.

Table 3 : Value added in agriculture as percentage of gross domestic product: North African countries 1963, 1970, 1975 and 1980

Country	1963	1970	1975	1980
1. Morocco	30.4	27.2	24.0	20.8
2. Algeria	23.0	19.7	17.6	15.5
3. Tunisia	24.4	20.2	17.4	14.4
4. Libya	7.4	3.7	3.0	2.4
5. Maghreb countries (1+2+3+4)	23.5	18.2	15.9	13.6
6. U.A.R.	27.3	24.3	22.1	19.1
7. Sudan	55.6	55.8	54.3	50.4
8. North African sub-region (5+6+7)	28.1	23.9	21.6	18.9

Source: Computed from ECA, Study on Industrialization and Economic Cooperation for North Africa, No. 2 (mimeographed).

Gross and net output of agriculture and the ratio between the two in U.A.R. for the period 1954-1964 are indicated in Table 4.

While agricultural gross output increased substantially, value added in agriculture increased more or less in the same proportion in the U.A.R. during the period 1954-1964. Consequently, the ratios between the two aggregates fluctuated slightly from year to year. This indicates that no substantial shift occurred in the level of agricultural efficiency if measured by these ratios.

However, these slight fluctuations may perhaps be due to fluctuations in the prices of agricultural inputs and products or to other economic factors which require a thorough analysis for their identification. If these fluctuations in the ratios between gross and net agricultural output could be attributed to factors other than increased efficiency, then the assumption of a constant

ratio or in other words of maintaining agricultural efficiency, at constant level might not be too presumptuous especially if the prerequisites for increasing agricultural efficiency are taken into consideration. Raising efficiency - as distinct from productivity - of agriculture necessitates the implementation of drastic economic, social and technical measures which include farm mechanization, the use of modern and profitable inputs, the favourable alteration of the economic scale of the farming unit and other similar measures. In the North African countries such measures are not visualized up to 1980. Thus, gross agricultural output has been projected on the basis of a constant ratio prevailing in each of the North African countries. In other words, both aggregates are forecast to increase by the same growth rates. These rates are as follows:

Country	Growth rate		
	1963-70	1970-75	1975-80
Morocco	2.5	3.0	3.0
Algeria	2.0	2.5	3.0
Tunisia	2.5	3.0	3.0
Libya	2.0	2.0	2.0
U.A.R.	3.5	4.0	4.0
Sudan	4.0	4.5	4.5

Source: Computed from ECA, Study on Industrialization and Economic Cooperation for North Africa, No. 2 (mimeographed).

(2) Gross output

Value of gross output of agriculture in each of the North African countries as well as the total gross output for the Maghreb countries and the North African sub-region for the years 1963, 1970, 1975 and 1980, is shown in Table 5. The rates of growth of gross output, used as a basic for this projection, in each country have already been indicated. Gross output amounted to about 1.7 billion US\$ in 1963 and is forecast for about US\$2.5 billion in 1980 compared with about US\$3.9 and US\$6.6 billion for all countries of the North African sub-region in 1963 and 1980 respectively.

The U.A.R. with its relatively limited cultivated area had in 1963 and will have in 1980 the highest gross output among the North African countries followed by Morocco up to 1970 but by Sudan in 1975 and 1980 and then Algeria, Tunisia and Libya. This implies a relatively higher productivity in the U.A.R. compared with other North African countries. This may be partially due to the system of irrigated agriculture in U.A.R. but it is also due to intensification of agriculture, the use of modern farm practices and inputs, the absence of a subsistence sector and so many other similar factors. The gap in agricultural productivity between U.A.R. and the rest of the countries of the sub-region tends to widen.

Table 4 : Gross output as a percentage of value added in agriculture - U.A.R., 1954 - 1964 (million E£)

Year	Gross output	Value added	Percentage
1954	420	301	140
1955	428	312	137
1956	489	374	131
1957	506	381	134
1958	497	364	137
1959	525	389	136
1960	559	412	136
1961	502	348	144
1962	593	437	136
1963	628	470	134
1964	721	545	131

Source: Computed from Ministry of Agriculture, Monthly Agricultural Economic Bulletin, Cairo July 1966 (in Arabic).

Table 5 : Value of gross output of agriculture - North African countries - 1963, 1970, 1975 and 1980

Country	1963	1970	1975	1980
1. Morocco	810	913	1,030	1,193
2. Algeria	595	690	785	904
3. Tunisia	238	274	312	369
4. Libya	87	99	112	124
5. Maghreb countries (1+2+3+4)	1,730	1,976	2,248	2,480
6. U.A.R.	1,444	1,795	1,184	2,653
7. Sudan	710	774	1,166	1,450
8. North African sub-region (5+6+7)	3,884	4,545	5,598	6,585

To illustrate, total gross output in the Maghreb countries amounted to about US\$1.7 billion or 121 per cent of that in the U.A.R. amounting to US\$1.4 billion in 1963 while in 1980 gross output in the Maghreb countries will amount to approximately US\$2.5 billion or 94 per cent of that in U.A.R. amounting to US\$2.6 billion. This comparison is made here merely to indicate the potentiality of agricultural expansion in the Maghreb countries if measures are undertaken in these countries to raise agricultural productivity. If such a comparison is made between the North African sub-region and the developed countries this productivity gap will appear even more conspicuous.

(3) Net agricultural output

Net agricultural output or value added in agriculture for each of the North African countries as well as for the Maghreb countries and the North African sub-region for the years 1963, 1970, 1975 and 1980 are indicated in Table 6.

In the North African sub-region total value added in agriculture amounted to about US\$3.2 billion in 1963 and is forecast to reach 4.0, 4.7 and 5.6 billion US\$ in 1970, 1975 and 1980 respectively.

The share of the Maghreb countries in the total net agricultural output of the whole North African sub-region amounted to about 46 per cent in 1963 and is expected to amount to 42, 40 and 39 per cent in 1970, 1975 and 1980 respectively. Thus while the net output will increase in absolute terms from about 1.5 to 1.7 to 1.9 to 2.2 billion US\$ its relative weight in the North African sub-region will tend to decline. It is to be noted, however, that this projected trend is due relatively to the low rates of growth assumed for the Maghreb countries which seem to be feasible at present. But these rates may and should be increased if more efforts and investments are devoted to the development of Maghreb agriculture.

Table 6 : Value added in agriculture - North African countries
1963, 1970, 1975 and 1980

Country	(million US\$)			
	1963	1970	1975	1980
1. Morocco	690	780	880	1,020
2. Algeria	500	580	660	760
3. Tunisia	200	230	270	310
4. Libya	70	80	90	100
5. Maghreb countries (1+2+3+4)	1,460	1,660	1,990	2,190
6. U.A.R.	1,090	1,340	1,630	1,980
7. Sudan	650	860	1,070	1,330
8. North African sub-region (5+6+7)	3,200	3,860	4,690	5,500

Source: ECA Study on Industrialization and Economic Cooperation
No. 2 (mimeographed).

The value of intermediate agricultural inputs for each country for the years 1970, 1975 and 1980 may be calculated by subtracting net output from gross output figures indicated in Tables 6 and 5 respectively.

Likewise, estimates of gross fixed capital formation in agriculture may be derived from Tables 5 and 6 by assuming certain capital/output ratios from each of the North African countries.

CHAPTER IV

INTER-INDUSTRY RELATIONS IN NORTH AFRICA

Scope

The relative importance and place of agriculture in the economies of various countries have often been conventionally expressed in terms of agriculture's share in gross domestic product, employment and exports as well as its role in the provision of raw materials and markets to the non-agricultural sectors.

Although such a descriptive approach has limited uses, it is still rather inadequate if the functional relationships between the various sectors and the structural characteristics of an economy are to be fully assessed.

Thus, the input-output analysis is applied in this paper in order to provide a further insight into the structural characteristics of the economies of the North African countries.

While the application of input-output analysis to economic planning and forecasting at different levels of economic development has gained widespread acceptance in developed countries since the late thirties it is still in the infancy stage in Africa. Input-output analysis has many useful uses such as the measurement of relations between final demand and primary inputs; price-cost relations; planning and forecasting; analysis of economic structure; linear programming and dynamic and regional analysis.

The scope of this study, however, is confined to the analysis of

- (a) Inputs and outputs of the agricultural sector or the assessment of the inputs from other sectors which are supplied to the agricultural sector and hence the relative importance of its demand on the other sectors. Likewise, the supply of products from the agricultural sector to other sectors and thus its relative importance as a supplier of products to them;
- (b) Demand generation in different sectors or the effects of initial demand on total demand in each sector;
- (c) Demand generation in the agricultural sector or the direct and indirect effects of the increase in demand for agricultural products upon the output of other sectors;

- (d) Effects of demand generation in other sectors on the agricultural sector, and
- (e) Brief note on methodology for planning and forecasting.

Methodology

Original input-output tables are only available for five of the six North African countries in specific years, i.e., Algeria, 1963; Morocco, 1964; Sudan 1962/63; Tunisia, 1964; and the UAR, 1956^{1/}.

It appears that an input-output table has not yet been constructed and/or published for Libya. A published input-output table for the UAR is available for 1956 and is considered to be obsolete due to marked changes which have taken place in the economy since then. Nevertheless, it is hoped that the methodology and findings of this study may be useful in making applications and in drawing conclusions with respect to Libya and UAR as well as other countries.

Moreover, the measurement of changes in the structural interdependence of the economies of these countries over time which may be derived from comparing figures which are computed on a homogeneous basis at different intervals for individual countries, requires a time series of input-output tables which does not seem to have been either published or constructed. Hence, a static view of the structural characteristics of these economies indicating the sectoral relationships for each country and the very broad differences between countries will be presented.

The number of sectors in the original input-output tables varies from about 20 to 35 sectors according to individual countries. As the main objective of this analysis is to indicate the inter-relationships between the agricultural sector and related economic activities, i.e., food processing and agro-allied industries on one hand and the rest of the economy on the other, and since non-agricultural activities have not yet occupied a predominant place in the economies of these countries - a more meaningful and pragmatic re-grouping of the above mentioned numerous branches of production activities into 4 or 5 sectors has been undertaken without effacing the main structural features of the economies of these countries.

Thus, a new set of abridged input-output tables has been constructed as indicated in Tables 1, 2, 3, and 4 for Algeria, Morocco, Sudan and Tunisia respectively.

^{1/} These tables have been published in the ECA, Statistical Bulletin for Africa, March 1967.

It should be noted, however, that the consolidated sectors contained in these abridged tables should be treated with reserve since industry classifications vary considerably from one country to another and hence the contents of each broad sector will not be the same for different countries. The components of each consolidated sector in various countries are indicated in Annex I.

Each of these abridged input-output tables which may be called a transaction matrix includes all goods and services produced in an economy during the given accounting period. Each sector appears in the accounting system twice; as a producer of output and as a user of inputs. The elements in each row of the table show the disposition made of the output of that sector while those in each column represent inputs supplied by other sectors to that sector. Furthermore, the elements in each row, representing uses of or demand for output, are classified into intermediate use (demand), i.e., use for further production and final demand, i.e., for investment, private consumption, government consumption and exports. Likewise, elements in each column are classified into intermediate inputs, i.e., purchase by each sector from all other sectors and value added, i.e., unproduced inputs or direct payment for primary inputs - land, labour and capital.

Table 1 : Algeria - Abridged input-output table, 1963 - (Million dollars)

	Purchasing sector		Intermediate demand				Total inter-mediate demand		Total final demand	
	Agri-cult-ural	Agri-cult-ural process-ing	Agri-cult-ural indus-tries	Industry manufac-turing mining	Const-ruccion utilities services	Comm-ercial margins				
Producing sector										
Agricultural	217	1,444	18	3	18	-	1,700	2,274	3,974	
Agricultural processing	19	269	13	12	18	-	331	2,680	4,011	
Agro-allied industries	2	2	242	4	7	1	258	1,102	1,360	
Industry, manufacturing and mining	165	93	5	811	668	151	1,893	6,051	7,944	
Construction, utilities and services	73	40	-	497	369	197	1,176	2,158	3,334	
Total intermediate inputs	476	1,848	278	1,327	1,080	349	5,358	15,265	20,623	
Value added	2,459	692	151	2,782	2,124	2,811				
Total production at factor costs	2,935	2,540	429	4,109	3,204	3,160				
Imports	384	779	578	2,393	112					
Commercial margins	655	692	353	1,442	18	-3,160				
Total output	3,974	4,011	1,360	7,944	3,334				20,623	

Source: Computed from ECA, Statistical Bulletin for Africa, No. 2 Part 2, March 1967.

Table 2 : Morocco - Abridged input-output table, 1964 - (Moroccan francs)

Production sector	Purchasing sector		Intermediate demand					Comm-ercial margins	Total inter-mediate demand	Total final demand	Total demand
	Agri-cult-ure	Agri-cult-ural processing	Agro-allied indus-tries	Industry, manufac-turing, mining	Const-ruccion, utilities, services						
Agriculture	26,459	69,300	16,056	2,517	940	-	-	115,272	417,108	532,380	
Agricultural processing	740	72,440	10	1,258	307	423		75,178	261,881	337,059	
Agro-allied industries	4,096	6,419	66,230	5,464	8,801	15,545		106,555	188,585	295,140	
Industry, manufacturing and mining	24,377	14,977	16,154	91,954	43,499	6,747		197,708	272,184	469,892	
Construction, utilities and services	2,181	6,967	6,213	15,977	33,672	46,672		111,570	227,021	338,591	
Total intermediary inputs	57,853	170,103	104,663	117,170	87,219	69,275		606,283	1,336,779	1,973,062	
Value added	352,147	58,570	59,264	129,300	236,403	254,655					
Total production at factor costs	410,000	228,673	163,927	246,470	323,622	323,930					
Imports	32,453	58,091	49,043	123,618	13,235						
Commercial margins	89,927	50,295	82,170	99,804	1,734	-323,930					
Total inputs	532,380	337,059	295,140	469,892	338,591					1,973,062	

Source: Computed from ECA, Statistical Bulletin for Africa, No. 2, Part 2, March 1967.

Table 3 - Sudan - Abridged input-output table, 1962/1963 - (thousand pounds)

Producing sector	Purchasing sector	Intermediate demand				Transport, utilities and services	Total intermediate demand	Total final demand	Total demand
		Agriculture	Food processing and allied industries	Construction and mining	Manufacturing and construction				
Agriculture		1,900	10,248	2,637 ^{a/}	40		14,825	242,482	257,307
Food processing and Agro-allied industries		1,200	-	2,050 ^{a/}	840		4,090	41,729	45,819
Construction and mining		-	19	75 ^{a/}	2,147		2,241	54,928	57,169
Transport, utilities and services		20,089	6,833	6,171	3,299		36,392	85,372	121,764
Total intermediate inputs		23,189	17,100	100,933	6,326		57,548	424,511	482,059
Value added		222,861	19,676	27,632	100,317		370,486		
Total production at factor cost		246,050	36,776	38,565	106,643		428,034		
Imports		10,046	6,180	15,452 ^{a/}	7,020		38,698		
Taxes on imports		1,211	2,863	3,152 ^{a/}	8,101		15,327		
Total inputs		257,307	45,819	57,169 ^{a/}	121,764		482,059		

Source: Computed from ECA, Statistical Bulletin for Africa, No. 2, Part 2, March 1967

^{a/} Construction only.

Table 4 : Tunisia - Abridged input-output table, 1962/1963 (1000 dinars)

Production sector	Purchasing sector	Intermediate demand							Comm-ercial margins	Total inter-mediate demand	Total final demand	Total demand
		Agri-culture	Agri-culture processing	Agro-allied industries	Industry, manufacturing, mining	Construction, utilities, services	Agro-allied industries	Industry, manufacturing, mining				
Agriculture		5,280	69,720	2,130	3,080	1,390			-	81,600	57,500	139,100
Agricultural processing		1,300	33,810	620	1,270	4,400			-	41,400	141,420	182,820
Agro-allied industries		870	900	16,100	1,460	3,230			2,660	25,220	60,429	85,649
Industry, manufacturing and mining		10,350	3,690	3,580	19,040	36,130			2,000	74,790	100,760	175,550
Construction, utilities and services		3,300	3,660	900	8,290	6,950			7,560	30,660	151,749	182,409
Total intermediate inputs		21,100	111,780	23,330	33,140	52,100			12,220	253,670	511,858	765,528
Value added		87,100	41,200	16,609	34,780	199,439			62,290			
Total production at factor costs		108,200	152,980	39,939	67,920	161,539			74,510			
Imports		8,900	12,590	23,230	65,570	20,870			-			
Taxes on imports		2,780	2,890	7,280	16,330	-						
Commercial margins		19,220	14,360	15,200	25,730	-			-74,510			
Total inputs		139,100	182,820	85,649	175,550	182,409						765,528

Source: Computed from ECA, Statistical Bulletin for Africa, No. 2, Part 2, March 1967.

Input coefficient matrices for individual countries have been computed from the above mentioned abridged input-output tables by dividing each inter-industry purchase by the total output of the sector, i.e., each entry in the transactions matrix by the total of the column in which it is recorded. For example, the input coefficient from agricultural processing into agriculture, for Algeria according to Table 1, has the value of $\frac{19}{3,974} = .0065$, as indicated

in Table 5, which means that .0065 million dinars of inputs from the agricultural processing sector are directly required to produce 1 million dinars worth of agricultural output. The resulting matrices of input coefficients - sometimes known as structural or technical coefficients - are shown in Tables 5, 6, 7 and 8 for Algeria, Morocco, Sudan and Tunisia respectively.

However, in the above example - according to Table 5 - the production of 1 million dinars worth of agricultural output, in Algeria, does not only directly require inputs from the agricultural processing sector but it also requires .0739, .0007, .0562 and .0249 million dinars from the agriculture sector itself; the agro-allied industries sector; the industry, manufacturing and mining sector and the construction, utilities and services sector respectively.

But the production of a given agricultural output does not only directly require the inputs from other sectors, as indicated above, but also indirectly requires the inputs necessary to produce those inputs. The indirect requirements of any output for final use extend in a series which converges rapidly until the successive increments of output required of every sector becomes insignificant.

In the above example the delivery of a final use of 1,000 million dinars worth of agricultural output, according to Table 9, would directly and indirectly require production from each sector the following amounts: from sector one, 1,085 million dinars; from sector two, 7 million dinars; from sector three, 3 million dinars; from sector four, 87 million dinars; and from sector five, 42 million dinars.

Table 5 : Algeria - Input coefficient matrix, 1963

Sector	1	2	3	4	5
1. Agriculture	.0719	.5685	.0419	.0007	.0056
2. Agricultural processing	.0065	.1059	.0303	.0029	.0056
3. Agro-allied industries	.0007	.0008	.5641	.0010	.0022
4. Industry, manufacturing and mining	.0562	.0036	.0116	.1974	.2085
5. Construction, utilities and services	.0249	.0157	.0129	.1209	.1152

Source: Computed from Table 1.

Table 6 : Morocco - Input coefficient matrix, 1964

Sector	1	2	3	4	5
1. Agriculture	.0645	.3030	.0979	.0102	.0029
2. Agricultural processing	.0018	.3168	-	.0051	.0009
3. Agro-allied industries	.0010	.0281	.4040	.0222	.0272
4. Industry, manufacturing and mining	.0594	.0655	.0985	.3731	.1344
5. Construction, utilities and services	.0053	.0305	.0379	.0648	.1040

Source: Computed from Table 2.

Table 7 : Sudan - Input coefficient matrix, 1963

S e c t o r	1	2	3	4
1. Agriculture	.0077	.2786	.0684	.0004
2. Food Processing and agro-allied industries	.0049	-	.0532	.0079
3. Construction and Mining	-	.0005	.0019	.0201
4. Transport, utilities and services	.0816	.1858	.1600	.0309

Source: Computed from Table 3.

Table 8 : Tunisia - Input coefficient matrix, 1964

S e c t o r	1	2	3	4	5
1. Agriculture	.0488	.4557	.0533	.0453	.0086
2. Agricultural Processing	.0120	.2210	.0155	.0187	.0272
3. Agro-allied industries	.0080	.0059	.4031	.0215	.0199
4. Industry, manufacturing and mining	.0956	.0241	.0986	.2803	.2236
5. Construction, utilities and services	.0305	.0239	.0225	.1221	.0430

Source: Computed from Table 4.

Thus by inverting the input coefficient matrix it is possible to determine the direct and indirect inputs required from a given sector to satisfy one unit of final demand of another sector. The inverse coefficients matrices for Algeria, Morocco, Sudan and Tunisia are shown in Tables 9, 10, 11 and 12 respectively.

In the inverse matrix coefficients each column shows, for a unit of final demand by the corresponding sector, the total output required from each sector represented by its row. In the meantime, each element of a row shows the amounts required from that sector to satisfy a unit of final demand for the output of each sector.

The inverse coefficient matrices $(I - A)^{-1}$, have been calculated according to the following formulae:

The matrix form for the input-output model is:

$$X - AX = Y \quad (1)$$

By multiplying X by the identity matrix, the result is:

$$(I - A) X = Y \quad (2)$$

or

$$X = \frac{1}{(I - A)} \cdot Y = (I - A)^{-1} \cdot Y \quad (3)$$

then

$$(I - A)^{-1} = \frac{1}{(I - A)} = I + A + A^2 + A^3 + \dots \text{etc} \quad (4)$$

The use of equation (4) gives an approximation to the inverse which would converge to the true value if carried out further by expansion in powers.

It should be noted that much can be gained from an analysis in considerable detail which is based on original input-output tables. Statistical uncertainties must also not be overlooked.

Table 9 c: Algeria - Inverse coefficient matrix, 1964

S e c t o r	1	2	3	4	5
1. Agriculture	1.085	.691	.148	.007	.014
2. Agricultural processing	.007	1.123	.074	.006	.009
3. Agro-allied industries	.003	.003	2.290	.003	.006
4. Industry, manufacturing and mining	.087	.113	.049	1.290	.304
5. Construction, utilities	.042	.054	.005	.176	1.172
Total	1.224	1.984	2.570	1.482	1.505

Source: Computed from Table 5 .

Table 10 : Morocco - Inverse coefficient matrix, 1964

S e c t o r	1	2	3	4	5
1. Agriculture	1.074	.488	.182	.029	.014
2. Agricultural processing	.004	1.468	.004	.012	.003
3. Agro-allied industries	.022	.089	1.695	.067	.062
4. Industry, manufacturing and mining	.109	.232	.305	1.636	.254
5. Construction, utilities and services	.015	.074	.094	.121	1.137
Total	1.224	2.351	2.280	1.865	1.470

Source: Computed from Table 6.

Table 11 : Sudan - Inverse coefficient matrix, 1963

S e c t o r	1	2	3	4
1. Agriculture	1.009	.282	.084	.004
2. Food processing and agro-allied industries	.006	1.003	.055	.009
3. Construction and mining	.002	.006	1.005	.022
4. Transport, utilities and services	.087	.217	.185	1.038
Total	1.104	1.508	1.329	1.073

Source: Computed from Table 7.

Table 12 : Tunisia - Inverse coefficient matrix, 1964

S e c t o r	1	2	3	4	5
1. Agriculture	1.072	.633	.128	.096	.052
2. Agricultural processing	.022	1.300	.044	.044	.049
3. Agro-allied industries	.021	.026	1.684	.060	.049
4. Industry, manufacturing and mining	.162	.149	.269	1.468	.352
5. Construction, utilities and services	.055	.072	.076	.186	1.092
Total	1.332	2.180	2.201	1.854	1.594

Source: Computed from Table 8.

Inputs of the agricultural sector

Inputs to agriculture from each sector as percentage of total agricultural inputs from all sectors for four North African countries, i.e., Algeria, Morocco, Sudan and Tunisia are shown in Table 13. The basic data are derived from Tables 1 to 4.

The agricultural sector provides the bulk of its own inputs especially in Algeria and Morocco. The percentage of total inputs to agriculture that comes from the agricultural sector amounts to about 46 per cent in each of Algeria and Morocco.

Due to the method of constructing the original input-output table in Sudan which was apparently based on a diagonal zero matrix, in which intermediary consumption was eliminated, and to assessment of intermediate activities on the basis of market prices, the part of the agricultural input which agriculture received from itself was underestimated; amounting only to 8.2 per cent while the contribution of the utilities and services sector was over-estimated; amounting to 86.6 per cent. Had the input-output table in Sudan been constructed on comparable basis to those in the other North African countries the structure of inputs to agriculture in Sudan would not have differed appreciably from its parallel counterparts in North African countries.

Agriculture also depends, to a varying degree in different North African countries, upon inputs it receives from other sectors. The difference in the mix of inputs between countries depends upon, and thus gives a broad picture of, the inter-industry relations of the countries concerned. The structure of inputs varies according to the level of monetization and modernization of the economy.

Inputs from the sectors of food processing and agro-allied industries to the agricultural sectors are still relatively unimportant. They provide 4.4, 8.4, 5.2 and 10.3 per cent of total inputs in Algeria, Morocco, Sudan and Tunisia respectively. The variation in the relative importance of these inputs from one country to another is perhaps due to the production of fertilizers (phosphate) in Morocco and Tunisia and to the development of some food processing industries in Algeria and Tunisia where about 85 per cent of agricultural output in each country is supplied to the food processing sector as indicated in Table 14.

The second most important sector as a supplier to the agricultural sector in most of the countries is industry, manufacturing and mining. It supplied 34.7, 42.1 and 49.1 per cent of total inputs to the agricultural sector in Algeria, Morocco and Tunisia respectively.

Construction, utilities and services are rather significant in Algeria and Tunisia, supplying 15.3 and 15.6 per cent of total inputs to agriculture respectively compared with only 3.8 per cent in Morocco.

Outputs of the agricultural sector

Outputs of agriculture to each sector as percentage of agricultural output to all sectors are indicated in Table 14 which is derived from Tables 1 to 4.

Agricultural outputs go mainly to the food processing sector in all the countries under consideration. The percentages of total output of agriculture going to the food processing sector amount to about 85, 60, 69^{1/} and 85 per cent in Algeria, Morocco, Sudan and Tunisia respectively. Thus the food processing sector is of major importance as a source of demand for agricultural products.

Second in importance in most of the North African countries is the agricultural sector itself which consumes 12.8, 23.0, 12.8 and 6.5 per cent of its total output.

Except for the relative importance of the agro-allied industries sector in Morocco and construction and mining sector in Sudan as sources of demand for agricultural products, the remaining sectors in the countries concerned have very low demand for inputs from agriculture.

^{1/} Including agro-allied industries.

Table 13 : Inputs to agriculture from each sector as percentage of total agricultural inputs from all sectors

Sector	Algeria	Morocco	Sudan	Tunisia
Agriculture	45.6	45.7	8.2	25.0
Food processing	4.0	1.3	5.2	6.2
Agro-allied industries	0.4	7.1		4.1
Industry, Manufacturing, Mining ^{a/}	34.7	42.1	-	49.1
Construction, Utilities, and services ^{b/}	15.3	3.8	86.6	15.6
Total	100.0	100.0	100.0	100.0

Source: Computed from Tables 1 to 4.

a/ For Sudan this sector includes construction and mining only.

b/ For Sudan construction is excluded from this sector.

Demand generation in different sectors

Using the inverse matrices (Tables 9 to 12) which are computed from the input coefficient matrices (Tables 5 to 8) which are derived from the abridged input-output tables (1 to 4), it is possible to measure total direct and indirect demand for each industry generated by a unit of final demand for any particular industry's products. Values of demand generated in all sectors per unit of final demand for the product of any one sector for Algeria, Morocco, Sudan and Tunisia are indicated in Tables 9, 10, 11 and 12 respectively.

Table 14 : Outputs of agriculture to each sector as percentage of agricultural output to all sectors

S e c t o r	Algeria	Morocco	Sudan	Tunisia
Agriculture	12.8	23.0	12.8	6.5
Food processing	85.0	60.1	69.1	85.4
Agro-allied industries	1.0	13.9		2.6
Industry, manufacturing and mining ^{a/}	0.2	2.2	17.8	3.8
Construction, utilities and Services ^{b/}	1.0	0.8	0.3	1.7
Total	100.0	100.0	100.0	100.0

Source: Computed from Tables 1 to 4.

^{a/} For Sudan this sector includes construction and mining only.

^{b/} For Sudan construction is excluded from this sector.

To illustrate, in column 1 of Table 9, it can be seen that, in the Algerian economy in 1963, an initial increase of, say, 1000 dinars in final demand for the product of the agricultural sector resulted in an increase in the total demand for agricultural products of 1,085 dinars for the products of the food processing sector 7 dinars; for the products of the agro-allied industries sector 3 dinars etc. and for the products of all sectors, including agriculture itself, 1,224 dinars. This process can be done with respect to every sector in all countries under consideration in this study.

Thus, the results of the effects of a unit increase in final demand for the products of any one sector upon the increase of direct and indirect demand for that sector for Algeria, Morocco, Sudan and Tunisia are indicated in Table 15.

It is clear, from Table 15 that there are considerable differences among different industries but not substantial differences among

different countries, with respect to the effect upon total demand of each unit of final demand for the product of any one industry. This perhaps implies that these countries have, more or less, achieved a similar degree of industrialization since the inter-dependence of the sectors of their economies is still at the same level as indicated by the ratios of total demand to final demand in each sector which are approximately the same in all countries.

Table 15 : Ratio of total demand to initial increase in demand in each sector

S e c t o r	Algeria	Morocco	Sudan	Tunisia
Agriculture	1,224	1,224	1,104	1,332
Food processing	1,984	2,351	(1,508)	2,180
Agro-allied industries	2,570	2,280		2,201
Industry, manufacturing and mining ^{a/}	1,482	1,865	1,329	1,854
Construction, utilities, and services ^{b/}	1,505	1,470	1,073	1,594

Source: Compiled from Tables 9 to 12.

^{a/} For Sudan this sector includes construction and mining only.

^{b/} For Sudan construction is excluded from this sector.

The ratios of total demand to final demand as indicated in Table 15 are also lowest with respect to the agricultural sector. They amount to approximately 1.2, 1.2, 1.1 and 1.3 in Algeria, Morocco, Sudan, and Tunisia respectively. This is to be expected since in a relatively low stage of agricultural development, with lack of mechanization, of application of modern farm inputs, of developed infrastructure and of the like, the forward and backward linkages between various sectors of the economy are weak. Thus the effect of final demand is not readily transmitted on a large scale. According to row 1 of Table 15 only 10 to 30 per cent of total demand of the agricultural sector is transmitted to other sectors of the economy. This, perhaps, partially explains why most of the increase in demand for agricultural products has to be met from imports, especially of food,

and why agriculture with such a low multiplier effect is rather a stagnant part of the economies of these countries.

On the other hand, the total demand effect was, obviously, greatest in the case of a final demand for the products of both the food processing and the agro-allied industries sectors. The ratios amount to approximately 2.0, 2.3, and 2.2 for food processing and to 2.6, 2.3 and 2.2 for agro-allied industries in Algeria, Morocco and Tunisia respectively. For the Sudan the ratio for both sectors is 1.5. The total demands generated by each unit of final demand for the products of these sectors were thus at least twice as great as the original final demand in Algeria, Morocco and Tunisia while in Sudan there were about one and one-half. This is the reverse of the picture of the agricultural sector described above.

While a detailed analysis of each sector (based on data indicated in Tables 9 to 12) is required to determine the links between each sector and the rest of the economy, it may be concluded that both the food processing and the agro-allied sectors are very important demand generator sectors. As a substantial part of the products of these sectors are exported then these two sectors must have a strategic role in providing foreign currencies needed for economic development in these countries. However, attention must be drawn to the large import components of these sectors (see Tables 1 to 4) which sometimes exceed total local production such as in Algeria with respect to agro-allied industries and vary from 10 to 60 per cent in the other countries. This, of course, mitigates the impact of these two sectors on the economy.

It has already been mentioned that these two sectors provide relatively limited inputs to the agricultural sector. Thus, if they were to be more developed in such a way as to serve agriculture more, as well as to become less dependent on imports, then their impact on the economic development of the economies of these countries would be greatly enhanced.

The demand-generation effect in the remaining sectors, i.e., non-agricultural sectors, is also very substantial. Its effect is - generally speaking - highest in both Morocco and Tunisia followed by Algeria and Sudan in that order. For the industry, manufacturing and mining sector the ratios are about 1.5, 1.9, 1.3 and 1.8 and for the construction, utilities and services sector they are approximately 1.5, 1.5, 1.1 and 1.6 for Algeria, Morocco, Sudan and Tunisia respectively.

As mentioned earlier in this study these two sectors are important suppliers of inputs to agriculture but are less important as sources of demand for agricultural products. Again, imports in these two sectors weigh heavily in total available resources. Thus an

improvement in the supply and demand functions of these two sectors should lead to a more viable and dynamic development of the economies of these countries.

Demand generation in the agricultural sector

Table 16 indicates, in more detail on the agricultural sector, the ratios of total demand generated per unit of initial increase in demand for the product of the agricultural sector in Algeria, Morocco, Sudan and Tunisia. Similar tables can, of course, be constructed for the other sectors as well from Tables 9 to 12 by analysing the elements in the column corresponding to each sector. It should be noted, however, that part of the derived demand falls on imports.

The effect of increases in the demand for agricultural products upon the agricultural sector itself are seen to have been rather negligible as the derived demand in each of these countries amounts to less than one-tenth of total demand. In Sudan it is even one-hundredth. The ratios of total demand to initial increase in demand amount to about 1.08, 1.07, 1.01 and 1.07 in Algeria, Morocco, Sudan and Tunisia respectively. This again points out the extent to which these countries rely on imports to meet rising demand for food and other agricultural products.

The effects on food processing and agro-allied industries are even less significant. Although food processing is mainly dependent upon domestic materials, there is a leakage of demand to foreign suppliers due to the already mentioned substantial import component in this sector. The same holds true, but to a lesser extent, for the agro-allied industries.

The non-agricultural sectors benefit considerably from the increase in final demand for agricultural products especially with respect to the industry and mining sector in Algeria, Morocco and Tunisia.

The percentage of total demand retained in agriculture is highly significant as a guide to the ability of the sector to generate demand elsewhere in the economy. The retention rates - as indicated in Table 16 - amount to 88.6, 87.7, 91.4 and 80.5 per cent in Algeria, Morocco, Sudan and Tunisia respectively. This means that roughly 11, 12, 9 and 20 per cent of total demand resulting from a unit of final demand for agricultural produce go to the rest of the economy in Algeria, Morocco, Sudan and Tunisia respectively.

Thus, unlike developed countries where a substantial part of total demand finds its way to other sectors of the economy to provide a broader spectrum of activities within which the demand

multiplier operates, in the countries under consideration, increased demand for agricultural products has relatively limited effects on their economies as a whole due to many factors such as the size of the traditional sector, lack of infrastructures, low level of productivity, inadequate industrialization and similar other variables.

Table 16 : Ratio of total demand in each sector to initial increase in demand for the product of the agricultural sector

S e c t o r	Algeria	Morocco	Sudan	Tunisia
Agriculture	1.085	1.074	1.009	1.072
Food Processing	.007	.004	.006	.022
Agro-allied Industries	.003	.022		.021
Industry, Manufacturing and Mining ^{a/}	.087	.109	.002	.162
Construction Utilities and Services ^{b/}	.042	.015	.087	.055
Total	1.224	1.224	1.104	1.332
Retention rate in agricul- ture (per cent)	88.6	87.7	91.4	80.5

Source: Compiled from Tables 9 to 12.

^{a/} For Sudan this sector includes construction and mining only.

^{b/} For Sudan construction is excluded from this sector.

Effects of demand generation in other sectors on the agricultural sector

Relevant figures showing the effect which an initial increase in demand for the product of other sectors has upon the agricultural sector for North African countries are presented in Table 17. Similar tables showing this relationship in sectors other than agriculture may, naturally, be constructed from Tables 9 to 12 by analysing the elements in the row corresponding to each sector.

• It appears that the food processing sector in all countries generates the greatest total demand in the agricultural sector per unit of initial increase. Besides, this marked effect is much larger than the total effect of demand increases in any sector upon agriculture. Thus the total demand generated in the agricultural sector from a final demand for food processing is about 69, 49, 28 and 63 per cent of initial demand in Algeria, Morocco, Sudan and Tunisia respectively. The relative importance of other sectors can clearly be seen from Table 17.

• Table 17 may also serve as an illustration of the part played by the agricultural sector as a supplier of products to the other sectors. It can be seen that agriculture caters to the greatest extent for the food processing sector followed by agro-allied industries and the two non-agricultural sectors of which the industry and mining sector is more important than the construction and utilities sector in these North African countries.^{1/}

Table 17 - Ratio of total demand generated in the agricultural sector to an initial increase in demand for the product of each sector

S e c t o r	Algeria	Morocco	Sudan	Tunisia
Food processing	.691	.488	(.282)	.633
Agro-allied industries	.148	.182		.128
Industry, Manufacturing and Mining	.007	.029	.084	.096
Construction, Utilities and Services	.014	.014	.004	.052

Source: Compiled from Tables 9 to 12.

^{1/} Except in Algeria where the construction and utilities sector precedes the industry and mining sector.

Brief note on methodology for planning and forecasting

Since this study is not primarily concerned with methods of applying the input-output system to economic planning and forecasting, it suffices to quote here the following statement:

[Using the word "projection" to describe all expected future values, whether they be known as "plans" or as "forecasts", then the formulation of the input-output system as a model for projection falls into two parts:

- (a) the projection of final demand, and
- (b) the projection of the coefficient matrix.

When these two tasks have been performed the estimated future levels of output can be derived in the familiar way by pre-multiplying the projected final demand by the inverse of the revised matrix.^{1/}

The study has already provided - among other things - the basis for projecting final demand and input coefficients. Recent estimates of final demand and input coefficient matrices have already been presented and analysed. Using these matrices it is possible to project final demand by assuming a certain rate of growth and to project also coefficient matrices by making relevant economic and technical adjustments to available input coefficients.

It is hoped that tasks of economic planning and forecasting in the countries of the North African sub-region are considerably facilitated.

1/ United Nations, Problems of Input-Output Tables and Analysis, Sales No.: 66 XVII.8, New York, 1966.

APPENDIX (TO CHAPTER IV)

Components of consolidated sectors used
in abridged input-output table

A L G E R I A

(1) Agriculture

Agriculture - livestock - fishery - forestry.

(2) Agricultural processing

Food industries - beverages - tobacco.

(3) Agro-allied industries

Textiles, clothing, yarn and thread - leather and skins - footwear - wood, carpentry and furniture - paper and cardboard.

(4) Industry, manufacturing and mining

Gas - electricity - petroleum products - minerals and metals - mechanical products - chemicals.

(5) Construction, utilities and services

Building and public works - transport - services - rent.

M O R O C C O

(1) Agriculture

Agriculture - livestock - fishery - forestry.

(2) Agricultural processing

Sugar - coffee - preserved and frozen foods - oils and fats - milk - processing of grain and flour - beverages - tobacco.

(3) Agro-allied industries

Textiles, spinning and weaving - textiles, clothing - textiles, handicrafts - leather - footwear - rubber products - paper and printing industries - wood products.

(4) Industry, manufacturing and mining

Energy - phosphates - mining - iron smelting, metallurgy - semi-finished metal products - motor vehicles, aeroplanes, cycles - household metal goods - chemical products - para-chemical products, pharmaceuticals - ceramics - glassware.

Appendix Contd.

(5) Construction, utilities and services

Construction materials - building - public works - transport - services - rent.

S U D A N

(1) Agriculture

Agriculture - livestock - forestry - fishery.

(2) Food processing and agro-allied industries

Manufacturing - craft industries.

(3) Construction and mining

Building and civil engineering - minerals.

(4) Transport, utilities and services

Transport and distribution - public utilities - banks and insurances - domestic services and others - rent.

T U N I S I A

(1) Agriculture

Agriculture - livestock - fishery.

(2) Agricultural processing

Food processing - beverages - tobacco.

(3) Agro-allied industries

Textiles - clothing - leather - carpentry and furniture - paper and printing - crafts.

(4) Industry, manufacturing and mining

Petroleum products - electricity - other energy products - construction materials - ceramics - glass - minerals and metals - electrical and mechanical products - chemicals.

(5) Construction, utilities and services

Buildings and public works - transport and communication - rent - services.

CHAPTER V
COMMODITY REVIEW AND PROJECTIONS

Production, export, import, domestic demand, projection, ('000 M.T.) Wheat

Country		(including wheat flour equivalent) ^{a/}					
		1960	1963	1965	1970	1975	1980
Morocco	P	974	1,196	1,314	1,461	1,685	1,944
	E	101	14	-	-	-	-
	I	204	189	305	283	458	752
	D.D.	1,077	1,371	1,619	1,744	2,143	2,696
Algeria	P	1,509	1,590	1,323	1,890	2,138	2,419
	E	-	-	8	-	-	-
	I	612	287	318	514	704	956
	D.D.	2,121	1,877	1,633	2,404	2,842	3,375
Tunisia	P	439	652	520	765	874	998
	E	148	128	9	-	-	-
	I	154	158	179	91	153	239
	D.D.	445	682	690	856	1,027	1,237
Libya	P	34	51	57	61	69	78
	E	-	-	-	-	-	-
	I	99	121	123	219	267	327
	D.D.	133	172	180	280	336	405
Total Maghreb	P	2,956	3,489	3,214	4,177	4,766	5,439
	E	249	142	17	-	-	-
	I	1,069	755	925	1,107	1,582	2,274
	D.D.	3,766	4,102	4,122	5,284	6,348	7,713
United Arab Republic	P	1,499	1,493	1,600	1,849	2,154	2,509
	E	-	1	1	-	-	-
	I	1,016	1,976	1,979	2,624	3,315	4,273
	D.D.	2,515	3,468	3,578	4,473	5,469	6,782
Sudan	P	25	31	56	47	63	84
	E	-	-	-	-	-	-
	I	95	106	124	123	142	175
	D.D.	120	137	180	170	205	259
Total Sub-region	P	4,480	5,013	4,870	6,073	6,983	8,032
	E	249	148	18	-	-	-
	I	2,180	2,837	3,028	3,854	5,039	6,722
	D.D.	6,411	7,707	7,880	9,927	12,022	14,754

P = Production E = Export I = Import D.D. = Domestic demand

Sources: FAO Production Yearbook, 1963, 1966; FAO Trade Yearbook, 1966

^{a/} Wheat flour converted to wheat on basis of 80 per cent extraction.

Production, export, import, domestic demand, projection, ('000 M.T.) Rice Paddy

Country		1960	1963	1965	1970	1975	1980
Morocco	P	16	17	19	22.4	27.3	33.2
	E	6	1	4	2.4	2.3	2.2
	I	3	-	-	-	-	-
	D.D	13	16	15	20	25	31
Algeria	P	8	7	4	7.5	7.9	8.3
	E	-	-	-	-	-	-
	I	2	-	-	1.5	3.1	4.7
	D.D	10	7	4	9	11	33
Tunisia	P	-	-	-	-	-	-
	E	-	-	-	-	-	-
	I	5	3	-	4	5	6
	D.D	5	3	-	4	5	6
Libya	P	-	-	-	-	-	-
	E	-	-	-	-	-	-
	I	9	8	12	14	17	21
	D.D	9	8	12	14	17	21
Total Maghreb	P	24	24	23	29.9	35.2	41.5
	E	6	1	4	2.4	2.3	2.2
	I	19	11	12	19.5	25.1	31.7
	D.D	37	34	31	47	58	71
United Arab Republic	P	1,426	2,219	1,862	3,019	3,762	4,688
	E	308	308	330	647	862	1,092
	I	10	-	-	-	-	-
	D.D	1,128	1,839	1,532	2,372	2,900	3,596
Sudan	P	-	-	-	-6	8	11
	E	-	-	-	-	-	-
	I	2	5	4	-	-	-
	D.D	2	5	4	6	8	11
Total sub-region	P	1,450	2,243	1,885	3,050.9	3,805.2	4,740.5
	E	314	381	334	649.4	854.3	1,094.2
	I	31	16	16	19.5	25.1	31.7
	D.D	1,167	1,878	1,567	2,425	2,966	3,678

P = Production E = Export I = Import D.D. = Domestic demand

Sources: FAO Production Yearbook, 1963, 1966,

FAO Trade Yearbook, 1966.

Production, export, import, domestic demand, projection. ('000 M.T.) Maize

Country		1960	1963	1965	1970	1975	1980
Morocco	P	334	460	279	528	583	644
	E	105	108	62	-	-	-
	I	-	-	11	-	-	-
	D.D	238	352	228	528	583	644
Algeria	P	9	4	6	4.6	5.1	5.6
	E	1	-	-	-	-	-
	I	-	-	1	-	-	-
	D.D	8	4	7	4.6	5.1	5.6
Tunisia	P	-	-	-	16.6	18.3	20.2
	E	-	-	-	-	-	-
	I	-	-	15	-	-	-
	D.D	-	-	15	16.6	18.3	20.2
Libya	P	-	2	3	2.3	2.5	2.8
	E	-	-	-	-	-	-
	I	-	-	-	-	-	-
	D.D	-	2	3	2.3	2.5	2.8
Total Maghreb	P	343	466	288	551.5	608.9	672.6
	E	106	108	62	-	-	-
	I	-	-	27	-	-	-
	D.D	237	358	253	551.5	608.9	672.6
United Arab Republic	P	1,691	1,868	2,100	2,376	2,822	3,351
	E	1	2	-	-	-	-
	I	51	180	137	227	300	429
	D.D	1,741	2,046	2,237	2,603	3,122	3,780
Sudan	P	31	24	12	25.7	27.0	28.4
	E	3	-	-	-	-	-
	I	-	-	-	3.3	6.0	10.6
	D.D	28	24	12	29	33	39
Total sub-region	P	2,065	2,358	2,400	2,953	3,458	4,052
	E	110	110	62	-	-	-
	I	51	180	164	203.3	306	439.6
	D.D	2,006	2,428	2,502	3,183	3,764	4,492

P = Production E = Export I = Import D.D. = Domestic demand

Sources: FAO Production Yearbook, 1963, 1966;

FAO Trade Yearbook, 1966.

Production, export, import, domestic demand, projection, ('000 M.T.) Barley

Country		1960	1963	1965	1970	1975	1980
Morocco	P	1,362	1,463	1,280	1,568	1,648	1,732
	E	29	148	7	-	-	-
	I	-	1	-	-	-	-
	D.D	1,333	1,316	1,273	1,568	1,648	1,732
Algeria	P	847	691	378	741	779	819
	E	59	26	-	-	-	-
	I	2	-	-	-	-	-
	D.D	904	665	378	741	779	819
Tunisia	P	136	204	180	219	230	242
	E	69	11	-	-	-	-
	I	4	11	38	-	-	-
	D.D	71	204	218	219	230	242
Libya	P	117	100	96	107	112	118
	E	-	-	-	-	-	-
	I	-	1	8	-	-	-
	D.D	117	101	104	107	112	118
Total Maghreb	P	2,462	2,458	1,934	2,635	2,769	2,911
	E	157	185	7	-	-	-
	I	6	13	46	-	-	-
	D.D	2,311	2,286	1,973	2,635	2,769	2,911
United Arab Republic	P	155	134	130	144	151	159
	E	1	2	1	-	-	-
	I	14	-	4	-	-	-
	D.D	168	132	133	144	151	159
Sudan	P	-	1	-	1	1	1
	E	-	-	-	-	-	-
	I	-	-	-	-	-	-
	D.D	-	1	-	1	1	1
Total sub-region	P	2,617	2,593	2,064	2,780	2,921	3,071
	E	158	187	8	-	-	-
	I	20	13	50	-	-	-
	D.D	2,479	2,419	2,106	2,780	2,921	3,071

P = Production E = Export I = Import D.D. = Domestic demand

Sources: FAO Production Yearbook, 1963, 1966.

FAO Trade Yearbook, 1966.

Production, export, import, domestic demand, projection ('000 M.T.) Millet and sorghum

Country		1960	1963	1965	1970	1975	1980
Morocco	P	20 U	6 M	6 M	7.5 M	9.0 M	11.0 M
	E	-	-	-	-	-	-
	I	-	-	-	-	-	-
	D.D	20 U	6 M	6 M	7.5 M	9.0 M	11.0 M
Algeria	P	2 S	2 S	2 S	2.6 S	3.1 S	3.7 S
	E	-	-	-	-	-	-
	I	-	-	-	-	-	-
	D.D	2 S	2 S	2 S	2.6 S	3.1 S	3.7 S
Tunisia	P	3 S	5 S	5 S	6.1 S	7.1 S	8.3 S
	E	-	-	-	-	-	-
	I	-	-	-	-	-	-
	D.D	3 S	5 S	5 S	6.1 S	7.1 S	8.3 S
Libya	P	-	1 U	2 U	1.4 U	1.6 U	1.8 U
	E	-	-	-	-	-	-
	I	-	-	-	-	-	-
	D.D	-	1 U	2 U	1.4 U	1.6 U	1.8 U
Total Maghreb	P	20 U	6 M	6 M	7.5 M	9.0 M	11.0 M
		5 S	7 S	7 S	8.7 S	10.2 S	12.0 S
			1 U	2 U	1.4 U	1.6 U	1.8 U
	E	-	-	-	-	-	-
	I	-	-	-	-	-	-
	D.D	20 U	6 M	6 M	7.5 M	9.0 M	11.0 M
		5 S	7 S	7 S	8.7 S	10.2 S	12.0 S
			1 U	2 U	1.4 U	1.6 U	1.8 U
United Arab Republic	P	603 S	729 S	740 S	867 S	990 S	1142 S
	E	-	-	-	-	-	-
	I	-	-	-	-	-	-
	D.D	603 S	729 S	740 S	867 S	990 S	1142 S
Sudan		226 M	387 M	253 M	466 M	538 M	630 M
	P	1051 S	1348 S	1094 S	1624 S	1873 S	2192 S
	E	-	-	-	-	-	-
	I	-	-	-	-	-	-
	D.D	226 M	387 M	253 M	466 M	538 M	630 M
		1051 S	1348 S	1094 S	1624 S	1873 S	2192 S
Total sub-region		226 M	393 M	259 M	473.5 M	547 M	641 M
	P	1659 S	1355 S	1841 S	2499.7 S	2873.2 S	3346 S
		20 U	1 U	2 U	1.4 U	1.6 U	1.8 U
	E	-	-	-	-	-	-
	I	-	-	-	-	-	-
	D.D	226 M	393 M	259 M	473.5 M	547 M	641 M
		1659 S	1355 S	1841 S	2499.7 S	2873.2 S	3346 S
		20 U	1 U	2 U	1.4 U	1.6 U	1.8 U

P = Production E = Export I = Import D.D. = Domestic demand

M = Millet U = Unclassified S = Sorghum.

Sources: FAO Production Yearbook, 1963, 1965; FAO Trade Yearbook, 1966.

Production, export, import, domestic demand, projection, ('000 M.T.) Potatoes

Country		1960	1963	1965	1970	1975	1980
Morocco	P	135	225	271	278	329	391
	E	54	81	103	47	51	51
	I	32	40	37	-	-	-
	D.D	113	184	205	231	278	340
Algeria	P	268	223	232	281	325	376
	E	73	47	22	-	-	-
	I	224	89	69	56	69	87
	D.D	419	265	279	337	394	463
Tunisia	P	41	52	48	57.0	61.0	65.0
	E	3.6	4.2	1.6	-	-	-
	I	14.3	5.2	7.0	7.6	14.3	22.7
	D.D	51.7	53.2	53.4	64.6	75.3	87.7
Libya	P	25	11	14	12.3	13.2	13.9
	E	0.5	0.02	-	-	-	-
	I	2.7	2.20	1.7	6.1	8.3	10.9
	D.D	27.2	13.2	15.7	18.4	21.5	24.8
Total Maghreb	P	469	511	565	628.3	728.2	845.9
	E	131.1	132.2	126.6	47	51	51
	I	273	136.4	114.7	69.1	91.6	120.6
	D.D	610.9	515.2	553.1	651	769	915
United Arab Republic	P	290	420	441	515	600	699
	E	150	83	44	72	69	56
	I	18	11	13	-	-	-
	D.D	158	348	410	443	531	643
Sudan	P	-	25	25	27.8	30.0	32.5
	E	0.01	0.01	-	-	-	-
	I	1.20	2.10	0.8	5.3	9.1	15.5
	D.D	1.2	27.1	25.8	33.1	39.1	48.0
Total sub-region	P	759	956	1031	1171	1358	1577
	E	281.10	215.2	170.6	119	120	107
	I	292.2	149.5	128.5	74	101	136
	D.D	770.1	890.3	988.9	1127	1339	1607

P = Production E = Export I = Import D.D. = Domestic demand.

Sources: FAO Production Yearbook, 1963, 1966;FAO Trade Yearbook 1966.

Production, export, import, domestic demand, projection, ('000 M.T.)
Sweet potatoes a/

Country		1960	1963	1965	1970	1975	1980
Morocco	P	-	-	-	-	-	-
	E	-	-	-	-	-	-
	I	-	-	-	-	-	-
	D.D	-	-	-	-	-	-
Algeria	P	-	7	-	8.0	8.8	9.7
	E	-	-	-	-	-	-
	I	-	-	-	-	-	-
	D.D	-	-	-	8.0	8.8	9.7
Tunisia	P	-	-	-	-	-	-
	E	-	-	-	-	-	-
	I	-	-	-	-	-	-
	D.D	-	-	-	-	-	-
Libya	P	-	-	-	-	-	-
	E	-	-	-	-	-	-
	I	-	-	-	-	-	-
	D.D	-	-	-	-	-	-
Total Maghreb	P	-	7	-	8.0	8.8	9.7
	E	-	-	-	-	-	-
	I	-	-	-	-	-	-
	D.D	-	-	-	8.0	8.8	9.7
United Arab Republic	P	90	82	86	94.2	104.0	114.8
	E	-	-	-	-	-	-
	I	-	-	-	-	-	-
	D.D	-	-	-	94.2	104.0	114.8
Sudan	P	-	11	11	12.6	13.9	15.3
	E	-	-	-	-	-	-
	I	-	-	-	-	-	-
	D.D	-	-	-	12.6	13.9	15.3
Total sub-region	P	90	100	97	114.8	126.7	139.8
	E	-	-	-	-	-	-
	I	-	-	-	-	-	-
	D.D	-	-	-	114.8	126.7	139.8

P = Production E = Export I = Import D.D. = Domestic demand.

Sources: FAO Production Yearbook, 1963, 1966.

a/ No foreign trade statistics for sweet potatoes available in FAO Trade Yearbook 1966.

Production, export, import, domestic demand, projection, ('000 M.T.)
Tomatoes a/

Country		1960	1963	1965	1970	1975	1980
Morocco	P	270	175	291	217	256	304
	E	-	-	-	-	-	-
	I	-	-	-	7	22	51
	D.D	270	175	291	224	278	355
Algeria	P	154	140	110	176	204	236
	E	-	-	-	-	-	-
	I	-	-	-	7	16	32
	D.D	154	140	110	183	220	268
Tunisia	P	65	91	117	106	119	133
	E	-	-	-	-	-	-
	I	-	-	-	15	33	61
	D.D	65	91	117	121	152	194
Libya	P	57	159	75	190	214	238
	E	-	-	-	-	-	-
	I	-	-	-	32	46	62
	D.D	57	159	75	222	260	300
Total Maghreb	P	546	565	593	689	793	911
	E	-	-	-	-	-	-
	I	-	-	-	61	117	206
	D.D	546	565	593	750	910	1,117
United Arab Republic	P	842	1,056	1,242	1,390	1,691	2,057
	E	-	-	-	28	26	-
	I	-	-	-	-	-	8
	D.D	842	1,056	1,242	1,362	1,665	2,065
Sudan	P	-	-	-	-	-	-
	E	-	-	-	-	-	-
	I	-	-	-	-	-	-
	D.D	-	-	-	-	-	-
Total sub-region ^{b/}	P	1,388	1,621	1,835	2,079	2,484	2,968
	E	-	-	-	28	26	-
	I	-	-	-	61	117	214
	D.D	1,388	1,621	1,835	2,112	2,575	3,182

P = Production E = Export I = Import D.D. = Domestic demand

Sources: FAO Production Yearbook, 1963, 1966. FAO Trade Yearbook 1966.

a/ No foreign trade statistics in Trade Yearbook 1966.

b/ Excluding Sudan.

Production, export, import, domestic demand, projection ('000 M.T.) Onion

Country		1960	1963	1965	1970	1975	1980
Morocco	P	33	35	35	43	51	61
	E	6.2	1.4	4.2	-	-	-
	I	0.04	0.07	-	1	4	9
	D.D	27	34	31	44	55	70
Algeria	P	84	63	68	79	91	105
	E	0.4	-	1.3	-	-	-
	I	6.4	-	-	3	8	15
	D.D	90	63	67	82	99	120
Tunisia	P	-	12	4	14	16	18
	E	0.1	0.6	0.06	-	-	-
	I	1.9	0.07	0.2	1.5	3.5	6.9
	D.D	1.8	11.6	4.2	15.5	19.5	24.9
Libya	P	4	4	8	4.8	5.4	6.0
	E	-	-	-	-	-	-
	I	2.5	3.2	5.4	5.3	6.4	7.6
	D.D	6.5	7.2	13.4	10.1	11.8	13.6
Total Maghreb	P	121	114	115	140.8	163.4	190.0
	E	6.7	2	5.6	-	-	-
	I	10.8	3.3	5.6	10.8	21.9	38.5
	D.D	125	115	115	151.6	185.3	228.5
United Arab Republic	P	545	695	691	978	1,248	1,593
	E	170	155	170	282	398	539
	I	-	-	0.05	-	-	-
	D.D	375	540	521	696	850	1,054
Sudan	P	-	9	11	11	12	14
	E	0.07	0.08	-	-	-	-
	I	-	-	-	-	1	22
	D.D	-	9	11	11	13	16
Total sub-region	P	666	818	817	1,130	1,423	1,797
	E	177	157	175.6	282	398	539
	I	11	3	5.6	11	23	40
	D.D	500	664	647	859	1,048	1,298

P = Production E = Export I = Import D.D. = Domestic demand

Sources: FAO Production Yearbook, 1963, 1966;
FAO Trade Yearbook 1966.

Production, export., import., domestic demand, projection., ('000 M.T.)

<u>Pulses a/</u>		1960	1963	1965	1970	1975	1980
Country							
Morocco	P	157	166	265	204	236	274
	E	150	138	170	167	191	218
	I	-	1	-	-	-	-
	D.D	7	29	95	37	45	56
Algeria	P	42	37	39	47	54	63
	E	9	6	-	6	4	1
	I	19	-	-	-	-	-
	D.D	52	31	39	41	50	62
Tunisia	P	10	31	35	36	40	45
	E	5	9	2	6	4	2
	I	2	1	1	-	-	-
	D.D	7	23	34	30	36	43
Libya	P	3	3	2	3.6	4.0	4.4
	E	-	-	-	-	-	-
	I	-	2	3	4.4	6.0	7.6
	D.D	3	5	5	8	10	12
Total Maghreb	P	212	237	341	290.6	334.0	386.4
	E	164	153	172	179	199	221
	I	21	4	4	4.4	6	7.6
	D.D	69	88	173	116	141	173
United Arab Republic	P	352	109	136	134	156	182
	E	-	45	76	40	38	30
	I	25	6	6	-	-	-
	D.D	377	70	66	94	118	152
Sudan	P	10	172	190	204	231	262
	E	9	10	10	3	-	-
	I	1	4	3	-	3	16
	D.D	2	166	183	201	234	278
Total sub-region	P	574	518	667	629	721	830
	E	173	208	258	222	237	251
	I	47	14	13	4	9	24
	D.D	448	324	422	411	493	603

P = Production E = Export I = Import D.D. = Domestic demand

a/ Dry beans, peas, broad beans, chickpeas, lentils, pigeon peas, cow-peas, vetches, lupins and other pulses.

Production, export, import, domestic demand, projection... ('000 M.T.)
 Other vegetables a/ b/

Country		1960	1963	1965	1970	1975	1980
Morocco	P	18	21	31	26	31	37
	E	-	-	-	-	-	-
	I	-	-	-	-	-	-
	D.D.	-	-	-	26	31	37
Algeria	P	14	13	7	16	19	22
	E	-	-	-	-	-	-
	I	-	-	-	-	-	-
	D.D.	-	-	-	16	19	22
Tunisia	P	8	19	16	22	25	28
	E	-	-	-	-	-	-
	I	-	-	-	-	-	-
	D.D.	-	-	-	22	25	28
Libya	P	-	-	-	-	-	-
	E	-	-	-	-	-	-
	I	-	-	-	-	-	-
	D.D.	-	-	-	-	-	-
Total Maghreb	P	40	53	54	64	75	87
	E	-	-	-	-	-	-
	I	-	-	-	-	-	-
	D.D.	-	-	-	64	75	87
United Arab Republic	P	423	365	415	419	463	511
	E	-	-	-	-	-	-
	I	-	-	-	-	-	-
	D.D.	-	-	-	419	463	511
Sudan	P	-	-	-	-	-	-
	E	-	-	-	-	-	-
	I	-	-	-	-	-	-
	D.D.	-	-	-	-	-	-
Total sub-region	P	463	418	469	483	538	598
	E	-	-	-	-	-	-
	I	-	-	-	-	-	-
	D.D.	-	-	-	483	538	598

P = Production E = Export I = Import D.D. = Domestic demand

a/ Cabbages, cauliflowers, green beans, green peas.

b/ No foreign trade statistics available in Trade Yearbook, 1966.
 Other vegetables not recorded for Libya and Sudan.

Production, export, import, domestic demand, projection, ('000 M.T.)
Groundnuts in shell a/

Country		1960	1963	1965	1970	1975	1980
Morocco	P	-	-	-	-	-	-
	E	-	-	-	-	-	-
	I	12.6	12.2	6.6	15.4	18.7	23.2
	D.D	12.6	12.2	6.6	15.4	18.7	23.2
Algeria	P	-	-	-	-	-	-
	E	-	-	-	-	-	-
	I	24.5	26.0 ^{b/}	-	32.7	37.9	43.9
	D.D	24.5	26.0	-	32.7	37.9	43.9
Tunisia	P	-	-	-	-	-	-
	E	-	-	-	-	-	-
	I	-	-	-	-	-	-
	D.D	-	-	-	-	-	-
Libya	P	10	7	12	13.6	15.3	17.0
	E	-	4.7	2.8	1.3	-	-
	I	-	0.01	-	-	1.2	5.1
	D.D	10	2.3	9.2	12.3	16.5	22.1
Total ^{c/} Maghreb	P	10	7	12	13.6	15.3	17.0
	E	-	4.7	2.8	1.3	-	-
	I	37.1	12.2	6.6	48.1	57.8	72.2
	D.D	47.1	14.5	15.8	60.4	73.1	89.2
United Arab Republic	P	35	45	50	55.2	64.3	74.9
	E	11	4	-	0.1	-	-
	I	-	0.25	-	-	5.3	14.8
	D.D	24	41.2	50	55.3	69.6	89.7
Sudan	P	192	289	305	380.0	462.0	562.0
	E	90.7	159	213.5	222.0	278.0	343.0
	I	-	-	-	-	-	-
	D.D	101.3	130	91.5	158.0	184.0	219.0
Total Maghreb	P	237	341	367	448.8	541.6	653.9
	E	101.7	167.7	216.3	223.4	278.0	343.0
	I	37.1	12.5	6.6	48.1	63.1	87.0
	D.D	199.9	185.8	157.3	274.0	327.0	398.0

P = Production E = Export, I = Import D.D. = Domestic demand

Sources: FAO Production Yearbook, 1963, 1966,

FAO Trade Yearbook, 1966.

a/ Exports and imports corrected to "in shell" basis.

b/ Based on continuation of population trend (1950-63).

c/ Excluding Algeria and Tunisia.

Production, projection, ('000 M.T.) - Grapes (total crop)

Country		1960	+	1963	+	1965	+	1970	1975	1980
Morocco	P	364	76	417	75	488	80	432	443	454
Algeria	P	2,035	99	1,614	99	2,091	99	2,144	2,198	2,253
Tunisia	P	230	88	278	91	242	90	288	295	302
Libya	P	9	44	8	75	8	75	8.9	9.6	10.3
Total Maghreb	P	2,638	91	2,317	89	2,829	92	2,873	2,946	3,019
United Arab Republic	P	102	-	105	-	90	-	117	126	136
Sudan	P	-	-	-	-	-	-	-	-	-
Total sub-region	P	2,740 ^{a/}	-	2,422 ^{a/}	-	2,919 ^{a/}	-	2,990 ^{a/}	3,072 ^{a/}	3,155 ^{a/}

Source: FAO Production Yearbook, 1963, 1966;
FAO Trade Yearbook 1966.

+ = Percentage of total crop used for wine production.

a/ Excluding Sudan.

Production, export, import, domestic demand projection ('000 M.T.) Wines^{a/}

Country		1960	1963	1965	1970	1975	1980
Morocco	P	231	258	345	301.3	354.4	431.2
	E	133	148	144	156.0	169.0	183.1
	I	0.8	0.4	0.3	-	-	-
	D.D	98.8	110.4	201.3	145.3	185.4	248.1
Algeria	P	1585	1258	1627	1670.0	1714.0	1759.0
	E	1313	640	734	829.0	641.0	357.0
	I	37	-	-	-	-	-
	D.D	309	618	893	841.0	1073.0	1402.0
Tunisia	P	159	198	185	143.0	194.0	269.0
	E	121	150	65	71.5	97.0	134.5
	I	0.3	0.2	0.1	-	-	-
	D.D	38.3	48.2	120.1	71.5	97.0	134.5
Libya	P	3	4	4	10.6	14.9	20.9
	E	0.5	0.1	-	-	-	-
	I	0.1	0.1	0.1	-	-	-
	D.D	2.6	4	4.1	10.6	14.9	20.9
Total Maghreb	P	1978	1718	2161	2124.9	2277.3	2480.1
	E	1567.5	938.1	943	1056.5	907.0	674.6
	I	38.2	0.7	0.5	-	-	-
	D.D	448.7	780.6	1218.5	1068.4	1370.3	1805.5
United Arab Republic	P	-	-	-	-0.5	0.7	1.0
	E	0.1	1.6	1.0	-	-	-
	I	0.1	0.02	0.04	-	-	-
	D.D	-	1.58	0.96	0.5	0.7	1.0
Sudan	P	-	-	-	-	-	-
	E	-	-	-	-	-	-
	I	0.3	0.2	0.4	0.3	0.4	0.5
	D.D	0.3	0.2	0.4	0.3	0.4	0.5
Total sub-region	P	1978	1718	2161	2125	2278	2481
	E	1567.5	937.7	944	1056.5	907	675
	I	38.5	0.9	0.44	0.3	0.4	1
	D.D	449.0	781.2	1217.44	1069	1371	1807

P = Production E = Export I = Import D.D. = Domestic demand

Sources: FAO Production Yearbook, 1963, 1966

FAO Trade Yearbook 1966.

^{a/} Imports and exports corrected to M.T.

Production, export, import, domestic demand, projection (1000 M.T.)
Citrus, all varieties

Country		1960	1963	1965	1970	1975	1980
Morocco	P	463	489	531	851	1365	2188
	E	331	359	417	683	1154	1915
	I	-	-	-	-	-	-
	D.D	132	130	114	168	211	273
Algeria	P	368	408	415	419	425	429
	E	240	261	157	222	182	125
	I	2.2	0.1	-	-	-	-
	D.D	130.2	147.1	258	197	243	304
Tunisia	P	96	89	83	148	264	472
	E	37	31	46	72	170	354
	I	-	-	-	-	-	-
	D.D	59	58	37	76	94	118
Libya	P	21	19	13	26	54	110
	E	4	3	3	-	16	63
	I	-	-	-	4	-	-
	D.D	17	16	10	30	38	47
Total Maghreb	P	948	1005	1042	1444	2108	3199
	E	612	604	623	977	1522	2457
	I	2.2	0.1	-	4	-	-
	D.D	338.2	401.1	419	471	586	742
United Arab Republic	P	239	436	482	633	828	1087
	E	22	5	6	-	-	-
	I	-	-	-	2	34	139
	D.D.	217	431	476	635	862	1226
Sudan	P	-	1	1	2.2	2.7	3.4
	E	-	-	-	-	-	-
	I	0.5	0.8	1	-	-	-
	D.D	0.5	1.8	2.0	2.2	2.7	3.4
Total sub-region	P	1187	1442	1525	2079	2939	4289
	E	634	609	629	977	1522	2457
	I	2.7	0.9	1	6	34	139
	D.D	555.7	833.9	897	1108	1451	1971

Sources: FAO Production Yearbook, 1963, 1966;
 FAO Trade Yearbook 1966.

Production, export, import, domestic demand, projection ('000 M.T.) Dates

Country		1960	1963	1965	1970	1975	1980
Morocco	P	49	80	85	99.1	117.1	139.1
	E	-	0.02	0.02	-	-	-
	I	1	2.4	1.1	6.4	13.7	27.8
	D.D	50	82.4	86.1	105.5	130.8	166.9
Algeria	P	94	113	110	141.8	164.4	190.6
	E	22	25	16	24.8	22.4	15.6
	I	-	-	-	-	-	-
	D.D	72	88	94	117	142	175
Tunisia	P	34	30	54	34.9	39.3	44.0
	E	3.5	1.7	1.5	-	-	-
	I	0.5	0.3	-	2.5	5.6	10.1
	D.D	31	28.6	52.5	37.4	44.9	54.1
Libya	P	26	22	40	26.3	29.6	32.8
	E	0.4	-	-	-	-	-
	I	-	-	-	9.7	14.4	20.2
	D.D	25.6	22	40	36	44	53
Total Maghreb	P	203	245	289	302.1	350.4	406.5
	E	25.9	26.7	17.5	24.8	22.4	15.6
	I	1.5	2.7	1.1	18.6	33.7	58.1
	D.D	178.6	221.0	272.6	295.9	361.7	449.0
United Arab Republic	P	424	440	386	537.4	626.1	729.4
	E	0.3	-	-	-	-	-
	I	5.3	4.8	10.6	71.9	151.5	291.7
	D.D	429	444.8	396.6	609.3	777.6	1021.1
Sudan	P	38	40	45	47.5	53.7	61.1
	E	2.8	1.3	0.02	-	-	-
	I	3.8	5.0	2.9	6.6	11.5	21.3
	D.D	39	43.7	47.9	54.1	65.2	82.4
Total sub-region	P	665	725	720	887.0	1030.2	1197.0
	E	29	28	17.5	24.8	22.4	15.6
	I	10.6	12.5	14.6	97.1	196.7	371.1
	D.D	646.6	709.5	717.1	959.3	1204.5	1552.5

P = Production E = Export I = Import D.D. = Domestic demand

Sources: FAO Production Yearbook, 1963, 1966;

FAO Trade Yearbook 1966.

Production, export, import, domestic demand, projection ('000 M.T.) Apples

Country		1960	1963	1965	1970	1975	1980
Morocco	P	3.8	8.3	7.1	13.8	17.6	22.8
	E	.06	.02	.02	-	-	-
	I	2.40	3.50	1.50	0.9	0.6	0.4
	D.D.	15.3	11.5	8.5	14.7	18.2	23.2
Algeria	P	15	17	16	34.1	42.9	53.2
	E	.02	-	-	-	-	-
	I	22.90	9.80	5.6	1.4	0.3	0.1
	D.D.	37.9	36.8	21.6	35.5	43.2	53.3
Tunisia	P	8	7	10	11.9	14.4	17.4
	E	-	.01	-	-	-	-
	I	1.1	2.20	.30	0.1	-	-
	D.D.	9.1	9.2	10.3	12.0	14.4	17.4
Libya	P	-	-	-	-	-	-
	E	-	-	-	-	-	-
	I	1.9	3.3	5.4	7.6	9.2	11.0
	D.D.	1.9	3.3	5.4	7.6	9.2	11.0
Total Maghreb	P	26	32	33	59.8	74.9	93.4
	E	.08	.03	.02	-	-	-
	I	28.30	18.80	12.80	10.0	10.1	11.5
	D.D.	54.2	50.8	45.8	69.8	85.0	104.9
United Arab Republic	P	4	5	6	9.5	12.4	16.3
	E	-	-	-	-	-	-
	I	4.7	2.1	-	0.2	-	-
	D.D.	8.7	7.1	6	9.7	12.4	16.3
Sudan	P	-	-	-	-	-	-
	E	-	-	-	-	-	-
	I	.60	1.90	2.30	2.7	3.3	4.2
	D.D.	0.6	1.9	2.3	2.7	3.3	4.2
Total sub-region	P	30	37	39	69.3	87.3	109.7
	E	.08	.03	.02	-	-	-
	I	33.60	22.80	15.1	12.9	13.4	15.0
	D.D.	63.5	59.8	54.1	82.2	100.7	124.7

P = Production E = Export I = Import D.D. = Domestic demand.

Sources: FAO Production Yearbook, 1963, 1966.

FAO Trade Yearbook, 1966.

Production, export, import, domestic demand, projection (*000 M.T.) Pears

Country		1960	1963	1965	1970	1975	1980
Morocco	P	2	2	2	2.7	3.3	4.2
	E	.07	-	.04	-	-	-
	I	.20	.06	.02	-	-	-
	D.D	2.1	2.1	2.0	2.7	3.3	4.2
Algeria	P	11	10	10	18.4	22.4	26.7
	E	-	-	-	-	-	-
	I	7	3.9	1.8	-	-	-
	D.D	18	13.9	11.8	18.4	22.4	26.7
Tunisia	P	3	5	5	6.8	8.2	9.9
	E	-	-	-	-	-	-
	I	.40	.20	.03	-	-	-
	D.D	3.4	5.2	5.0	6.8	8.2	9.9
Libya	P	-	-	-	0.5	0.6	0.7
	E	-	-	-	-	-	-
	I	.20	.30	.30	-	-	-
	D.D	.20	.30	.30	0.5	0.6	0.7
Total Maghreb	P	16	17	17	28.4	34.5	42.4
	E	.07	-	.04	-	-	-
	I	7.80	4.46	2.15	-	-	-
	D.D	23.70	21.4	19.1	28.4	34.5	42.4
United Arab Republic	P	11	9	16	12	15	20
	E	.02	.03	.04	-	-	-
	I	.03	-	-	-	-	-
	D.D	11	9	16	12	15	20
Sudan	P	-	-	-	-	-	-
	E	-	-	-	-	-	-
	I	-	-	-	-	-	-
	D.D	-	-	-	-	-	-
Total ^{a/} sub-region	P	27	26	33	40.4	49.5	62.4
	E	.1	.03	.08	-	-	-
	I	3.8	4.46	2.1	-	-	-
	D.D	34.7	30.4	35.0	40.4	49.5	62.4

P = Production E = Exports I = Imports D.D. = Domestic demand.

Source: FAO Production Yearbook, 1963, 1966

FAO Trade Yearbook 1966.

^{a/} Excluding Sudan for pears.

Production, export, import, domestic demand, projection ('000 M.T.) Peaches^{a/}

Country		1960	1963	1965	1970	1975	1980
Morocco ^{b/}	P	1	2	13	15.1	17.8	21.1
	E	-	-	-	-	-	-
	I	-	-	-	-	-	-
	D.D	-	-	-	-	-	-
Algeria	P	8	10	10	12.6	14.6	16.9
	E	-	-	-	-	-	-
	I	-	-	-	-	-	-
	D.D	-	-	-	12.6	14.6	16.9
Tunisia	P	7	14	9	16.3	18.4	20.6
	E	-	-	-	-	-	-
	I	-	-	-	-	-	-
	D.D	-	-	-	16.3	18.4	20.6
Libya	P	-	-	-	-	-	-
	E	-	-	-	-	-	-
	I	-	-	-	-	-	-
	D.D	-	-	-	-	-	-
Total Maghreb	P	16	26	32	44.0	50.8	58.6
	E	-	-	-	-	-	-
	I	-	-	-	-	-	-
	D.D	-	-	-	44.0	50.8	58.6
United Arab Republic	P	4	5	5	6.1	7.1	8.3
	E	-	-	-	-	-	-
	I	-	-	-	-	-	-
	D.D	-	-	-	6.1	7.1	8.3
Sudan	P	-	-	-	-	-	-
	E	-	-	-	-	-	-
	I	-	-	-	-	-	-
	D.D	-	-	-	-	-	-
Total sub-region	P	20	31	37	50.1	57.9	66.9
	E	-	-	-	-	-	-
	I	-	-	-	-	-	-
	D.D	-	-	-	50.1	57.9	66.9

P = Production E = Export I = Imports D.D. = Domestic demand.

Source: FAO Production Yearbook, 1963, 1966.

a/ No foreign trade statistics available in FAO Trade Yearbook 1966.

b/ Base year for peaches and apricots, 1965.

Production, export, import, domestic demand, projection ('000 M.T.) Apricots

Country		1960	1963	1965	1970	1975	1980
Morocco ^{b/}	P	8	13	28	32.6	38.5	45.7
	E	-	-	-	-	-	-
	I	-	-	-	-	-	-
	D.D	-	-	-	32.6	38.5	45.7
Algeria	P	15	15	14	18.8	21.8	25.3
	E	-	-	-	-	-	-
	I	-	-	-	-	-	-
	D.D	-	-	-	18.8	21.8	25.3
Tunisia	P	16	19	13	22.1	24.9	27.9
	E	-	-	-	-	-	-
	I	-	-	-	-	-	-
	D.D	-	-	-	22.1	24.9	27.9
Libya	P	1	1	1	1.2	1.4	1.6
	E	-	-	-	-	-	-
	I	-	-	-	-	-	-
	D.D	-	-	-	1.2	1.4	1.6
Total Maghreb	P	40	48	56	74.7	86.6	100.5
	E	-	-	-	-	-	-
	I	-	-	-	-	-	-
	D.D	-	-	-	74.7	86.6	100.5
United Arab Republic	P	6	8	6	9.8	11.4	13.3
	E	-	-	-	-	-	-
	I	-	-	-	-	-	-
	D.D	-	-	-	9.8	11.4	13.3
Sudan	P	-	-	-	-	-	-
	E	-	-	-	-	-	-
	I	-	-	-	-	-	-
	D.D	-	-	-	-	-	-
Total sub-region	P	46	56	62	84.5	98.0	113.8
	E	-	-	-	-	-	-
	I	-	-	-	-	-	-
	D.D	-	-	-	84.5	98.0	113.8

P = Production E = Export I = Import D.D. = Domestic demand

Source: FAO Production Yearbooks 1964, 1966.

a/ No foreign trade statistics available in FAO Trade Yearbook 1966.

b/ Base year for peaches and apricots, 1965.

Production, export, import, domestic demand, projection ('000 M.T.) - Bananas

		Bananas					
Country		1960	1963	1965	1970	1975	1980
Morocco	P	-	-	-	10.6	13.1	16.7
	E	-	-	-	-	-	-
	I	11.7	8.3	8.6	-	-	-
	D.D	11.7	8.3	8.6	10.6	13.1	16.7
Algeria	P	-	-	-	21.1	25.7	31.7
	E	-	-	-	-	-	-
	I	18.9	15.9	18.1	-	-	-
	D.D	18.9	15.9	18.1	21.1	25.7	31.7
Tunisia	P	-	-	-	3.8	4.6	5.5
	E	-	-	-	-	-	-
	I	2.8	2.9	1.1	-	-	-
	D.D	2.8	2.9	1.1	3.8	4.6	5.5
Libya	P	-	-	-	3.2	3.7	4.3
	E	-	-	-	-	-	-
	I	-	2.3	3.1	-	-	-
	D.D	-	2.3	3.1	3.2	3.7	4.3
Total Maghreb	P	-	-	-	38.7	47.1	58.2
	E	-	-	-	-	-	-
	I	33.4	29.4	30.9	-	-	-
	D.D	33.4	29.4	30.9	38.7	47.1	58.2
United Arab Republic	P	66	56	64	73.7	92.7	119.4
	E	2.1	1.1	0.7	-	-	-
	I	-	-	-	-	-	-
	D.D	63.9	54.9	63.3	73.7	92.7	119.4
Sudan	P	-	10	10	11.9	14.3	18.1
	E	0.4	0.4	0.9	-	-	-
	I	-	-	-	-	-	-
	D.D	-	9.6	9.1	11.9	14.3	18.1
Total sub-region	P	66	66	74	124.3	154.1	195.7
	E	2.5	1.5	1.6	-	-	-
	I	33.4	29.4	30.9	-	-	-
	D.D	96.9	93.9	103.3	124.3	154.1	195.7

P = Production E = Export I = Import D.D. = Domestic demand

Source: FAO Production Yearbooks 1963, 1966.

Production, export, import, domestic demand, projection ('000 M.T.)

Figs. (fresh basis) a/

Country		1960	1963	1965	1970	1975	1980
Morocco	P	78	121	139	155	192	245
	E	-	-	-	-	-	-
	I	-	-	-	-	-	-
	D.D	78	121	139	155	192	245
Algeria	P	101	95	94	126	153	189
	E	-	-	-	-	-	-
	I	-	-	-	-	-	-
	D.D	101	95	94	126	153	189
Tunisia	P	-	18	20	24	29	35
	E	-	-	-	-	-	-
	I	-	-	-	-	-	-
	D.D	-	18	20	24	29	35
Libya	P	2	4	2	7	9	11
	E	-	-	-	-	-	-
	I	-	-	-	-	-	-
	D.D	2	4	2	7	9	11
Total Maghreb	P	181	238	255	312	383	480
	E	-	-	-	-	-	-
	I	-	-	-	-	-	-
	D.D	-	-	-	312	383	480
United Arab Republic	P	6	6	4	8	10	13
	E	-	-	-	-	-	-
	I	-	-	-	-	-	-
	D.D	6	6	4	8	10	13
Sudan	P	-	-	-	-	-	-
	E	-	-	-	-	-	-
	I	-	-	-	-	-	-
	D.D	-	-	-	-	-	-
Total ^{b/} sub-region	P	187	244	259	320	393	493
	E	-	-	-	-	-	-
	I	-	-	-	-	-	-
	D.D	-	-	-	320	393	493

P = Production E = Export I = Import D.D. = Domestic demand.

Source: FAO Production Yearbook 1963, 1966.

a/ No foreign trade statistics available in FAO Trade Yearbook 1966.

b/ Excluding Sudan.

a/ 1961 - No foreign trade statistics available in FAO Trade Yearbook 1966.

++ = Olives for oil.

E/CN.14/INR/162

Page 85

Production, export, import, domestic demand, projection ('000 M.T.) - Olives ^{a/}		1960	1963	1965	1970	1975	1980	++
country								
Morocco	P	180	200	223	214	248	293	348
	E	10.0	10.0	10.0	10.0	10.0	10.0	10.0
	I	10.0	10.0	10.0	10.0	10.0	10.0	10.0
	D.D.	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Algeria	P	131	148	160	90	186	216	250
	E	10.0	10.0	10.0	10.0	10.0	10.0	10.0
	I	10.0	10.0	10.0	10.0	10.0	10.0	10.0
	D.D.	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Tunisia	P	625	460	278	272	536	604	677
	E	10.0	10.0	10.0	10.0	10.0	10.0	10.0
	I	10.0	10.0	10.0	10.0	10.0	10.0	10.0
	D.D.	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Libya	P	29	102	100	40	122	137	152
	E	10.0	10.0	10.0	10.0	10.0	10.0	10.0
	I	10.0	10.0	10.0	10.0	10.0	10.0	10.0
	D.D.	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Total Maghreb	P	965	910	777	616	1,092	1,250	1,427
	E	10.0	10.0	10.0	10.0	10.0	10.0	10.0
	I	10.0	10.0	10.0	10.0	10.0	10.0	10.0
	D.D.	10.0	10.0	10.0	10.0	10.0	10.0	10.0
United Arab Republic	P	9	8	10	10	635	729	838
	E	10.0	10.0	10.0	10.0	10.0	10.0	10.0
	I	10.0	10.0	10.0	10.0	10.0	10.0	10.0
	D.D.	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Yugoslavia	P	9	8	10	10	635	729	838
	E	10.0	10.0	10.0	10.0	10.0	10.0	10.0
	I	10.0	10.0	10.0	10.0	10.0	10.0	10.0
	D.D.	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Total sub-region	P	974	918	777	616	1,102	1,262	1,441
	E	10.0	10.0	10.0	10.0	10.0	10.0	10.0
	I	10.0	10.0	10.0	10.0	10.0	10.0	10.0
	D.D.	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Total	P	974	918	777	616	1,102	1,262	1,441
	E	10.0	10.0	10.0	10.0	10.0	10.0	10.0
	I	10.0	10.0	10.0	10.0	10.0	10.0	10.0
	D.D.	10.0	10.0	10.0	10.0	10.0	10.0	10.0

Source: FAO Production Yearbooks, 1963, 1966.

Production, export, import, domestic demand, projection ('000 M.T.)
Olive oil a/

Country		1960	1963	1965	1970	1975	1980
Morocco	P	30	28	44	51.3	60.6	72.0
	E	1.5	8.7	1.2	-	-	-
	I	1.0	-	-	0.3	4.9	14.0
	D.D	29.5	19.3	42.8	51.6	65.5	86.0
Algeria	P	14	17	18	21.4	24.8	28.7
	E	2.9	5.2	1.1	4.9	3.6	0.9
	I	0.4	-	-	-	-	-
	D.D	11.5	11.8	16.9	16.5	21.2	27.8
Tunisia	P	142	104	60	121.0	136.1	152.4
	E	26.2	29	46.3	19.6	6.7	15.1
	I	-	-	-	-	-	-
	D.D	115.8	75	13.7	101.4	129.4	167.5
Libya	P	6	14	8	16.8	18.9	21.0
	E	0.9	-	-	-	-	-
	I	-	0.2	-	14.2	21.8	31.7
	D.D	5.1	14.2	8	31.0	40.7	52.7
Total Maghreb	P	192	163	130	210.5	240.4	274.1
	E	31.5	42.9	48.6	24.5	10.3	0.9
	I	1.4	0.2	-	14.5	26.7	60.8
	D.D	161.9	120.3	81.4	200.5	256.8	334.0
United Arab Republic	P	-	-	-	-	-	-
	E	-	-	-	-	-	-
	I	0.9	0.04	0.3	0.06	0.08	0.11
	D.D	0.9	0.04	0.3	0.06	0.08	0.11
Sudan	P	-	-	-	-	-	-
	E	-	-	-	-	-	-
	I	0.02	0.01	0.03	0.01	0.01	0.01
	D.D	0.02	0.01	0.03	0.01	0.01	0.01
Total sub-region	P	192	163	130	210.5	240.4	274.1
	E	31.5	42.9	48.6	24.5	10.3	0.9
	I	1.4	0.2	0.3	14.6	26.8	60.9
	D.D	161.9	120.3	81.4	200.6	256.9	334.1

P = Production E = Exports I = Imports D.D. = Domestic demand.

Source: FAO Production Yearbooks, 1963, 1966;

FAO Trade Yearbook, 1966.

Production, export, import, domestic demand, projection ('000 M.T.)
Cotton (lint)

Country		1960	1963	1965	1970	1975	1980
Morocco	P	2	5	7	12.0	17.0	22.0
	E	1.4	4.1	6.5	6.1	9.5	12.0
	I	3.1	3.6	4.3	-	-	-
	D.D	3.7	4.5	4.8	5.9	7.5	10.0
Algeria	P	1	1	1	1.9	3.1	5.0
	E	0.4	-	-	0.3	1.1	2.4
	I	-	0.2	0.5	-	-	-
	D.D	0.6	1.2	1.5	1.6	2.0	2.6
Tunisia	P	-	-	-	3.4	4.6	6.4
	E	-	0.7	-	-	-	-
	I	-	0.7	2.6 ^{a/}	-	-	-
	D.D	-	-	2.6 ^{a/}	3.4	4.6	6.4
Libya	P	-	-	-	-	-	-
	E	-	-	-	-	-	-
	I	-	-	-	-	-	-
	D.D	-	-	-	-	-	-
Total Maghreb	P	3	6	8	17.3	24.7	33.4
	E	1.8	4.8	6.5	6.4	10.6	14.4
	I	3.1	4.5	7.4	-	-	-
	D.D	4.3	5.7	8.9	10.9	14.1	19.0
United Arab Republic	P	478	442	520	546.2	575.0	604.3
	E	374	290	330	325.2	279.0	189.3
	I	-	-	-	-	-	-
	D.D	104	152	190	221.0	296.0	415.0
Sudan	P	114	163	150	177.3	210.0	248.2
	E	105	178	106	123.8	141.7	156.8
	I	-	-	-	-	-	-
	D.D	9	15	44 ^{a/}	53.5	68.3	91.4
Total sub-region	P	595	611	678	740.8	809.7	885.9
	E	480.8	472.8	442.5	455.4	431.3	360.5
	I	3.1	4.5	7.4	-	-	-
	D.D	117.3	142.7	242.9	285.4	378.4	525.4

P = Production E = Export I = Import D.D. = Domestic demand.

Sources: FAO Production Yearbooks, 1963, 1966; FAO Trade Yearbook, 1966.

a/ Base year taken as 1965.

Production, export, import, domestic demand, projection ('000 M.T.)
Tobacco(unmanufactured)

Country		1960	1963	1965	1970	1975	1980
Morocco	P	2.5	0.8	2.3	3.1	4.2	5.7
	E	0.2	0.1	0.05	-	-	-
	I	2.1	4.1	3.8	3.2	3.8	5.0
	D.D	4.4	4.8	6.05	6.3	8.0	10.7
Algeria	P	15.6	7.3	6.0	9.3	14.3	22.1
	E	8.4	0.3	-	-	2.2	6.3
	I	7.1	-	-	0.2	-	-
	D.D	14.3	7.0	6.0	9.5	12.1	15.8
Tunisia	P	1.9	0.9	1.8	3.0	5.0	8.4
	E	-	-	0.2	-	-	-
	I	2.2	2.2	1.1	1.6	1.2	0.2
	D.D	4.1	3.1	2.7	4.6	6.2	8.6
Libya	P	0.7	0.7	1.1	2.4	3.4	4.8
	E	-	-	0.1	-	-	-
	I	0.05	0.2	0.3	-	-	-
	D.D	0.75	0.9	1.3	2.4	3.4	4.8
Total Maghreb	P	20.7	9.7	11.2	17.8	26.9	41.0
	E	8.6	0.4	0.35	-	2.2	6.3
	I	11.45	6.5	5.2	5.0	5.0	5.2
	D.D	23.55	15.8	16.05	22.8	29.7	39.9
United Arab Republic	P	-	-	-	-	-	-
	E	-	-	-	-	-	-
	I	11.8	12.4	14.6	18.0	24.1	33.8
	D.D	11.8	12.4	14.6	18.0	24.1	33.8
Sudan	P	-	-	-	-	-	-
	E	-	-	-	-	-	-
	I	-	0.01	-	0.01	0.01	0.01
	D.D	-	0.01	-	0.01	0.01	0.01
Total sub-region	P	20.7	9.7	11.2	17.8	26.9	41.0
	E	8.6	0.4	0.35	-	2.2	6.3
	I	23.25	18.91	19.8	23.0	29.1	39.0
	D.D	35.35	28.21	30.65	40.8	53.8	73.7

P = Production E = Export I = Import D.D. = Domestic demand.

Source: FAO Production Yearbooks, 1963, 1966;
 FAO Trade Yearbook, 1966.

Production, export, import, domestic demand, projection ('000 M.T.) - Alfa

Country		1960	1963	1965	1970	1975	1980
Morocco	P	83 ^{a/}	111 ^{a/}	100 ^{a/}	95	90	86
	E	493 ^{b/}	67 ^{b/}	-	58	53	48
	I	-	-	-	-	-	-
	D.D	-	-	-	37	37	38
Algeria	P	130 ^{a/}	130 ^{a/}	130 ^{c/}	124	118	112
	E	55 ^{b/}	48 ^{b/}	-	42	38	34
	I	-	-	-	-	-	-
	D.D	-	-	-	82	80	78
Tunisia	P	92 ^{d/}	95 ^{d/}	111 ^{d/}	106	101	96
	E	107 ^{b/}	57 ^{b/}	-	50	45	41
	I	-	-	-	-	-	-
	D.D	-	-	-	56	56	55
Libya	P	29 ^{e/}	40 ^{e/}	-	37.0	35.0	33.0
	E	20 ^{b/}	5.5 ^{b/}	-	4.8	4.3	3.9
	I	-	-	-	-	-	-
	D.D	-	-	-	32.2	30.7	29.1
Total Maghreb	P	334	376	-	362.0	344.0	327.0
	E	231	177.5	-	154.8	140.3	126.9
	I	-	-	-	-	-	-
	D.D	103	198.5	f/	207	204	200
United Arab Republic	P	-	-	-	-	-	-
	E	-	-	-	-	-	-
	I	-	-	-	-	-	-
	D.D	-	-	-	-	-	-
Sudan	P	-	-	-	-	-	-
	E	-	-	-	-	-	-
	I	-	-	-	-	-	-
	D.D	-	-	-	-	-	-
Total sub-regio	P	334	376	-	362	344	327
	E	231	177.5	-	155	140	127
	I	-	-	-	-	-	-
	D.D	103	198.5	f/	207	204	200

P = Production E = Export I = Import D.D. = Domestic demand.

^{a/} La situation économique du Maroc, 1965.

^{b/} Conference paper 11 B, 15, Pulp and Paper Development in Africa and Near East.

^{c/} Division des statistiques agricoles, Alger.

^{d/} L'économie de la Tunisie en chiffres, 1965.

^{e/} Libyan Agriculture in the Light of Statistical Data. Ministry of Planning and Development.

^{f/} Total exports 1965, 140,000 M.T. (estimate); 1967, 120,000 M.T. (estimate).

Production, export, import, domestic demand, projection ('000 M.T.)

Cork a/

Country		1960	1963	1965	1970	1975	1980
Morocco	P	39	36 ^{c/}	46 ^{b/}	46	46	46
	E	-	40 ^{c/}	29 ^{c/}	29	29	29
	I	-	-	-	-	-	-
	D.D.	-	-	-	17	17	17
Algeria	P	14	23	-	23	23	23
	E	14	9	-	9	9	9
	I	-	-	-	-	-	-
	D.D.	-	-	-	14	14	14
Tunisia	P	8	8	7	7	7	7
	E	-	7	-	-	-	-
	I	-	-	-	-	-	-
	D.D.	-	-	-	7	7	7
Libya	P	-	-	-	-	-	-
	E	-	-	-	-	-	-
	I	-	-	-	-	-	-
	D.D.	-	-	-	-	-	-
Total Maghreb	P	61	67	53	76	76	76
	E	-	56	-	38	38	38
	I	-	-	-	-	-	-
	D.D.	-	-	-	38	38	38
United Arab Republic	P	-	-	-	-	-	-
	E	-	-	-	-	-	-
	I	-	-	-	-	-	-
	D.D.	-	-	-	-	-	-
Sudan	P	-	-	-	-	-	-
	E	-	-	-	-	-	-
	I	-	-	-	-	-	-
	D.D.	-	-	-	-	-	-
Total sub-region	P	61	67	53	76	76	76
	E	-	56	-	38	38	38
	I	-	-	-	-	-	-
	D.D.	-	-	-	38	38	38

P = Production E = Export I = Import D.D. = Domestic demand.

a/ Certain production and export figures unobtainable.

b/ 1962/63, Three-year Plan 1965/67, Economic Co-ordination and Planning Division, Morocco.

c/ Annuaire statistique du Maroc.

Production, export, import, domestic demand, projection ('000 M.T.) Raw Sugar^a

Country		1960	1963	1965	1970	1975	1980
Morocco	P	-	19.0B	29.0B	37.0B	59.6B	96.0B
	E	11.4	8.3	8.6	-	-	-
	I	362.7	373.9	373.2	455.6	551.3	683.7
	D.D.	351.3	384.6	393.6	492.6	610.9	779.7
Algeria	P	1.0B	-	-	2.6B	4.2B	6.8B
	E	2.0	-	-	-	-	-
	I	240.9	223.3	260.0	299.3	372.0	468.8
	D.D.	239.9	223.3	260.0	301.9	376.2	475.6
Tunisia	P	-	5.0B	5.0B	9.7B	15.6B	25.1B
	E	-	1.4	-	-	-	-
	I	84.5	60.0	61.9	76.0	93.8	116.5
	D.D.	84.5	63.4	66.9	85.7	109.4	141.6
Libya	P	-	-	-	-	-	-
	E	-	-	-	-	-	-
	I	20.5	23.4	19.4	51.1	67.1	86.9
	D.D.	20.5	23.4	19.4	51.1	67.1	86.9
Total: Maghreb	P	4.0B	24.0B	34.0B	49.3B	79.4B	127.9B
	E	13.4	9.7	8.6	-	-	-
	I	708.6	680.6	714.5	882.0	1,084.2	1,355.9
	D.D.	696.2	694.9	739.9	931.3	1,163.6	1,483.8
United Arab Republic	P	364.0C	382.0C	366.0C	589.4C	951.2C	1,531.9C
	E	51.6	13.6	16.1	-	135.6	393.2
	I	21.8	53.4	44.2	20.1	-	-
	D.D.	334.2	421.8	394.1	609.5	815.6	1,138.7
Sudan	P	-	20.0C	18.0C	39.0C	62.8C	101.1C
	E	-	-	-	-	-	-
	I	116.9	122.1	203.0	139.4	156.4	184.0
	D.D.	116.9	142.1	221.0	178.4	219.2	285.1
Total sub-region	P	365.0	426.0	418.0	(49.3B 626.4C	79.4B 1,014.0C	127.9B 1,633.0C
	E	65.0	23.3	24.7	-	-	-
	I	847.3	856.1	961.7	1,041.5	1,105.0	1,146.7
	D.D.	1,147.3	1,258.8	1,355.0	1,719.2	2,198.4	2,907.6

P = Production E = Export I = Import D.D. = Domestic demand.

Source FAO Production Yearbooks, 1963, 1966.

FAO Trade Yearbook, 1966.

^{a/} All figures corrected to a "raw sugar" basis.

B = Beet sugar C = Cane sugar.

Commodity exports, imports, projections ('000 M.T.) - Meats, fresh, chilled or frozen

Country		1960	1963	1965	1970	1975	1980
Morocco	E	0.3	0.1	0.03	0.03	0.03	0.03
	I	0.03	-	0.01	0.01	0.02	0.02
	B	+0.3	+0.1	+0.02	+0.02	+0.01	+0.01
Algeria	E	0.1	-	-	-	-	-
	I	19.7	9.2	5.2	13.03	16.87	22.47
	B	-19.6	-9.2	-5.2	-13.03	-16.87	-22.47
Tunisia	E	0.1	0.01	0.4	0.40	0.40	0.40
	I	-	-	0.1	0.13	0.17	0.22
	B	+0.1	+0.01	+0.3	+0.27	+0.23	+0.18
Libya	E	-	-	-	-	-	-
	I	0.1	0.3	1.4	2.71	3.70	4.97
	B	-0.1	-0.3	-1.4	-2.71	-3.70	-4.97
Total Maghreb	E	0.5	0.1	0.4	0.43	0.43	0.43
	I	19.8	9.5	6.7	15.88	20.76	27.68
	B	-19.3	-9.4	-6.3	-15.45	-20.33	-27.25
Sudan	E	-	-	0.1	0.10	0.10	0.10
	I	-	-	-	-	-	-
	B	-	-	+0.1	+0.10	+0.10	+0.10
United Arab Republic	E	0.02	0.02	0.01	0.01	0.01	0.01
	I	4.8	5.1	12.7	16.52	22.11	30.87
	B	-24.8	-5.1	-12.7	-16.51	-22.10	-30.86
Total sub-region	E	0.52	0.13	0.54	0.54	0.54	0.54
	I	24.63	14.6	19.5	32.40	42.87	58.55
	B	-24.1	-14.5	-19.0	-31.86	-42.33	-58.01

E = Export I = Import B = Quantitative balance of trade.

Source: FAO Trade Yearbook 1966.

Commodity exports, imports, projections ('000 M.T.) - Canned meat and meat preparations

Country		1960	1963	1965	1970	1975	1980
Morocco	E	0.2	0.04	-	-	-	-
	I	0.3	0.2	0.06	0.26	0.34	0.46
	B	-0.1	-0.02	-0.1	-0.26	-0.34	-0.46
Algeria	E	-	-	-	-	-	-
	I	13.2	1.6	1.5	2.27	2.94	3.92
	B	-13.2	-1.6	-1.5	-2.27	-2.94	-3.92
Tunisia	E	-	-	-	-	-	-
	I	0.4	0.3	0.1	0.41	0.53	0.70
	B	-0.4	-0.3	-0.1	-0.41	-0.53	-0.70
Libya	E	-	-	-	-	-	-
	I	0.3	0.3	0.5	0.76	1.04	1.40
	B	-0.3	-0.3	-0.5	-0.76	-1.04	-1.40
Total Maghreb	E	0.2	0.04	-	-	-	-
	I	14.2	2.4	2.16	3.70	4.85	6.48
	B	-14.0	-2.4	-2.2	-3.70	-4.85	-6.48
Sudan	E	-	-	-	-	-	-
	I	0.1	0.2	0.3	0.25	0.30	0.38
	B	-0.1	-0.2	-0.3	-0.25	-0.30	-0.38
United Arab Republic	E	-	-	-	-	-	-
	I	1.4	1.7	3.5	4.55	6.09	8.50
	B	-1.4	-1.7	-3.5	-4.55	-6.09	-8.50
Total sub-region	E	0.2	0.04	-	-	-	-
	I	15.7	4.3	5.96	8.50	11.24	15.36
	B	-15.5	-4.3	-6.0	-8.50	-11.24	-15.36

E = Export I = Import B = Quantitative balance of trade.

Source: FAO Trade Yearbook 1966.

Production and projection of liquid milk supply^{a/} ('000 M.T.)

Country	1960	1963	1965	1970	1975	1980
Morocco	464 ^{b/}	477	481	587	681	789
Algeria	432 ^{b/}	384	397	472	547	634
Tunisia	167 ^{b/}	196	181	241	279	323
Libya	24	43	50	53	61	71
Total, Maghreb	1,087	1,100	1,109	1,353	1,568	1,817
United Arab Republic	1,116	1,131	1,162	1,391	1,613	1,870
Sudan	1,701	1,350	1,389	1,660	1,924	2,230
Total sub-region	3,904	3,581	3,660	4,404	5,105	5,917

Sources: FAO Production Yearbook , 1963, 1966.

a/ Including cow, sheep, goat and buffalo milk.

b/ 1961.

Exports, imports, balances and projections, milk and cream, (1000) M.T.
Evaporated and/or condensed

Country		1960	1963	1965	1970	1975	1980
Morocco	E	0.03	0.01	-	0.012	0.014	0.016
	I	6.84	8.59	8.76	11.23	14.40	19.18
	B	-6.81	-8.58	-8.76	-11.218	-14.386	-19.164
Algeria	E	-	-	-	-	-	-
	I	20.60	15.26	18.53	20.63	25.71	32.50
	B	-20.60	-15.26	-18.53	-20.63	-25.71	-32.50
Tunisia	E	-	-	-	-	-	-
	I	2.68	2.67	2.13	3.76	4.96	6.67
	B	-2.68	-2.67	-2.13	-3.76	-4.96	-6.67
Libya	E	-	-	-	-	-	-
	I	2.00	3.00	5.70	6.55	8.60	11.13
	B	-2.00	-3.00	-5.70	-6.55	-8.60	-11.13
Total Maghreb	E	0.03	0.01	-	0.012	0.014	0.016
	I	32.12	29.52	35.12	42.17	53.67	69.48
	B	-32.09	-29.51	-35.12	-42.158	-53.656	-69.464
Sudan	E	-	-	-	-	-	-
	I	0.02	0.03	0.03	0.04	0.05	0.06
	B	-0.02	-0.03	-0.03	-0.04	-0.05	-0.06
United Arab Republic	E	-	-	-	-	-	-
	I	0.28	7.33	4.55	10.38	13.69	18.76
	B	-0.28	-7.33	-4.55	-10.38	-13.69	-18.76
Total sub-region	E	0.03	0.01	-	0.01	0.01	0.02
	I	32.42	36.88	39.70	52.59	67.41	88.30
	B	-32.39	-36.87	-39.70	-52.58	-67.41	-88.28

E = Export I = Import B = Balance.

Sources: FAO Trade Yearbook, 1963, 1966.

Exports, imports, balances and projections, milk and cream, ('000 M.T.) Dried

Country		1960	1963	1965	1970	1975	1980
Morocco	E	-	-	-	-	-	-
	I	1.96	2.00	2.21	2.61	3.35	4.46
	B	-1.96	-2.00	-2.21	-2.61	-3.35	-4.46
Algeria	E	-	-	-	-	-	-
	I	3.34	7.85	2.96	10.61	13.22	16.71
	B	-3.34	-7.85	-2.96	-10.61	-13.22	-16.71
Tunisia	E	-	-	-	-	-	-
	I	0.59	1.26	2.78	1.77	2.34	3.15
	B	-0.59	-1.26	-2.78	-1.77	-2.34	-3.15
Libya	E	-	-	-	-	-	-
	I	0.44	0.27	0.43	0.59	0.77	1.05
	B	-0.44	-0.27	-0.43	-0.59	-0.77	-1.05
Total Maghreb	E	-	-	-	-	-	-
	I	6.33	11.38	8.38	15.58	19.68	25.37
	B	-6.33	-11.38	-8.38	-15.58	-19.68	-25.37
Sudan	E	-	-	-	-	-	-
	I	0.39	1.22	1.33	1.50	1.77	2.17
	B	-0.39	-1.22	-1.33	-1.50	-1.77	-2.17
United Arab Republic	E	-	-	-	-	-	-
	I	7.21	3.08	10.92	4.36	5.75	7.88
	B	-7.21	-3.08	-10.92	-4.36	-5.75	-7.88
Total sub-region	E	-	-	-	-	-	-
	I	13.93	15.68	20.63	21.44	27.20	35.42
	B	-13.93	-15.68	-20.63	-21.44	-27.20	-35.42

E = Export I = Import B = Balances

Sources: FAO Trade Yearbook, 1963, 1966.

Exports, imports, balances and projections ('000 M.T.) - Butter

Country		1960	1963	1965	1970	1975	1980
Morocco	E	0.003	0.005	0.002	-0.006	0.007	0.008
	I	3.035	5.659	3.655	7.248	8.988	11.471
	B	-3.032	-5.654	-3.653	-7.242	-8.981	-11.463
Algeria	E	-	-	-	-	-	-
	I	7.956	7.010	3.993	9.798	12.565	16.499
	B	-7.956	-7.010	-3.993	-9.798	-12.565	-16.499
Tunisia	E	-	-	-	-	-	-
	I	0.615	1.111	0.275	1.423	1.731	2.127
	B	-0.615	-1.111	-0.275	-1.423	-1.731	-2.127
Libya	E	-	-	-	-	-	-
	I	0.146	0.232	0.370	0.584	0.796	1.070
	B	-0.146	-0.232	-0.370	-0.584	-0.796	-1.070
Total Maghreb	E	0.003	0.005	0.002	0.006	0.007	0.008
	I	11.752	14.012	8.293	19.053	24.080	31.167
	B	-11.749	-14.007	-8.291	-19.047	-24.073	-31.159
Sudan	E	0.078	0.061	0.006	0.075	0.087	0.101
	I	0.006	0.002	0.032	0.002	0.003	0.004
	B	+0.072	+0.059	-0.026	+0.073	+0.084	+0.097
United Arab Republic	E	0.050	0.011	0.006	0.014	0.016	0.019
	I	0.070	0.064	1.682	0.091	0.120	0.164
	B	-0.020	-0.053	-1.676	-0.077	-0.104	-0.145
Total sub-region	E	0.131	0.077	0.014	0.095	0.110	0.128
	I	11.828	14.078	10.007	19.146	24.203	31.335
	B	-11.697	-14.001	-9.993	-19.051	-24.093	-31.207

E = Export I = Import B = Balance .

Source: FAO Trade Yearbook 1966.

Exports, Imports, Balances and Projects ('000 M.T.) - Cheese and Curd

Country		1960	1963	1965	1970	1975	1980
Morocco	E	0.002	0.003	0.002	0.004	0.005	0.006
	I	2.907	3.008	2.195	3.931	5.041	6.715
	B	-2.905	-3.005	-2.193	-3.927	-5.036	-6.709
Algeria	E	0.014	-	-	0.019	0.022	0.026
	I	19.624	5.967	4.222	8.066	10.051	12.706
	B	-19.610	-5.967	-4.222	-8.047	-10.029	-12.680
Tunisia	E	0.233	0.210	0.064	0.258	0.299	0.347
	I	1.035	0.937	0.736	1.319	1.740	2.339
	B	-0.802	-0.727	-0.672	-1.061	-1.441	-1.992
Libya	E	-	-	-	-	-	-
	I	0.746	0.850	1.447	1.856	2.437	3.155
	B	-0.746	-0.850	-1.447	-1.856	-2.437	-3.155
Total Maghreb	E	0.249	0.213	0.056	0.281	0.326	0.379
	I	24.312	10.762	8.600	15.172	19.269	24.915
	B	-24.063	-10.549	-8.534	-14.891	-18.943	-24.536
Sudan	E	-	-	-	-	-	-
	I	0.002	0.024	0.019	0.030	0.040	0.050
	B	-0.002	-0.024	-0.019	-0.030	-0.040	-0.050
U.A.R.	E	0.264	0.281	0.200	0.346	0.401	0.465
	I	1.330	4.655	2.424	6.593	8.698	11.916
	B	-1.066	-4.374	-2.224	-6.247	-8.297	-11.451
Total sub-region	E	0.513	0.494	0.266	0.627	0.727	0.844
	I	25.644	15.441	11.043	21.795	28.007	36.881
	B	-25.131	-14.947	-10.777	-21.168	-27.289	-36.037

E = Export, I = Import B = Balance .

Source: FAO Trade Yearbook, 1966.

Production, exports, imports, domestic demand, projections, (-'000 M.T.)
Eggs in shell

Country		1960	1963	1965	1970	1975	1980
Morocco	P	40.0 ^{1/}	40.0	40.0	49.54	58.51	69.47
	E	3.9	0.9	0.2	0.25	0.29	0.35
	I	—	—	—	—	—	—
	D.D	36.1	39.1	39.8	49.29	58.22	69.12
Algeria	P	20.0 ^{1/}	20.0	20.0	25.10	29.10	33.74
	E	—	—	—	—	—	—
	I	6.0	3.0	0.9	1.13	1.13	1.52
	D.D	26.0	23.0	20.9	26.23	30.41	35.26
Tunisia	P	11.3 ^{1/}	11.3	11.3	13.16	14.87	16.70
	E	—	—	—	—	—	—
	I	—	—	—	—	—	—
	D.D	11.3	11.3	11.3	13.16	14.87	16.70
Libya	P	2.0	2.7	2.7	3.23	3.60	3.99
	E	—	0.01	—	—	—	—
	I	—	0.05	—	4.70	7.63	11.69
	D.D	2.0	2.74	2.7	7.93	11.23	15.68
Total: Maghreb	P	73.3	74.0	74.0	91.03	106.08	123.90
	E	3.9	0.91	0.2	0.25	0.29	0.35
	I	6.0	3.05	0.9	5.83	8.94	13.21
	D.D	75.4	76.14	74.7	96.61	114.73	136.76
Sudan	P	14.2 ^{1/}	15.0	15.6	17.83	20.14	22.85
	E	—	—	—	—	—	—
	I	—	—	—	—	—	—
	D.D	14.2	15.0	15.6	17.83	20.14	22.85
U.A.R.	P	35.0 ^{1/}	39.5	43.7	48.25	56.15	65.47
	E	0.7	0.1	0.07	0.08	0.09	0.10
	I	—	—	—	—	—	—
	D.D	34.3	39.4	43.63	48.17	56.06	65.37
Total sub-region	P	122.5	128.5	133.5	157.11	182.37	212.22
	E	4.6	1.01	0.27	0.33	0.38	0.45
	I	6.0	3.05	0.9	5.83	8.94	13.21
	D.D	123.9	130.54	133.93	162.61	190.93	224.98

P = Production E = Export I = Import D.D. = Domestic demand.

^{1/} 1961.

Sources: FAO Production Yearbook, 1963, 1966.

FAO Trade Yearbook, 1966.

Production, export, import, domestic demand, projection, ('000 M.T.)
Wool (Greasy basis) 1/

Country		1960	1963	1965	1970	1975	1980
Morocco	P	16.0	16.5	13.0	18.3	19.7	21.2
	E	3.8	1.9	1.3	-	-	-
	I	0.3	0.4	0.5	0.7	4.5	11.2
	D.D	12.5	15.0	12.2	19.0	24.2	32.4
Algeria	P	6.5	-	8.6 ^{2/}	9.3	10.0	10.8
	E	0.5	-	-	-	-	-
	I	0.4	0.2	0.4	2.9	5.6	9.6
	D.D	6.4	0.2	9.0	12.2	15.6	20.4
Tunisia	P	3.6	3.5	4.0	4.2	4.5	4.9
	E	-	-	-	-	-	-
	I	-	0.1	-	0.8	2.3	4.5
	D.D	3.6	3.6	4.0	5.0	6.8	9.4
Libya	P	2.1	-	-	2.2	2.2	2.3
	E	-	-	-	-	-	-
	I	-	-	-	6.3	9.7	14.4
	D.D	2.1	-	-	8.5	11.9	16.7
Total Maghreb	P	28.2	20.0	25.6	34.0	36.4	39.2
	E	4.3	1.9	1.3	-	-	-
	I	0.7	0.7	0.9	10.7	22.1	39.7
	D.D	24.6	18.8	25.2	44.7	58.5	78.9
U.A.R.	P	3.2	4.0	3.4	4.4	4.7	5.1
	E	-	-	-	-	-	-
	I	2.4	1.4	4.7	3.0	5.2	8.8
	D.D	5.6	5.4	8.1	7.4	9.9	13.9
Sudan ^{3/}	P	-	-	-	-	-	-
	E	0.1	0.2	0.1	-	-	-
	I	-	-	-	-	-	-
	D.D	0.1	0.2	0.1	-	-	-
Total sub-region	P	31.4	24.0	29.0	38.4	41.1	44.3
	E	4.4	2.1	1.4	-	-	-
	I	3.1	2.1	5.6	13.7	27.3	48.5
	D.D	30.1	24.0	33.2	52.1	68.4	92.8

P = Production, E = Export, I = Import, D.D. = Domestic demand.

Sources: FAO Production Yearbook, 1963, 1966. FAO Trade Yearbook, 1966.

1/ Conversion of clean wool to "greasy" wool basis, multiply by x 2.

2/ U.S.D.A. Commodity publication.

3/ The sheep of the Sudan are predominantly non-wooled, hairy sheep.

Exports, imports, and projections, (10 M.T.) - Oilseed cakes, meals and other vegetable oil residues 1/2/

		1960	1963	1965	1970	1975	1980
Morocco	E	1,899	1,660	1,799	3,984	5,657	7,298
	I	-	-	-	-	-	-
Algeria	E	3,128	2,406	-	4,571	7,451	11,996
	I	204	60	199	194	189	184
Tunisia	E	56	62	80	114	163	233
	I	-	22	60	67	75	84
Libya	E	-	-	-	-	-	-
	I	-	-	228	259	291	323
Total Maghreb	E	5,083	4,128	1,879	8,669	13,271	19,294
	I	204	82	487	520	555	591
U.A.R.	E	2,012	3,430	3,680	4,322	4,538	4,765
	I	-	-	-	-	-	-
Sudan	E	6,378	14,203	16,580	15,765	18,603	21,952
	I	-	-	-	-	-	-
Total sub-region	E	13,473	21,761	22,139	28,756	36,412	46,011
	I	204	82	487	520	555	591

E = Export, I = Import.

Source: FAO Trade Yearbook 1966.

1/ Export projections follow pattern of cottonseed production, excepting Tunisia, where past trends of exports were assumed to continue.

2/ Import projections follow past trends, excepting Libya and Tunisia, where projected population rates were used.

Production, export, import, domestic demand, projection, ('000 M.T.) -
Sesame seed

Country		1960	1963	1965	1970	1975	1980
Morocco	P	-	-	-	-	-	-
	E	0.1	-	0.01	-	-	-
	I	-	0.06	-	0.07	0.08	0.1
	D.D	-0.1	0.06	-0.01	0.07	0.08	0.1
Algeria	P	-	-	-	-	-	-
	E	-	-	-	-	-	-
	I	0.2	0.21	-	0.25	0.29	0.34
	D.D	0.2	0.21	-	0.25	0.29	0.34
Tunisia	P	-	-	-	-	-	-
	E	-	-	0.02	-	-	-
	I	0.4	1.5	0.72	1.7	1.9	2.1
	D.D	0.4	1.5	0.7	1.7	1.9	2.1
Libya	P	-	-	-	-	-	-
	E	-	-	-	-	-	-
	I	-	-	-	-	-	-
	D.D	-	-	-	-	-	-
Total Maghreb	P	-	-	-	-	-	-
	E	0.1	-	0.03	-	-	-
	I	0.6	1.5	0.70	2.02	2.27	2.54
	D.D	0.5	1.5	0.70	2.02	2.27	2.54
U.A.R.	P	15	256	225	318	364.9	423.0
	E	0.2	1.8	4.1	-	-	-
	I	6.3	9.5	5	-	-	-
	D.D	21.1	263.7	225.9	314.8	364.9	423.0
Sudan	P	127	173.9	160.0	228.8	278.4	338.7
	E	76.4	69.6	52.1	111.3	150.4	199.3
	I	-	-	-	-	-	-
	D.D	50.6	105.8	107.9	117.5	128.0	139.4
Total sub-region	P	142	429.9	385	543.6	643.3	761.7
	E	76.7	71.4	56.2	111.3	150.4	199.3
	I	6.9	11	5.7	2.0	2.3	2.5
	D.D	72.2	369.5	334.5	434.3	495.2	564.9

P = Production, E = Export I = Import D.D = Domestic demand.

Sources: FAO Production Yearbook, 1963, 1966.
FAO Trade Yearbook, 1966.

Production, export, import, domestic demand, projection, ('000 M.T.) -
Linseed

Country		1960	1963	1965	1970	1975	1980
Morocco	P	4	5	11	16.0	21.0	26.0
	E	10.2	1.8	3.3	11.8	15.6	18.8
	I	-	-	-	-	-	-
	D.D.	-6.2	3.2	7.7	4.2	5.4	7.2
Algeria	P	-	-	-	-	-	-
	E	-	-	-	-	-	-
	I	0.03	-	-	-	-	-
	D.D.	0.03	-	-	-	-	-
Tunisia	P	3	1	1	0.6	0.8	1.1
	E	1.03	10.6	0.1	-	-	-
	I	-	-	-	-	-	-
	D.D.	2	0.4	0.9	0.6	0.8	1.1
Libya	P	-	-	-	-	-	-
	E	-	-	-	-	-	-
	I	-	-	-	-	-	-
	D.D.	-	-	-	-	-	-
Total Maghreb	P	7.0	6.0	12.0	16.6	21.8	27.1
	E	11.2	2.4	3.4	11.8	15.6	18.8
	I	-	-	-	-	-	-
	D.D.	-4.2	3.6	8.6	4.8	6.2	8.3
U.A.R.	P	9	4	10	16.0	21.4	30.0
	E	-	-	-	-	-	-
	I	1.7	-	0.6	-	-	-
	D.D.	10.7	11.0	10.6	16.0	21.4	30.0
Sudan	P	-	-	-	-	-	-
	E	-	-	-	-	-	-
	I	-	-	-	-	-	-
	D.D.	-	-	-	-	-	-
Total sub-region	P	16	17	22	32.6	43.2	57.1
	E	11.2	2.4	3.4	11.8	15.6	18.8
	I	1.7	-	0.6	-	-	-
	D.D.	6.5	14.6	19.2	20.8	27.6	38.3

P = Production E = Export I = Import D.D. = Domestic demand.

Sources: FAO Production Yearbook, 1963, 1966;
 FAO Trade Yearbook 1966.

Production, export, import, domestic demand, projection, (1000 M.Ts.)
Cotton seed.

Country		1960	1963	1965	1970	1975	1980
Morocco	P	3	10	15	24.0	34.0	44.0
	E	0.3	-	1.9	10.8	17.2	21.5
	I	-	-	-	-	-	-
	D.D	2.7	10	13.1	13.2	16.8	22.5
Algeria	P	1	2	2	3.8	6.2	10.0
	E	-	-	-	1.1	2.8	5.6
	I	-	-	-	-	-	-
	D.D	1	2	2	2.7	3.4	4.4
Tunisia	P	-	-	-	6.8	9.2	12.8
	E	-	-	0.02	4.6	6.2	8.6
	I	0.4	1.5	0.70	-	-	-
	D.D	0.4	1.5	0.7	2.2	3.0	4.2
Libya	P	-	-	-	-	-	-
	E	-	-	-	-	-	-
	I	-	-	-	-	-	-
	D.D	-	-	-	-	-	-
Total Maghreb	P	4	12	17	34.6	49.4	66.8
	E	0.3	-	1.9	16.5	26.2	35.7
	I	0.4	1.5	0.7	-	-	-
	D.D	4.1	13.5	15.8	18.1	23.2	31.1
U.A.R.	P	888	867	990	1,092.4	1,150.0	1,208.0
	E	-	-	-	-	-	-
	I	-	16.2	0.03	192.3	569.2	1,203.1
	D.D	888	883.2	990	1,284.7	1,719.2	2,411.7
Sudan	P	216	319	291	354.6	420.0	496.4
	E	93	152	0.3	134.8	139.5	121.0
	I	-	-	-	-	-	-
	D.D	123	167	290.7	219.8	280.5	375.4
Total sub-region	P	1,108	1,198	1,298	1,482	1,619	1,772
	E	93.3	152	2.2	151	166	157
	I	0.4	17.7	0.7	192	569	1,203
	D.D	1,015.1	1,063.7	1,296.5	1,523	2,023	2,818

P = Production E = Export I = Import D.D = Domestic demand.

Sources: FAO Production Yearbook, 1963, 1966;
 FAO Trade Yearbook, 1966.

Production, export, import, domestic demand, projection ('000 M.T.)
Sunflower seed

Country		1960	1963	1965	1970	1975	1980
Morocco	P	2	9	10	11.1	13.1	15.6
	E	-	-	-	-	-	-
	I	.01	.08	.004	0.8	2.1	4.7
	D.D	2.01	9.08	10.0	11.9	15.2	20.3
Algeria	P	-	-	-	-	-	-
	E	-	-	-	-	-	-
	I	-	-	-	-	-	-
	D.D	-	-	-	-	-	-
Tunisia	P	-	-	-	-	-	-
	E	-	-	-	-	-	-
	I	0.1	0.2	-	0.3	0.4	0.6
	D.D	0.1	0.2	-	0.3	0.4	0.6
Libya	P	-	-	-	-	-	-
	E	-	-	-	-	-	-
	I	-	-	-	-	-	-
	D.D	-	-	-	-	-	-
Total Maghreb	P	2	9	10	11.1	13.1	15.6
	E	-	-	-	-	-	-
	I	0.1	0.3	-	1.1	2.5	5.3
	D.D	2.1	9.3	10	12.2	15.6	20.9
U.A.R.	P	-	-	-	-	-	-
	E	-	-	-	-	-	-
	I	-	-	-	-	-	-
	D.D	-	-	-	-	-	-
Sudan	P	-	-	-	-	-	-
	E	-	-	-	-	-	-
	I	-	-	-	-	-	-
	D.D	-	-	-	-	-	-
Total sub-region	P	2	9	10	11.1	13.1	15.6
	E	-	-	-	-	-	-
	I	0.1	0.3	-	1.1	2.5	5.3
	D.D	2.1	9.3	10	12.2	15.6	20.9

P = Production, E = Export, I = Imports, D.D. = Domestic demand.

Sources: FAO Production Yearbooks, 1963, 1966.

FAO Trade Yearbooks, 1963, 1966.

Production, export, import, domestic demand, projection ('000 M.T.) -
Castor beans

Country		1960	1963	1965	1970	1975	1980
Morocco	P	-	-	-	-	-	-
	E	0.9	0.1	0.1	-	-	-
	I	-	-	-	-	-	-
	D.D	-0.9	-0.1	-0.1	-	-	-
Algeria	P	-	-	-	-	-	-
	E	-	-	-	-	-	-
	I	-	-	-	-	-	-
	D.D	-	-	-	-	-	-
Tunisia	P	-	-	-	-	-	-
	E	-	-	-	-	-	-
	I	-	-	-	-	-	-
	D.D	-	-	-	-	-	-
Libya	P	-	5	2	6.6	8.0	9.7
	E	3.4	5.1	2.2	6.6	8.0	9.7
	I	-	-	-	-	-	-
	D.D	-3.4	-0.1	-0.2	-	-	-
Total Maghreb	P	-	5	2	6.6	8.0	9.7
	E	4.3	5.2	2.3	6.6	8.0	9.7
	I	-	-	-	-	-	-
	D.D	-4.3	-0.2	-0.3	-	-	-
U.A.R.	P	-	-	-	-	-	-
	E	-	-	-	-	-	-
	I	0.01	0.02	-	0.03	0.04	0.06
	D.D	0.01	0.02	-	0.03	0.04	0.06
Sudan	P	-	7	10	9.2	11.2	13.6
	E	3.7	6.1	2.6	8.0	9.7	11.6
	I	-	-	-	-	-	-
	D.D	-3.7	0.9	7.4	1.2	1.5	2.0
Total sub-region	P	-	12.0	12.0	15.8	19.2	23.3
	E	6.7	11.3	4.9	14.6	17.7	21.3
	I	.01	.02	-	0.03	0.04	0.06
	D.D	-8.0	0.70	7.1	1.2	1.5	2.1

P = Production E = Export I = Import D.D = Domestic demand.

Sources: FAO Production Yearbook, 1963, 1966;
FAO Trade Yearbook, 1966.

Exports, imports and projections (10 M.T.) - Bran and other milling
by-products

Country		1960	1963	1965	1970	1975	1980
Morocco	E	1,352	1,577	1,438	1,926	2,222	2,563
	I	2	-	-	-	-	-
Algeria	E	7,829	7,653	5,725	9,097	10,292	11,644
	I	20	-	-	-	-	-
Tunisia	E	4,940	5,017	4,563	6,045	6,906	7,889
	I	-	-	-	-	-	-
Libya	E	-	-	-	-	-	-
	I	-	-	190	269	327	392
Total Maghreb	E	14,121	14,247	11,726	17,068	19,420	22,096
	I	22	-	190	269	327	392
U.A.R.	E	70	24	15	30	35	41
	I	2	-	-	-	-	-
Sudan	E	-	-	1,165	1,559	2,086	2,791
	I	-	-	-	-	-	-
Total sub-region	E	14,191	14,271	12,906	18,657	21,541	24,928
	I	24	-	190	269	327	392

E = Export

I = Import

Source: FAO Trade Yearbook 1966.

Livestock numbers, exports, imports, net numbers, projections, ('000)
Cattle (all classes).

Country		1959/60	1962/63	1964/65	1969/70	1974/75	1979/80
Morocco	TN	2,500 ^{1/}	2,800	3,000	3,443	3,991	4,627
	E	-	-	-	-	-	-
	I	0.3	1.0	0.1	-	-	-
	NN	2,500	2,801	3,000	3,443	3,991	4,627
Algeria	TN	664	810	731	996	1,155	1,339
	E	-	-	-	-	-	-
	I	42	32	20	-	-	-
	NN	706	842	751	996	1,155	1,339
Tunisia ⁺	TN	1,033 ^{1/}	1,098	1,037	1,350	1,565	1,814
	E	2	0.3	0.1	-	-	-
	I	0.2	6.0	0.5	-	-	-
	NN	1,031	1,104	1,037	1,350	1,565	1,814
Libya	TN	111	125	121	154	179	208
	E	3.4	-	-	-	-	-
	I	-	-3	4	-	-	-
	NN	108	128	125	154	179	208
Total Maghreb	TN	4,308	4,833	4,889	5,943	6,890	7,988
	E	5.4	0.3	0.1	-	-	-
	I	42.5	42.0	24.6	-	-	-
	NN	4,345	4,875	4,913.5	5,943	6,890	7,988
U.A.R. ⁺	TN	3,648 ^{1/}	3,125	3,225	3,843	4,455	5,165
	E	0.4	0.3	0.1	-	-	-
	I	40.0	56.0	31.0	-	-	-
	NN	3,688	3,181	3,256	3,843	4,455	5,165
Sudan	TN	7,000	7,000	7,100	8,609	9,980	11,570
	E	40	22	10	-	-	-
	I	-	0.3	1	-	-	-
	NN	6,960	6,978	7,091	8,609	9,980	11,570
Total sub-region	TN	14,956	14,958	15,214	18,395	21,325	24,723
	E	45.8	22.6	10.2	-	-	-
	I	82.5	98.3	56.2	-	-	-
	NN	14,993	15,034	15,260	18,395	21,325	24,723

TN = Total number E = Export I = Import NN = Net number.

^{1/} 1960/61.

+ Numbers include buffaloes - U.A.R. 50%, Tunisia 40%.

Sources: FAO Production Yearbook, 1963, 1966 ;
 FAO Trade Yearbook, 1966.

Livestock numbers, exports, imports, net numbers, projections ('000)- Poultry^{3/}

Country							
Morocco	TN	10,000 ^{1/}	10,500	10,500	13,004	15,372	18,256
	E	-	-	-	-	-	-
	I	-	-	-	-	-	-
	NN	10,000	10,500	10,500	13,004	15,372	18,256
Algeria	TN	10,067 ^{2/}	5,557	8,057	6,975	8,086	9,374
	E	-	-	-	-	-	-
	I	-	-	-	-	-	-
	NN	10,067	5,557	8,057	6,975	8,086	9,374
Tunisia	TN	5,000	5,412	5,500	6,304	7,101	7,959
	E	-	-	-	-	-	-
	I	-	-	-	-	-	-
	NN	5,000	5,412	5,500	6,304	7,101	7,959
Libya	TN	782	890	931	1,065	1,200	1,332
	E	-	-	-	-	-	-
	I	-	-	-	-	-	-
	NN	782	890	931	1,065	1,200	1,332
Total Maghreb	TN	25,849	22,359	24,988	27,348	31,759	36,921
	E	-	-	-	-	-	-
	I	-	-	-	-	-	-
	NN	25,849	22,359	24,988	27,348	31,759	36,921
U.A.R.	TN	32,439 ^{1/}	27,867	28,751	34,037	39,653	46,196
	E	-	-	-	-	-	-
	I	-	-	-	-	-	-
	NN	32,439	27,867	28,751	34,037	39,653	46,196
Sudan	TN	-	-	-	-	-	-
	E	-	-	-	-	-	-
	I	-	-	-	-	-	-
	NN	-	-	-	-	-	-
Total sub-region	TN	58,288 ^{4/}	50,226 ^{4/}	53,739 ^{4/}	61,385	71,412	83,117
	E	-	-	-	-	-	-
	I	-	-	-	-	-	-
	NN	58,288	50,226	53,739	61,385	71,412	83,117

TN = Total number NN = Net number.

1/ 1960/61.

2/ Chickens, ducks, geese and turkeys.

3/ 1958/59.

4/ Excluding Sudan.

Livestock numbers, exports, imports, net numbers, projections ('000) -
Sheep and goats.1/

Country		1959/60	1962/63	1964/65	1967/70	1974/75	1979/80
Morocco ^{2/}	TN	21,000/43	22,200/33	22,650/33	24,658	26,584	28,660
	E	39	2	-	1,668	3,254	4,980
	I	-	-	-	-	-	-
	NN	20,961	22,198	22,650	22,990	23,330	23,680
Algeria	TN	7,339/26	8,078/32	8,222/32	8,972	9,673	10,428
	E	-	-	-	18	-	-
	I	136	30	-	-	111	227
	NN	7,475	8,108	8,222	8,954	9,784	10,655
Tunisia	TN	4,775/18	3,928/10	4,294/12	4,499	4,850	5,229
	E	-	1	1	-	-	-
	I	1	14	-	33	60	91
	NN	4,776	3,941	4,293	4,532	4,910	5,320
Libya	TN	2,450/48	3,352/51	4,374/54	4,400	4,450	4,500
	E	20	-	-	-	-	-
	I	-	56	123	640	1,216	1,850
	NN	2,430	3,408	4,497	5,040	5,666	6,350
Total Maghreb	TN	35,564/36	37,558/32	39,540/34	42,529	45,557	48,817
	E	59	3	1	1,686	3,245	4,980
	I	137	100	123	673	1,387	2,168
	NN	35,642	37,655	39,662	41,516	43,690	46,005
U.A.R.	TN	2,411/34	2,471/31	2,642/30	2,745	2,959	3,190
	E	5	6	4	-	-	-
	I	17	9	7	190	294	420
	NN	2,423	2,474	2,645	2,935	3,253	3,610
Sudan	TN	14,136/45	14,840/44	15,510/44	16,483	17,770	19,158
	E	75	73	227	173	347	564
	I	-	-	-	-	-	-
	NN	14,061	14,767	15,283	16,310	17,423	18,594
Total sub-region	TN	52,111/38	54,869/35	57,692/35	61,757	66,286	71,165
	E	139	82	232	1,859	3,601	5,544
	I	154	109	130	863	1,681	2,588
	NN	52,126	54,896	57,590	60,761	64,366	68,209

TN = Total number E = Exports I = Imports NN = Net number;

1/ Per cent goats on right of column.

2/ 1960/61.

Livestock numbers, exports, imports, net numbers, projections ('000) - Pigs.

Country		1959/60	1962/63	1964/65	1969/70	1974/75	1979/80
Morocco	TN	50 ^{1/}	48	49	61	77	101
	E	14.3	1.3	1.0	-	-	-
	I	-	-	-	-	-	-
	NN	35.7	46.7	48	61	77	101
Algeria	TN	69	68	71	95	122	160
	E	0.3	-	-	-	-	-
	I	7.3	-	-	-	-	-
	NN	76	68	71	95	122	160
Tunisia	TN	5	3	5	4	5	6
	E	0.5	-	-	-	-	-
	I	-	-	-	-	-	-
	NN	4.5	3	5	4	5	6
Libya	TN	2	4	4	8	10	13
	E	-	-	-	-	-	-
	I	-	-	-	-	-	-
	NN	2	4	4	8	10	13
Total	TN	126	123	129	168	214	280
Maghreb	E	15.1	1.3	1.0	-	-	-
	I	7.3	-	-	-	-	-
	NN	118.2	121.7	128	168	214	280
U.A.R. ⁺	TN	-	5	5	7	9	12
	E	-	-	-	-	-	-
	I	-	-	-	-	-	-
	NN	-	5	5	7	9	12
Sudan	TN	17 ^{1/}	13	11	16	19	23
	E	-	-	-	-	-	-
	I	-	-	-	-	-	-
	NN	17	13	11	16	19	23
Total	TN	133	141	145	191	242	305
sub-	E	15.1	1.3	1.0	-	-	-
region	I	7.3	-	-	-	-	-
	NN	125.2	139.7	144	191	242	305

TN = Total number E = Export I = Import NN = Net number

1/ 1960/61.

Sources: FAO Production Yearbook, 1963, 1966;
FAO Trade Yearbook, 1966.

Livestock numbers, projections, ('000) - Horses and mules.

Country		1959/60	1962/63	1964/65	1969/70	1974/75	1979/80
Morocco	H	240 ^{1/1}	273	325	338	399	474
	M	220 ^{1/1}	273	380	316	356	403
Algeria	H	210	136	117	171	198	229
	M	245	174	147	204	225	248
Tunisia	H	80	80	86	93	105	118
	M	49	50	54	54	58	62
Libya	H	24	37	37	44	50	56
	M	1	2	2	2.2	2.4	2.5
Total	H	554	526	565	646	752	877
Maghreb	M	515	499	583	576.2	641.4	715.5
Sudan	H	20	21	21	25	28	32
	M	-	1	1	1.1	1.2	1.3
U.A.R.	H	48 ^{1/1}	53	56	65	76	89
	M	10 ^{1/1}	11	11	12.5	13.9	15.4
Total	H	622	600	642	736	856	998
sub-region	M	525	511	595	590	656	732

H = Horses M = Mules.

1/ 1960/61.

Sources: FAO Production Yearbook, 1963, 1966.

Livestock numbers, projections, ('000) - Camels.

Country	1959/60	1962/63	1964/65	1969/70	1974/75	1979/80
Morocco	230 ^{1/}	230	185	148	119	95
Algeria	103	190	225	491	1,072	2,340
Tunisia	171	150	190	211	234	260
Libya	255	212	254	254	253	253
Total Maghreb	759	782	854	1,104	1,678	2,948
U.A.R.	189	174	175	162	150	139
Sudan	2,000	2,000	2,000	2,102	2,209	2,322
Total sub-region	2,948	2,956	3,049	3,368	4,037	5,409

1/ 1960/61.

Source: FAO Production Yearbook, 1963, 1966.

Livestock numbers, projection ('000) - Asses

Country	1959/60	1962/63	1964/65	1969/70	1974/75	1979/80
Morocco	1,000 ^{1/}	1,125	1,035	1,301	1,465	1,658
Algeria	427	290	248	340	375	414
Tunisia	180	151	163	164	176	188
Libya	104	105	105	117	125	132
Total Maghreb	1,711	1,671	1,551	1,922	2,141	2,392
Sudan	576	590	590	655	706	765
U. A. R.	1,011	1,091	1,138	1,245	1,381	1,532
Total sub-region	3,298	3,352	2,279	3,822	4,228	4,689

Source: FAO Production Yearbook, 1963, 1966.

^{1/} 1960/61.

COMMODITY REVIEW

GENERAL

Commodity statistics obtained in the main from information recorded in FAO Production and Trade Yearbooks, form the basis on which ensuing assumption and projection criteria (see Annex I) are based. Study of the FAO commodity information available when considered against national and other scattered sources of record, indicate continuing need for improving the reliability and accuracy of statistical data of this nature, if such figures are to be meaningful in forward planning and development programmes. It is strongly recommended that the closest possible liaison be established by every Government statistical department and the FAO Statistical Service, to ensure uniformity, accuracy, and the fullest exchange of information likely to secure improved efficiency in a service now recognized as vital to all agricultural planning and development organizations in each and every country throughout the world.

WHEAT

Wheat is one of the most important food grains produced in North Africa; production in the Maghreb and in the sub-region as a whole, however, tends to remain stationary despite the demands of increasing population, while on the other hand, wheat flour imports demonstrate a positive tendency to escalate. Imports of wheat grain and wheat flour into North Africa (assuming an extraction rate for the latter of eighty per cent) collectively were equivalent in 1965 to approximately three million tons of wheat grain.

Wheat production in North Africa is largely the concern of traditional farmers whose farming units and husbandry methods are in general inconsistent with the requirements of modern methods of farming.

The challenge to North African Governments to reach a higher degree of self-sufficiency in this important food grain is seen therefore to be of considerable magnitude and complexity, calling for substantially increased levels of inputs in the following particular directions: (1) use, and increased use, of fertilizer; (2) provision of improved varieties of wheat, breed to respond to increased levels of fertilizer usage; (3) lowering of production costs through the reorganization of existing small units into larger farming units more responsive to mechanization; (4) chemical control of weeds and pests; (5) improved transport services to collecting and/or organized market centres; (6) adoption of rotational systems of farming,

including the reduction in areas left under fallow each year; (7) provision of expanded advisory and extension services; (8) adoption of more efficient methods of milling and grain storage.

These are but a few of the immediate requirements suggested by the production challenge indicated above, which currently involves import expenditure in North Africa equivalent to approximately US\$219 million per annum.

Average yields of wheat vary considerably in the countries representing the North African sub-region which for 1965^{1/} are indicated as follows:

<u>Country</u>	<u>Quintals per ha.</u>
Morocco	8.0
Algeria	6.0
Tunisia	4.7
Libya	3.2
U.A.R.	27.7
Sudan	9.8

Wheat production in the Maghreb is generated predominantly through rain-fed cropping, while production in the U.A.R. and the Sudan arises largely as the product of irrigated cropping. It should be noted that the outstanding yields at least for North African conditions, recorded for U.A.R. are considerably influenced by application of moderate to high dressings of fertilizer, use of improved varieties which have been bred and selected for optimum conditions, and through the general practice of irrigation.

Some progress is being made in Morocco to promote fertilizer application, but such practice is observed mostly on "modern" farms. Elsewhere in North Africa, and especially in the traditional sectors, improved seed and fertilizer usage are virtually unknown, although attempts to improve the latter situation are now receiving increasing attention in

1/ FAO Production Yearbook 1966.

the U.A.R., Sudan, Tunisia and Morocco. The current rate at which the problem is being tackled, however, is unlikely to be substantially effective during the next decade towards reducing the already substantial production deficit position revealed, especially when considered concurrently with future projections of population increase. The scope of plans leading to "modernization" of wheat production in all countries of the sub-region must be considerably accelerated.

Factors which have a bearing on future wheat production levels in North Africa include:

- (a) The likely effect on production of development of new irrigation perimeters in Morocco, including the Sebou project;
- (b) The impact on production, including wheat production, of new irrigated lands which will be influenced by the waters of the Aswan High Dam in the U.A.R. (new area approximately 1 million ha);
- (c) The further development of potential wheat areas in the Sudan including areas adjacent to Khashm El Girba, Wad Madani, Hudeiba, and the Gezira;
- (d) Development of new wheat areas in every country of the sub-region, in some areas possibly at the expense of barley production;
- (e) The impact of current UNDP, FAO, US/AID and other country projects designed to encourage greater use of fertilizer, improved seeds, and a further degree of mechanization; these practices being encouraged and exploited through the medium of expanded and improved agricultural extension services.

All of these factors, however, are dependent on infrastructural developments which included: expansion of institutional and agricultural services, increases in production in the agro-allied industries which include fertilizer production, expansion of institutions concerned with professional and technical education, expanded production of farm machinery, transport vehicles, provision of new and extended flourmilling complexes, and increased production of herbicides and pesticides.

Up to 1980, modernization of wheat production will depend to a considerable extent on satisfactory domestic price support for this commodity. Oil and mineral-rich countries may be tempted, because of new-found wealth, to purchase cheaper wheat on foreign markets rather than seek expansion of domestic production. On economic grounds this may appear to make sense, but in the long term, must inevitably lead to a faster rate of rural depopulation with concomitant heavy investment in urban development with possible serious social consequence, hopefully of short duration, arising out of unemployment or underemployment.

WHEAT FLOUR

Deficiency of wheat production in the North African sub-region makes it necessary to import wheat flour in substantial quantities to meet domestic demand. Principal suppliers of flour to the sub-region are the USA, West Germany and Italy, but from time to time other countries have also contributed to import requirements.

At the moment the milling industries in North Africa are generally considered sufficient to handle domestic production, but there is a wasteful proliferation of small rural mills in every country, which offer scope for rationalization and modernization, leading to higher levels of milling efficiency and better utilization of milling by-products for animal nutrition.

In most countries, however, there is need to increase the capacity of milling industries to process imported wheat rather than to import flour. This policy would lead to increased employment and would produce a greater volume of by-products which might be expected to go a long way to meeting the need for livestock feed, thus ensuring an increase in the volume of animal products, including milk, cheese, eggs, poultry and meat. Approximately one million tons of imported wheat entering the sub-region could be so processed, to replace the flour required at current levels of flour imports, leaving approximately 150,000 tons of wheat offal for animal production.

RICE is grown in the North African sub-region on irrigated soils. The producer of greatest importance is the U.A.R., followed by Morocco, the latter contributing modest tonnages from the Kenitra area. Rice is the second largest agricultural export commodity in the U.A.R., representing over six per cent of the value of agricultural output.

Accession to the cropping area of the U.A.R., made possible by the Aswan High Dam, will allow further areas to be developed for this valuable food crop, for which increasing demand and consumer interest is discernible.

There exists also in both the U.A.R. and Morocco, need to accelerate development of new rice varieties selected with particular reference to ensuring a range of photo and thermo sensitive varieties enabling production over a wider spread of the calendar year. Success in such developments would call for some modification of existing rotational systems and might even make possible double-cropping from existing areas of irrigated rice.

Extension of certain irrigable areas in the Sudan would also appear to offer research possibilities for the development of rice growing, but momentarily, research activity is largely directed towards expansion of areas suitable for wheat growing. The possibilities of rice production, however, should not be ignored in any drive to increase total food production in that country.

MAIZE

Due largely to increased production in the U.A.R. the production of maize is now assuming greater significance in the North African sub-region. Morocco is the only country of the Maghreb, however, which grows a significant quantity of this coarse grain, but production recorded between 1960 and 1965 in that country has fluctuated considerably. Maize is a plant which has a high water requirement, wilting point being rapidly reached under dry conditions, consequently, maize is only likely to succeed consistently under irrigated conditions in the sub-region. There would appear therefore to be considerable scope for increased production in the U.A.R., Sudan and Morocco. Yields could be further expanded in countries where irrigation facilities are available through vigorous

development of hybrid types, bred to suit the prevailing climatic conditions. It is important to ensure that need of this type is more widely available to growers of this crop. In Morocco, maize resembles the hard flint corn of Central and South America and at the moment, is most frequently observed in rainfall zones considered more suitable for barley.

With the development of irrigation schemes in Morocco, however, existing types of maize will require to give way to more productive genotypes selected for an entirely new set of micro-climatic conditions. A maize breeding programme designed for this purpose is indicated.

Expansion of maize production in North Africa is desirable in the future as a means of providing cheap feed for cattle, particularly dairy cattle, and for poultry.

BARLEY

In terms of production, barley currently ranks second in importance in the North African sub-region followed by maize and rice. Total production, however, has declined compared with the base year 1963, due largely to a reduction in the area sown, and in recent years, to a slight lowering of yield. Yields per hectare are indicated as follows:^{1/}

Country	Area sown ('000 ha)		Av. yield 1963	Qs. per ha. 1965
	1963	1965		
Morocco	1935	1545	7.6	8.3
Algeria	930	625	7.4	6.0
Tunisia	615	588	3.3	3.1
Libya	350	272	2.9	3.5
U.A.R.	51	53	26.5+	24.6+
Total	3881	3083	-	-

+ Largely irrigated.

^{1/} FAO Production Yearbook, 1966.

Barley is generally grown by traditional farmers in the drier areas of the Maghreb (300/450 mm. rainfall/annum) on soils generally considered unsuitable for wheat growing. In practically all countries of the sub-region, little has been accomplished towards improving varieties by genetic or mass selection techniques, and on account of the inherent tendency of native unimproved types of barley to lodge when top-dressed with chemical fertilizer, fertilizers are almost unused for this crop. Stiff-strawed varieties in Morocco, however, have indicated yield increases from moderate N/P fertilizer application, of 3-4 quintals per ha, demonstrating the yield potential inherent in this approach.

In the Maghreb countries in particular, barley is largely used for human consumption. The grain, frequently blended with wheat, is ground into a flour for the production of "native" bread or more generally for a "native" variety of Cous-Cous. Some barley is also fermented to provide a form of beer, although this practice is by no means universal. Little barley, it would appear, is fed to livestock, although some is fed on occasion to horses and work animals.

In view of the traditional uses of barley in North Africa, the apparent decline in production gives cause for some concern, calling for a special drive to secure increased production particularly through use of newer varieties capable of responding to fertilizer application. Traditional methods of cultivation also offer scope for improvement. The native wooden plough for instance, could well give way to light steel ploughs which would increase depth of cultivation. Benefit to yield and weed control would almost certainly result.

MILLET

(Pennisetum sp.)

This grain crop is of particular interest in the North African sub-region to the Sudan, and to a lesser extent to Morocco.

For the most part, millet is a rain-fed crop produced by traditional farmers for domestic consumption. In recent years, however, development of hybrid millets in India and elsewhere has demonstrated the value of this new type of seed in terms of yield potential, and in Africa similar approaches give ground for optimism.

Millet, customarily grown in the drier areas of the Sudan and Morocco, where annual precipitation is of the order of 300-450 mm., resists to some extent the worst effects of drought and with improved varieties, may usually be relied on to produce satisfactory cost/benefit returns from application of N/P fertilizer.

SORGHUM

(Sorghum vulgare)

In the North African sub-region sorghum is prominent in the U.A.R. and the Sudan, average yields in 1963 and 1965 respectively being 35.9 and 35.2 quintals per ha. in the U.A.R., and in the Sudan, 9.8 and 8.1 quintals per ha.^{1/}

The yields variation between these countries is attributed to the universal practice of irrigation in the U.A.R., and in recent years to the introduction of hybrid sorghum types, associated with moderate to high dressings of N/P fertilizer.

Although in recent years increases in production of sorghum have been satisfactory in the Sudan, there remains ample scope for expansion of production of this cereal, as only some five per cent of the total cultivable land is used each year.^{2/}

As irrigation of the area under cultivation is expanding rapidly in the Sudan, increased areas of sorghum and higher yields per feddan may be expected over the next decade. Substantially increased areas and yields of sorghum will call for a higher degree of mechanization, particularly as regards land preparation, levelling and harvesting, the latter through greater use of combine harvesters. A vigorous programme of sorghum breeding and selection of shorter-strawed types is indicated for this purpose. In this connexion, however, experience in other sub-regions of Africa requires that attention be paid to other factors as well as yield such as palatability, if the new varieties are to win consumer acceptance.

POTATOES

Potatoes are grown in every country in the sub-region but to a lesser extent in the Sudan and Libya. Production levels in the sub-region are currently running at over one million tons annually. In the U.A.R., potatoes are grown exclusively under irrigation, while in the Maghreb, the crop is predominantly grown under rain-fed conditions. Sub-regional production has increased by some 36 per cent during the period 1960-1965. Both exports and imports are receding. Potatoes are an important item of diet, particularly in Morocco, Algeria, Tunisia and the U.A.R., and substantial increases in production, as indicated by projection, will be required up to 1980 to keep pace with domestic demand. A "crash" production programme involving the use of more productive varieties free from virus diseases is coupled with an intensive programme of fertilizer use, particularly in the traditional sector.

^{1/} FAO Production Yearbook, 1966.

^{2/} Statistics on crop production and land use in the Sudan. Dec. 1966.

SWEET POTATOES

Production of this crop is almost the exclusive preserve of the U.A.R. in the North African sub-region. Production of the crop is static, and increases in production will have to await the release of new irrigated areas made available by the High Dam and of further irrigated areas in the Sudan.

TOMATOES

In the North African sub-region, production of tomatoes is predominantly the concern of the U.A.R. which grows over one million metric tons annually. The collective Maghreb production represents roughly half of the productive capacity of the U.A.R. No figures are available in the FAO Trade Yearbook, 1966, to indicate the trends of trade, but most countries and in particular the U.A.R. are now producing tomato juice and puree for export and domestic consumption.

Production in the Maghreb countries is erratic, presumably as a result of reliance on rain-fed conditions. Under irrigation, tomato yields are much higher, and double cropping is frequently possible. It is considered feasible in the Maghreb countries, and particularly in Morocco, to substantially increase tomato juice and puree production for sale to European countries. Apart from the U.A.R., little work has been carried out in the Maghreb countries to improve "native" tomato varieties. This would be of particular importance were it considered worthwhile to seriously enter the export trade for canned tomatoes.

ONIONS

Production of onions in the North African sub-region is largely the concern of the U.A.R., Algeria and Morocco in that order. Approximately 84 per cent of the total North African production of onions in 1965 was grown in the U.A.R. where onions are the third largest export crop, approximately 40 per cent of the crop grown being exported either in fresh or dehydrated form. Yield per feddan in the U.A.R. is approximately 6.4 tons.

Exports of onions from the sub-region have remained relatively steady since 1960 at 175,000 M.T. per annum. With indications of projected population increase up to 1980, however, there would appear to be considerable scope for expansion of production to satisfy an enlargement of domestic and export demand. Climatically the countries of the North African sub-region are well situated for the production of export quality onions, and increased levels of production of 6-8 per cent per annum would probably find a ready market. Onions respond well to balanced artificial fertilizer applications, split dressings giving the most economic returns.

OTHER VEGETABLES AND PULSES

The volume of production of green vegetables remains a fairly static in the sub-region with the U.A.R. again occupying a dominating position in this area of production. Green vegetables are almost exclusively grown under irrigated conditions, but to meet the local requirements of an expanding population, it will be necessary to satisfy an expansion rate of about 5 per cent per annum, at least up to 1980.

Production of pulses (dry beans, peas, chick peas, lentils, cow peas, etc) continues to expand satisfactorily in all countries of the sub-region with the exception of Libya. The most consistent increases are noted in Morocco. Export returns for this group of commodities also indicate a healthy position, particularly in the Maghreb countries and the Sudan. Beans occupy about 3.7 per cent of the area under crops in the U.A.R., where about 50 per cent of production is used for human consumption while the rest goes for animal feed. In the Maghreb countries, a higher proportion of pulse crops grown are used for human consumption. On the score of satisfying nutritional requirements, it is desirable that the current satisfactory production situation continues in the North African sub-region, and that production of green vegetables and pulses continue to expand to match the ever-growing demand of population, and in particular for the benefit of the younger sectors of population.

GROUNDNUTS

Production of groundnuts in the sub-region increased by 56 per cent between the years 1960-1965, and the crop is confined to the Sudan, U.A.R., and Libya. Oil is extracted in each of these countries by the expeller process and is sold principally in Western European markets. Trade in nuts and oil, however, has suffered a recession in recent months which may have the effect of slowing down the satisfactory rate of production increase noted over the last decade. The domestic trade for groundnuts, for confectionery or as whole nuts, is equivalent to approximately one third of current levels of production. Groundnuts contain approximately 42 per cent of oil, which until recently, commanded a ready market for the margarine and cooking oil trades. Groundnut cake also sells readily as cattle food in European countries.

GRAPES AND WINES

Wine production in the Maghreb countries of the North African sub-region is currently experiencing a period of extreme difficulty through problems arising out of loss of former markets. The wine industry was developed in the Maghreb as a result of former colonial connexions, but

current demand is considerably reduced. The former colonial power, France, in order to protect her domestic wine industry, is now unwilling to absorb surplus production which earlier found a fairly ready market in France and on the Continent of Europe, although recently, French imports of wine from Algeria have been resumed.

While exports of wine remain on a par with the base year 1963, the volume of trade in 1965 represents only 60 per cent of the level of trade experienced in 1960 before France withdrew from North Africa.

The industry is faced therefore with the alternative either of a drastic reduction in area cropped for wine production, or of securing alternative markets.

Attempts to reduce areas of grapes are being seriously considered by most countries, particularly Algeria, which carries the largest surplus of wine stocks. Algeria has also established a plant, with aid offered by the USSR, to convert surplus wine stocks into brandy and other concentrated forms of alcoholic beverage. The scope of the latter plant is not known, but it is understood that a market for the products so produced will be developed in Eastern Europe.

It is seen, therefore, that possibilities for this industry are now limited, and that ability to maintain current areas under this crop will to some extent depend on success in developing stable markets for wine or its new guise. Land released by retrenchment of the area formerly planted to grapes will be used for the production of food crops. In Morocco, new plantings of grapes are now controlled by Government.

CITRUS

Production of citrus fruits and particularly the production of oranges, has been making satisfactory progress in Morocco, Algeria, and the U.A.R. Slight recessions in production are noted, however, in Tunisia and Libya. Citrus fruits are almost exclusively grown under irrigated conditions.

Because of competition from other Mediterranean countries, marketing of fresh fruit in recent years has become more difficult, and the time may have arrived when a degree of consolidation may be necessary, or alternatively that diversification and development in the direction in canning or bottling of citrus juice should be given more priority. The market for the latter commodity, however, is not unlimited and attention to quality control and trade marketing would be a sales factor of importance in European markets. Development of canning and bottling has already made some headway in Morocco, Algeria and Tunisia. Continuation of the development of seedless orange varieties would also be likely to improve acceptability in overseas markets. Careful study of overseas market conditions will, however, be vitally necessary for North African countries if over-production and price cutting is to be avoided during the next decade.

DATES

Date production in the North African sub-region indicates a tendency (between years 1960-1965) to level off at a gross tonnage of approximately 725,000 M.T. Imports indicate a tendency to rise, while exports tend to fall. An increase in production appears necessary to cover the needs of the next decade. This could be achieved by fresh plantings or alternatively through better husbandry practices including greater use of fertilizer and better insect control during flowering and fruiting stages. The chief competitor for export markets is Iraq. As dates constitute a major item of diet for many people in the sub-region, efforts to increase production should be started now if additional production is to be effective before 1980.

APPLES AND PEARS

While in recent years the production of apples and pears has made modest progress in the North African sub-region, there would still appear to be scope up to 1980 for an increase in production of approximately 30 per cent to satisfy domestic consumption and export demand.

Because of favourable climatic conditions, increased production could best be secured in Morocco, Algeria and Tunisia.

BANANAS

Production of bananas under conditions of controlled irrigation is largely confined in North Africa to the U.A.R. and Sudan. Considerable quantities of bananas are still imported into the Maghreb countries, which at first glance, suggests a possible opportunity for intra-sub-regional trade. An extension of irrigated banana growing in selected sheltered conditions, where these are available, is recommended for the sub-region.

PEACHES AND APRICOTS

Production of both these fruits is making satisfactory progress in the Maghreb and particularly in Morocco. Peaches and apricots are almost exclusively produced under irrigated conditions, and while trade statistics are unavailable, it would appear that improved varieties suitable for export or canning still have scope for considerable expansion into European markets.

FIGS

Figs are produced almost exclusively in North Africa in the Maghreb, with Moroccan production being in excess of all other countries combined. No foreign statistics are available for this commodity in the FAO Trade Yearbooks, but canned, bottled or dried figs would appear to offer further export possibilities. To keep pace with projected demand and exports, increased production of improved varieties is now indicated.

OLIVES AND OLIVE OIL

Olives are grown principally in the countries of the Maghreb, largest tonnages being produced by Tunisia. Olive oil is pressed from a high proportion of the crop grown (see table), the remainder of the crop being consumed as fresh fruit or in a preserved state.

The olive is sensitive to conditions of extreme drought which may in part explain the sharp decline in the Tunisian crop (1955) which reflects the production output of cropping year 1964.

Olives ('000 M.T.)

Country	1961	x	1962	x	1963	x	1964	x	1965	x
Algeria	138	100	143	87	148	87	153	85	160	90
Morocco	140	120	145	125	200	170	155	109	223	214
Tunisia	184	180	230	225	460	450	439	430	278	272
Libya	31	30	32	30	102	70	100	35	100	40
Total	493	430	550	467	910	777	847	659	761	616
% crop used for oil		87		85		85		78		81

x Olives used for oil

Olives are frequently located on coarse-grained soils generally considered unsuitable for most other crops. Such soils are frequently found to be deficient in major plant nutrients. It is of considerable importance, therefore, that mixed fertilizers are applied annually if reasonable yields and satisfactory fruit size are to be obtained.

In recent years some difficulty has been experienced in securing markets for all of the olive oil produced in North Africa, hence a tendency toward a lowering of the proportion of the crop used for oil extraction. Entrepreneurs in several North African countries are, however, countering this situation by manufacturing soap based on olive oil, but find that such manufactures enter a highly competitive and a relatively unrewarding market. In Tunisia, with fertilizer and the use of irrigation facilities, high-yielding varieties of olives may yield in excess of 200 kg. per tree. Normal yields are approximately 50 kg per tree.

COTTON

In the North African sub-region cotton production is of considerable importance in the U.A.R. and the Sudan. In the Maghreb, only Morocco produces cotton on a scale of any significance.

Cotton occupies a prominent position in the agricultural economy of the Sudan, where 60-70 per cent of the irrigated area of three million feddans, especially in the Central Sudan, is devoted to the crop. In 1965-1966, 155,000 M.T. of ginned cotton were produced of which 88 per cent was ginned long-staple cotton and the remainder ginned American cotton. Long staple cotton is produced under irrigated conditions, but only one-third of the American cotton is so produced, the remainder being grown under flood or rain-fed conditions.

In the U.A.R., cotton is the principal cash crop and the country's main source of foreign exchange. Approximately 16 per cent of the total area in crop is under cotton, accounting for 22 per cent of the value of agricultural output. About 30 per cent of the cotton crop is locally processed and the remainder exported. The U.A.R. is the main supplier of long-staple cotton to the world, producing approximately 40 per cent of the world's long varieties and 50 per cent of the extra-long staple cotton.

Production of cotton in Morocco is increasing, if slowly, but when the irrigation perimeters, some of which are even now under construction, become fully exploitable, larger areas planted to this crop may be expected. The most spectacular progress in cotton growing has taken place in the Tadla perimeter, an increase in gross yield of 710 per cent having taken place in five years up to 1965.

Relative yields of cotton lint per ha in the cotton producing countries of the North African sub-region are indicated below:

Country	Qs. per hectare	
	1963	1965
Morocco	3.8	4.0
U.A.R.	6.5	6.5
Sudan	3.6	3.3

Source: FAO Production Yearbook, 1966.

1/ U.A.R. Agriculture, 1965.

While exports of cotton from the U.A.R. and Morocco continued to expand over the base year 1963, exports from the Sudan in 1965 indicate a slight reduction over the base year figure. The size of the future export market for quality cottons is one of the imponderables of the cotton production situation, not only in the continent of Africa, but in cotton producing countries in every continent of the world. Competing man-made fibres will undoubtedly continue to command an increasing share of the textile markets, but the technique of blending, recognition of the special qualities of cotton-based apparel for hot climates, and the steady accession to world population will almost certainly call for expanded production of cotton fibre to cover the requirements of the period at least up to 1960.

TOBACCO

The production of tobacco is of limited importance in North Africa, with no records of production in the U.A.R. and the Sudan, and only some eleven thousand M.T. recorded for the Maghreb in 1965.

With imports in the North African sub-region running at approximately twenty thousand tons per annum there would appear to be scope for increased production of this crop to satisfy at least some of the domestic demand. On the basis of establishing priority use of agricultural land, one is able to establish reason for the lack of production in the U.A.R. and the fairly substantial importation of unmanufactured tobacco into that country.

The Government of the U.A.R. has no doubt weighed in the balance the advantages and disadvantages to be gained by the current tobacco production policy, and have decided that employment generated in manufacture and the taxes to be derived, outweigh the advantages of self-sufficiency in a situation where use of scarce fertile land is involved. In the Maghreb, however, and particularly in the current circumstances with Rhodesian tobacco banned from world markets, the time would seem opportune for a drive to capture some of the market for Virginia-type flue-cured tobacco. This course of action is recommended for serious consideration by the Maghreb Committee.

ALFA

Accurate statistics concerned with production and trade in alfa (esparto grass) are difficult to secure. According to trade information, however, while exports continued to decline, domestic use of alfa is slowly increasing. In particular, current plans in Algeria, Morocco and Tunisia to extend or to build additional paper-making plants envisage greater use being made of this domestic raw material. The larger mills in Europe which specialize in high quality papers, appear, however to be turning increasingly to coniferous pulp for their requirements on account of price and reliability of supplies.

Alfa is produced in the Maghreb countries of the sub-region where potential and producing areas are indicated as 4 million ha. Algeria has been estimated to have 1 million ha, of such areas, Morocco 635,000 ha and Tunisia 500,000 ha. Average yields are assumed to vary between 110 and 125 kg of air-dry esparto per ha.

Harvesting of the grass is still undertaken by hand and with added costs involved in sorting, baling and transportation to shipping ports, fibre costs, at approximately US\$25-31 per ton FOB, compare favourably with imported wood pulp.

Export markets for esparto are principally located in the United Kingdom and France, but these outlets are declining steadily and eventually may cease completely. Efforts should be made in the Maghreb countries to convert esparto into pulp or paper instead of exporting the raw material which is bulky and expensive to transport.

It has been suggested that in Libya, the harvesting of alfa should now cease, as a conservation measure designed to prevent wind erosion on the sandy soils in that territory.

CORK

Accurate statistics for cork production and trade in North Africa are also difficult to obtain. Principal producers in the sub-region are Morocco, Algeria and Tunisia. Most of the cork produced is exported, earnings in 1962 for exports of this commodity being approximately US\$7 million. Trade for bottle cork is tending to decline in Europe as a result of the greater use now being made of cork lined metal tops and plastic.

stoppers. Demand for cork slab board for insulation purposes is still quite brisk, however, although production of new insulation materials, not based on cork, is steadily finding an expanding market.

RAW SUGAR

Consumption of sugar in the North African sub-region is relatively high compared with other areas of the world, consumption in Morocco being particularly high. In the Maghreb countries, sugar production is based on sugar beet and in the U.A.R. and Sudan on sugar cane. While total production in the sub-region is increasing slowly - particularly in the cane growing countries, and in Morocco as a product of beet production - substantial and increasing quantities of raw sugar are imported into the sub-region from overseas, in 1965 just short of one million tons. About 70-80 per cent of the capital expenditure devoted to the processing of food in the sub-region is for sugar factories.^{1/} Development plans are being furthered in Morocco where beet production is to be extended, particularly through the Sebou irrigation project, and in the U.A.R. and the Sudan, by establishment of expanded areas of irrigated cane.

Raw sugar at very competitive world prices, possibly "dumping" prices, is supplied to North Africa, principally from Cuba. In such circumstances and on the grounds of economic cost-worthiness, it may be difficult to justify domestic production from irrigated sugar beet. If, however, it is the intention of North African governments to support domestic production and North African intra-territorial trade, then production should be encouraged more particularly in the U.A.R. and the Sudan, particularly the latter country, where considerable areas of suitable land and favourable climatic conditions are still available for this purpose.

In the present state of world markets, it might be unwise in terms of total production, to reach beyond plans for sub-regional self-sufficiency.

1/ The Food Processing Industries of North Africa, Cutting 1967.

MEATS AND MEAT PREPARATIONS

Current and projected levels of meat imports into the North African sub-region also give cause for some concern. By 1980, projected levels of imports indicate an increase of over 200 per cent. To a considerable degree the extent of such levels of imports will be influenced by measures to increase domestic production of meat of all classes. It has been estimated that cattle numbers might be expected to increase by some 60 per cent by 1980, but production of the final product, meat, in the quantities required, will be largely dependent on a substantial improvement in breeding and husbandry methods coupled with provision of managed pastures, fodder production and greater use of milling and other agricultural by-products. The conception calls for a stratification of production methods, with breeding and rearing considered as phase one of the project, with the feeding and fattening for market representing a separate and final phase of these proposals.

The field of marketing of livestock also offers considerable scope for development and modernization in North Africa. The traditional system of bargaining and trading with its retinue of middlemen, agents and butcher dealers is now outdated, failing in the primary objective to secure a fair price to the producer, where incentive to produce better butcher's animals is so badly required, and failure in the final outcome, to retail meat at prices which ensure equitable distribution to the community as a whole.

MILK AND MILK PRODUCTS

The increasing imports of milk products into almost all North African countries give cause for some concern, in view of the steady demand for foreign exchange to meet these rising levels of imports. Governments are acutely aware of the situation, most countries having placed considerable emphasis on the need to increase production of milk in current and future plans concerned with agricultural development.

In North Africa, projections of demand up to 1980 suggest that imports of milk products will continue to increase by as much as 100 per cent for dried, evaporated, condensed and sterilized milks, and that increases of up to 200 per cent might be expected for butter and cheese.

. In view of the climatic conditions which prevail, milk production in North African countries is a much more difficult undertaking than in Western Europe, especially when considered against the current low productive capacity of the traditional sector. Three factors of considerable importance must be taken into account, however, if domestic milk production is to make a reasonable impact on current demand for milk and dairy products, namely:

- a) Exotic dairy animals possessing higher genetic potential for milk production must be secured and integrated with native cattle;
- b) High potential dairy animals require to be fed at levels considerably above those currently prevailing for native cows which in effect calls for managed pastures, provision of supplementary fodder, possibly through irrigation, and greater use of supplementary feeding stuffs;
- c) Collection of existing milk supplies must be better organized and rationalized;
- d) Cost of production of domestic milk supplies must also of necessity be equated with levels of per capita income, especially in urban areas.

Reliable statistics concerned with milk production and milk products are notoriously scanty in Africa, and at best are only inspired guesses. Much milk produced in North Africa is known to be converted into formulated milk, soft cheese and ghee. None of these commodities are indicated by volume or value in "official" statistics.

EGGS

See PIGS AND POULTRY. With an increase in egg production of approximately 70 per cent required by 1980, the poultry industry in most countries in North Africa is now required to gear production through modern approaches and techniques if this target is to be achieved.

Initially, governments will be required to provide the necessary infrastructure through provision of improved laying birds and balanced feed supplies, coupled with extension help required to train potential entrepreneurs in modern methods of poultry-keeping. In certain circumstances, new ventures of this nature are well-suited to cooperative enterprise, involving credit advances, supplies and marketing facilities.

WOOL

The possibility of increasing wool production during the next decade will depend in the first instance on an increase in sheep numbers, and secondly on efforts to improve both quality and yield through selection based on these special factors.

North African wools suffer, in terms of price, because of the all too frequent fault of multi-coloured fleeces which involve wool mills in additional sorting and classing.

Sheep industry specialists have a unique opportunity to demonstrate how wool quality and colour standardization may be quickly improved, through selective breeding and higher standards of nutrition. Some work in this direction is already being undertaken in Morocco and Libya, but much more remains to be done. Little wool is produced in the Sudan, and it is suggested that experimental work be started to introduce wool-bearing, heat-tolerant breeds from Middle East countries and the Merino, to determine their usefulness under Sudan conditions.

SESAME

During the past five years sesame production has assumed a dominant position in the agricultural economy of the Sudan. No production is recorded for the Maghreb countries, and only moderate production is recorded for the U.A.R.

Sesame is valuable crop on account of its drought resistance, short vegetative period and ability to produce some 250/350 kg/ha under moderate fertility conditions. The seeds contain 45/55 per cent of oil of high quality and stability. After extraction, the meal provides an excellent source of protein for human and animal consumption, the protein containing all of the major amino acids found in meat and in comparable proportions.

Considerable progress has been made in recent years in the breeding and selection of non-dehiscent varieties which respond to fertilizer treatment, and with the addition of irrigation during the vegetative stage, yields of 1,500 kg/ha are not uncommon. Further research in the genetics of this plant coupled with improved husbandry practices including irrigation, could well lead to an expansion of area sown within the next decade.

COTTON SEED

Cotton seed represents approximately two-thirds by weight of raw unginned cotton. In the North African sub-region, production figures for cotton seed and lint for the base year 1963 and for 1965 are approximate to the proportions indicated above. In earlier times cotton seed was largely exported to European markets for milling, today exports of cotton seed are negligible, indicating that oil seed milling is now largely a domestic industry in North Africa. The products of cotton seed are cotton seed oil, and the by-product, cotton seed cake or meal. The former is used largely for the manufacture of such products as margarine, soaps, etc., the latter for livestock feed. Modern mills extract oil from cotton seed mainly by the hydraulic expeller process, extract by solvent is rarely practised for this type of seed. The FAO Trade Yearbook does not differentiate between the different types of oilseed cake, meal etc., exported, but the total for North Africa for this class of export commodity now exceeds 220,000 M.T. per annum. The largest producers of cotton seed are the U.A.R., Sudan and Morocco in this order. Remarks regarding suggested future uses for oilseed by-products of this class are included under remarks for milling and oilseed by-products.

LINSEED

The chief producers of linseed in the North African sub-region are Morocco and the U.A.R. In the former country, production is increasing satisfactorily while the latter is holding production at levels similar to the base year 1963. Linseed oil is used largely by paint manufacturers, but competition from synthetic plastic paints is eating rapidly into this market once held almost exclusively by linseed oil-based paints. Linseed cake and meal produced by expeller or extract process respectively, is a valuable by-product used for cattle feed, being particularly valuable for dairy cattle.

SUNFLOWER SEED

Sunflowers are grown to a limited extent in Morocco where production has been increasing gradually with the introduction of improved American varieties. Better qualities of sunflower seed oil are used for the margarine trade or are blended to produce cooking oils. Poorer grades are used as drying oils or are used in the manufacture of soap. Little interest has been shown in this crop by other North African countries. Morocco produced 10,000 M.T. of sunflower seed in 1965.

CASTOR BEANS

Improved varieties of this oil seed crop have led to increased interest in recent years. Production in the Sudan is increasing, while interest in Libya, the only country producing castor beans in the Maghreb, is declining. Newer American selections offer possibilities for increased yield, lower growth habit for ease of harvesting, non-dehiscent fruits, and larger seeds with improved oil content. Castor oil, because of its high viscosity and low congealing point, has great value for industrial purposes particularly in the manufacture of high-grade lubricants, paints, varnishes, plastics, etc. World demand is strong. Expanded production in the Sudan seems possible on well-drained soils of moderate to high fertility. Castor beans usually contain 45 per cent or more of oil.

MILLING AND OILSEED BY-PRODUCTS

The production and export of bran and other milling by-products and of oil seed cakes and other vegetable oil residues is tending to increase annually. While such exports undoubtedly generate revenue, it would seem, however, in the best interest of the livestock industry in every country of the North African sub-region that such by-products should be used to increase the efficiency of animal production in the respective countries where these by-products are produced. The general effect of such a policy would be to reduce the need for imports of animal protein, to alleviate dietary deficiencies allegedly evident among certain younger sectors of the population.

CATTLE (ALL CLASSES)

Livestock numbers in the North African sub-region indicate a slow but steady increase since 1960. In most countries, however, the beef and dairy qualities of the animals leave much room for improvement, with the result that output of beef and milk is well below what is required to ensure an adequate intake of animal protein, particularly for younger age-groups in the population. In many areas there is considerable evidence of over-stocking, and at certain seasons of the year, most cattle suffer from lack of nourishment. If improvement in the level of production of both beef and milk is to be secured, fundamental change in the spheres of breeding and management will require to be made.

Morocco

The cattle population of Morocco is distributed among many small owners, some 50 - 75 per cent being held in "micro-herds" with three or less animals in each herd. Herds with 20 or more head account for approximately 20 per cent of the cattle population. The cattle of the country are predominantly of the Brown Atlas type although cross-breeding with exotic cattle is becoming increasingly evident. In recent years importation of Friesians, Tarentais and Charolais cattle from Holland and France have contributed to a certain amount of confusion in breeding policy. The native cattle of Morocco, within the limits of their natural environment, produce reasonably well, but could do even better if bull selection was systematically practiced. Nearer to centres of population, dairying is being encouraged, principally through a breeding programme based on artificial insemination and the use of exotic dairy bull, which include the Friesian, Tarentais and Montbéliard breeds.

It is important that the authorities of Morocco maintain control over the functional use expected of their cattle so as to avoid the worst features of indiscriminate breeding directed neither to beef nor to dairying.

Production of milk is improving, particularly in some areas of the newly developed irrigation perimeters where fodder production and the development of sown pastures is taking place.

The greatest single drawback to increased production of beef in Morocco is concerned with the poor quality of the natural pastures which are largely communally owned, and to the apparent reluctance on the part of

cattle owners to produce fodder crops which could be used for fattening beef animals. To achieve improvement in this direction, enclosure and limitation of numbers are obvious starting points.

In Morocco there are six major abattoirs, with a combined daily slaughter capacity of 1870 head of cattle. In 1966 consumption of beef was approximately 68,500 M.T. representing carcass production from 602,000 head of cattle or approximately 114 kg of carcass meat per animal slaughtered.

Total milk production in 1966 has been estimated at 6 million hectolitres, to which total cow's milk contributed 2.9 million hectolitres, sheep's milk 1.2 million hectolitres and goat's milk 900,000 hectolitres.

The average milk production from 50 per cent of the total cow population is estimated at 450 litres per cow per lactation.

Milk sold for human consumption in Morocco in 1966 is indicated as 42 million litres, the produce of 8000 purebred, 9000 crossbred, and 15,000 Moroccan cows.

Algeria

Many of the remarks concerning the production of beef, milk and milk products indicated for Morocco, hold good also for Algeria. With numbers of cattle tending to rise since the base year 1963, the basic livestock problem for Algeria at this moment is the problem of how to improve the quality of existing grasslands and rough grazing, and at the same time, how to build up a viable dairy industry in the proximity of major towns and cities.

Proposals to set up a Service pastoral to rationalize and improve the productivity and use of existing natural grasslands and to provide supplementary forage crops was approved by Government in 1966. Proposals have also been submitted, and plans approved, to import improved breeds of cattle to hasten genetic improvement of native cattle.

In 1955, it has been estimated that 26,405 M.T. of meat were produced and that average carcass weight was approximately 105 kilogrammes per beef animal slaughtered. Since 1963, animals of the following breeds have been imported into Algeria: Friesian, Tarentais and Montbéliard. Bulls of these breeds have been used to up-grade native animals. Assuming that 40 per cent of all beef cattle are slaughtered in places other than controlled abattoirs, of which there are 14, the total number of cattle slaughtered in Algeria in 1965 was 251,428. Imports of meat in 1965 are given as 4,500 M.T.

Cattle in Algeria are distributed as follows: Secteur socialiste 10,041, Secteur privé moderne 45,000, Secteur privé traditionnel 667,737 indicating a total for all cattle of 722,788.

Estimates of milk production in 1965 are indicated as 230 million litres, of which 168,000 litres were pasteurized, refrigerated and condensed. Milk imports in the same year were 40 million litres pasteurized, 22 million litres concentrated milk considered equal to 50 million litres normal milk, and 1,500 M.T. of powdered milk equal to 15 million litres of normal milk.

Tunisia

The cattle of Tunisia are predominantly of the Brown Atlas type. In the environs of Tunis and some of the larger towns, dairy farming is being actively encouraged. Substantial numbers of Friesians, and to a lesser extent Montbéliards and Tarentais have been imported to grade up local cattle, leading hopefully to development of dairy animals which will produce economic yields of milk under semi-intensive conditions. Several pure-bred Friesian herds are also to be found in the vicinity of Tunis.

Total numbers of cattle have changed little in Tunisia during the past five years, despite plans to improve pastures, forage supplies and supplementary feeds. Under comprehensive irrigation schemes, such as the Medjerda valley scheme, the possibilities of increasing beef and milk production, however, have been spectacularly demonstrated. In the drier areas of the country, where little possibility of pasture or forage production through irrigation exists, little improvement in numbers or in the beefing and milking qualities of cattle can be envisaged in the foreseeable future. Production of mutton, lamb, goatmeat, beef and veal in hase year 1963 was 43,000 M.T. with an annual per capita consumption of

10.2 kg. Mutton, lamb and goatmeat represent approximately 50 per cent of all meats consumed. Total milk production, including the milk of cows, sheep and goats, has tended to level off. In 1965 production was estimated at approximately 180,000 M.T. The proportion of the estimated total supply which passed through commercial channels is not known.

It should be noted that as a result of representations made to the Statistics Division of FAO, figures for buffaloes which have appeared regularly in recent FAO Production Yearbooks, are now to be disregarded for Tunisia. It is believed that there are no buffaloes in that country.

Libya

The land area of Libya is 1.7 million km² of which 1.6 million km² is classified as desert (i.e. with below 100 mm rainfall). Such a situation is obviously not favourable for the production of livestock and particularly cattle. In the past, the livestock industry contributed greatly to agricultural production and exports, but since 1960-1961 with the extended exploitation of petroleum resources, the position has changed radically, the country now imports livestock, meat and milk products on an ever increasing scale. Animal power has also become of decreasing importance to the agricultural economy.

The cattle of Libya were originally of the Brown Atlas type (the Libyan Shorthorn) but these have become mixed through accessions of imported exotic cattle which include Friesian, Brown Swiss, Jersey, Pantellaria and a few Red Sindhi and Sahiwal cattle.

The Libyan Shorthorn is admirably adapted to the severe climatic conditions, having great recuperative powers, and if offered improved conditions, will put on flesh rapidly. With the production of irrigated lucerne in certain areas, this type of intensified production is not only possible but desirable.

Numbers of cattle slaughtered in "official" abattoirs in Libya have changed little since 1960 at around 22,000 per annum. Numbers slaughtered outside recognized abattoirs are assumed to be of the order of 12.5 per cent of the numbers slaughtered officially. Since 1961, imports of live cattle have increased substantially, often arriving clandestinely from Tunisia, Chad and the North Western Desert of the U.A.R. Dairy production in Libya has not yet proceeded very far. A small number of dairy herds

based on Friesian, Brown Swiss and Jersey cattle have sprung up around Tripoli and to a lesser extent Benghazi, to cater for the liquid milk trade.

Pasteurization is rarely practised. Sheep, goats, cows and camels are milked by nomadic and semi-nomadic Bedouin inhabitants for their own domestic needs. Liquid milk production is increasing in Libya as, however, are imports of milk and dairy products. A plant to reconstitute imported milk powder has recently been set up in Tripoli with a capacity of 10,000 litres per day. Domestic milk production in 1965 was estimated to be approximately 50,000 M.T.

In the future, cattle production in Libya will depend on extended use of subterranean water resources for irrigation purposes. Less than one half of the settled area of Libya can normally expect more than 300 mm of annual rainfall and almost all of this precipitation occurs during the winter months. Where irrigation is possible, however, satisfactory yields of lucerne or alfalfa can be grown for stockfeed.

United Arab Republic

There are approximately equal numbers of cattle and buffaloes in the U.A.R. As far as milk production is concerned, the buffalo is the most important milk-producing animal in the country. Buffalo milk has a fat content of 6/8 per cent. In the base year 1963 the aggregate output of milk was estimated¹ at approximately 1,642 million tons, of which 13,295 tons were pasteurized. In the same year, production of soft cheese amounted to 110,000 tons compared with 4,209 tons of processed and hard cheese.

Local cattle are of mixed origin, but in the north east of the Delta Region, the cattle based on Damietta are considered to be of superior type in terms of milk production. The cattle and buffaloes of Egypt are widely dispersed in a series of micro-herds, the property of small farmers particularly in the Delta Region. No large herds are maintained, except on government stations.

¹/ U.A.R. Agriculture - by Hassan Abdallah - 1965.

Current cattle and buffalo breeding policy consists of measures to upgrade local cattle with imported Friesian cattle with a view to improving both size and milking capacity, and through issue to farmers of selected buffalo bulls, to achieve the same objectives. Another project aims to improve the Damietta type of cattle by selection. There is considerable infertility among both cattle and buffaloes, estimated among breeding females to be of the order of 30 per cent. Efforts are currently being made to combat this situation through greater attention to nutritional requirements, particularly in the summer months when there exists a shortage of green fodder, and through a health campaign aimed at eliminating brucellosis, the side effects of which may lead in some instances to infertility.

Future prospects for cattle and buffalo production are promising, due to the additional irrigable land shortly to become available in the Aswan Region, to herd improvement plans currently in operation, and to elimination of disease and infertility amongst breeding females. Greater efforts are to be made to provide supplementary feed through the medium of milling by-products, cotton seed cakes and meal, and through expansion of production of green fodder, and in particular, improved varieties of berseem. To meet domestic demand, however, it will still be necessary to import live cattle, the main supplier to the U.A.R. being the Sudan. The numbers of cattle and buffaloes slaughtered for meat production in the base year 1963 were as follows:

Oxen	53,000
Cows	33,000
Buffaloes	89,000
Veal	245,000
Calves	268,000

Total (1,286 million) head

The comparable total for year 1965 was 1.025 million head.

Sudan

In a country of the Sudan's magnitude, the problems and difficulties of head counting have to be appreciated. It should be noted, however, that cattle numbers as indicated in the FAO Production Yearbooks, 1963 and 1966, have remained stationary since 1960 at a figure of 7 million head.

Such figures are patently unreliable. Figures presented in a recent report prepared by a firm of American consultants^{1/} indicate that in 1963 there were probably 9 - 15 million head which might be projected forward, based on an annual increase of approximately 8.9 per cent. Proposals to extend the anti-rinderpest campaign to the Sudan may, as has occurred in most other countries covered by the campaign, reveal even higher figures. The same report^{1/} suggests, that in the opinion of the consultants, the Sudan offers the greatest potential for increased livestock production in the savanna areas of Northern Africa which stretch eastwards across Africa from Mauritania.

The cattle of the Sudan may be conveniently sub-divided into northern and southern types as follows:

	Approx. number (million)	Southern types	Approx. number (million)
Baggara	4.0	Nilotic	3.0
Riverain	0.25	Mongolla	0.15
Desert	1.25	Tapase	0.35
Red Fellata	0.10		
Kaclib	0.05		

The average number of live cattle exported annually from the Sudan during the decade ending 1964/1965 was 31,750; the U.A.R., Saudi Arabia and Libya providing the chief market outlets.

Numbers of cattle slaughtered in the main towns of the Sudan 1964/65 amounted to 230,732 head. Average carcass weight for cattle of all classes is indicated at approximately 200 lb.

The possibilities of increasing numbers of cattle, and ultimately the total production of beef, are considered to be good (see Chapter I - Sudan).

^{1/} A livestock resources development survey and programme - T.H. Miner and Associates, Inc.

Pre-investment studies have also indicated the credit-worthiness of schemes involving improved grazing management under controlled conditions, the erection of new canning plants and the improvement of several existing abattoirs, all with a view to increasing beef exports from the Sudan.

Several of the Sudanese types of cattle, but particularly the Riverain types (which include the Kenana breed) are noted as possessing reasonably good milking potential. In and around Khartoum and Omdurman and at Wad Medani, the beginnings of a dairy industry are slowly evolving. Encouragement in these efforts is being offered by the Veterinary and Animal Husbandry Departments of the Ministry of Agriculture.

SHEEP AND GOATS

Sheep and goats offer a considerable contribution to supplies of meat and milk in North African countries. The proportion of these species in each country is estimated to be approximately as follows:

Country	Percentage taken from FAO Production Yearbook	
	Sheep	Goats
Morocco	65	35
Algeria	68	32
Tunisia	87	13
Libya	48	52
U.A.R. ^{a/}	68	32
Sudan	64	36

^{a/} See Sudan note.

In North Africa, modern methods of breeding, selection and management are rarely practised, and it is abundantly evident that much development, educational and extension work now requires to be initiated before production performance can be brought to a level even remotely comparable with sheep production enterprise in Western Europe. Sheep and goats in North Africa are required to adapt to climatic and other conditions of considerable variability, wet and dry, cold and hot, coupled with surplus

and scarcity of natural forage and grazing. Environmental conditions of this nature call for specialization and development of adapted local breeds of the several large geographic races identifiable in the Northern sub-region.

Morocco

The sheep of Morocco may be broadly divided into three main ecotypes. The mountain or Berber race, plateau or Arab race, and the coastal or Syrian race.

The sheep of the Berbers include varieties not far removed from the original species of sheep which once populated the Mountainous regions of North Africa. They are generally primitive in form, possessing fleeces of coarse carpet-quality wool which may vary in colour from white through a melange of colours to black. The Berber race is hardy, if slow-maturing, and survives under conditions which prove unsuitable for most other races indicated above. The mutton of the Berber sheep is of good quality. The mature liveweight varies according to local variety and the prevailing environmental conditions, from 24-40 kg. Berber sheep represent approximately 70 per cent of the national Moroccan flock.

Varieties of the Arab race also vary in size, according to environment and the degree of cross-breeding which has taken place with Berber sheep. Varieties of the Arab race are considered to possess good mutton qualities especially when further crossed with imported breeds of sheep.

The coastal sheep of Morocco largely consist of a conglomerate of races to which the Merino and the Barbarin have made a considerable contribution. These coastal sheep are currently the subject of indiscriminate crossing with imported exotic breeds which include: Merinos, Precoces, Champenois, Chatillonnais, and Ile-de-France. The latter breed has possibly contributed most to this improvement of the coastal race in recent years.

Enough has probably been indicated to focus attention on the difficulties, under present conditions, of securing standardization of mutton carcass and wool qualities and of the harmful effects which unconsidered crossing has had in achieving desiderates. Sheep production in Morocco has reached a stage when a thorough going review of breeding and

management policy requires to be made, with guidelines set for the future. Extension work in this field is urgently required.

Sheep's milk production in Morocco in 1965 has been estimated at 1.2 million hl which arises largely from production in the coastal and plateau areas. Sheep milk is consumed by the herders and their families, any surplus being converted into soft cheese or fermented milk.

The greatest concentration of goats in Morocco is noted in the Atlas or Middle Atlas areas of the country. To the south, the goats are fewer in number and smaller in size. Types of goats in Morocco are very mixed and owe their origins principally to the predominant goat of the Middle East. Considerable efforts have been made to effect improvement both in size and milking qualities, through crossing with goats of European and other origins including Murcina, Malaga, Granadina, Malta, Alpine and Angora goats, resulting in a population which is very diversified. Milk production was estimated in 1965 at 900,000 hl which is largely produced and consumed by the herders and their families.

Like most African countries, the goat population requires to be controlled in terms of numbers on account of the destructive nature of their grazing and browsing habits.

Algeria

The sheep of Algeria are predominantly of the fat-tailed Barbarin race although in the mountainous regions of the country, the sheep are in many respects similar to the mountain sheep of Morocco. Numbers have been increasing steadily since 1960. Some of these sheep and goats are milked by the herders for their own domestic needs. Soft cheese is also produced from this milk. Consumption of milk from these sources was estimated in 1965 to be: sheep milk 45 million litres, goat milk 90 million litres.

On account of the scarcity of pasture during the summer season, young male sheep and goats not required for further breeding are frequently slaughtered at an immature stage to relieve grazing pressure on the main flock which is largely composed of breeding females. Under normal management practice, sheep and goats are usually herded as one flock.

Current breeding policy in Algeria is to improve the productive capability of the flocks by selection and use of improved animals from within established selected flocks. In the north, where grazing conditions are most favourable, imports of improved exotic sheep would be likely to be of considerable benefit, especially if, concurrently, grazing conditions were improved.

Goats in Algeria are predominantly of the Middle East type.

Tunisia

Sheep are of much greater importance in Tunisia than goats. Controlled slaughter in 1964 is indicated as follows: Sheep 530,685, goats 46,987. It is difficult in Tunisia, as elsewhere in Africa, to arrive at take-off figures which are meaningful, on account of the considerable numbers of animals known to be slaughtered in rural areas which are unaccounted for in official statistics. For the smaller farm species, such as sheep and goats, the "unofficial" slaughter figure, however, may be assumed to be as great as the officially recorded statistics received from government-supervised abattoirs.

The sheep of Tunisia are predominantly of the Barbarin race, which in general are greatly in need of improvement in terms of mutton conformation, wool, and the factor concerned with early maturity, coupled with a nationwide programme of pasture improvement including the development of irrigated pastures and enclosures.

Sheep and goats in Tunisia are frequently grazed together as one flock under an extensive regime of nomadic or semi-nomadic management. Sheep and goats are milked by the nomads who look after the flocks, chiefly for family consumption.

Libya

While possessing a national herd of sheep and goats numerically as great as Tunisia, the proportion of goats to sheep in the Kingdom of Libya is significantly different, goats actually exceeding sheep in total numbers.

The indigenous sheep of Libya is the Barbarin (the Barbary fat-tailed sheep) which in many respects is similar to the Awassi and Barki sheep of the Middle East. Mature live weight varies between 35-55 kg. producing a mature dead weight of 55-67 per cent of live weight. Lambs reach 15-25 kg at 3-4 months, when males not required for further breeding are usually weaned and slaughtered, with a view to reducing pressure on grazings. Ewes will continue to respond to hand milking for a further 40-60 days after weaning. A reasonably good location yield for a 150 day period has been estimated at 54 litres. In the base year 1963 the total numbers slaughtered (official and unofficial) are indicated as 459,009 and 168,543 for sheep and goats respectively. In 1965 comparable figures are indicated as: sheep 547,759, goats 337,653. In 1962, total meat consumption per caput was indicated as 11.5 kg, of which mutton, lamb and goat meat supplied 6.1 kg, the remainder being beef, veal, camel and poultry meat.

The goats of Libya are mostly of the black coarse-haired type found all over the Middle East. In a country whose soils are largely of a sandy nature and susceptible to wind erosion, goat numbers should be limited as a matter of wise conservation, before irreparable damage is done to the spare vegetative cover of the country.

U.A.R.

The intensity of crop production in the U.A.R. leaves little scope for the development of a major sheep industry. To satisfy demand, additional live sheep are currently imported from Libya and the Sudan to supplement domestic production.

The two principal varieties of sheep produced in the U.A.R. are the Ossimi and the Barki. Both are fat-tailed and provide some wool of carpet quality. In recent years, experiments to improve mutton quality have been attempted through cross-breeding with exotic sheep, notably the Suffolk from the U.K.

Scope for increasing the production of mutton is limited and would rely to a considerable extent on the adoption of more intensive husbandry and breeding techniques which must include a raising of the present levels of fecundity.

Goats in the U.A.R. are predominantly of the black-haired Middle East type, which are maintained in small micro-flocks on the innumerable small farms which are found in the Delta and other irrigated areas. Goat milk provides an important item of diet on many such holdings.

The Sudan

The current sheep and goat population of the Sudan is represented by approximately 55 per cent sheep and 45 per cent goats.

The industry is largely the concern of nomadic or semi-nomadic peoples who live in the savanna or semi-desert areas of the country.

There are five recognizable types of sheep consisting of the Desert type (approximately 4.5 mn), and Taposa (0.5 mn).

Most of these types are hairy sheep, providing little or no wool fibre. Some of the general types are thin tailed while others indicate some of the characteristics of fat-tailed sheep, more commonly found in Middle East countries.

Goats in general may be classified into three broad types, namely: the Nubian (3.5 mn), Desert (1.5 mn) and Nilotic (1.85 mn).

The Desert sheep are long-legged and are considered to be the best mutton type. Nilotic sheep are characteristically very small, with short legs and thin tails. The black-haired Zaghawa sheep of North West Darfur are the sheep of Arab tribes in that area.

During the decade 1955/1956 to 1964/1965, annual exports of live sheep from the Sudan have averaged 110,000, Saudi Arabia and the U.A.R. being the chief customers.

Only in special areas is it possible to foresee sustained improvement in husbandry methods which of necessity would involve water supplies, and enclosure with managed grazing. A lot could be achieved, however, to improve productivity through careful selection of rams and male goats.

Where enclosure is feasible, considerable improvement in productivity levels might be expected through managed grazings, mineral supplementation, and better health control. The outlook in the latter direction is reasonably promising.

PIGS AND POULTRY

It is perhaps not unexpected that since the early sixties swine production has made little headway in the North African sub-region in view of the predominance of Muslims in each country.

However, among all classes of farm livestock, pigs and poultry are known to be the most economic converters into meat of waste food, vegetable wastes and milling by-products. Having regard to an expected increase in overseas tourists to North African countries in the next decade, seasonal production of **pork** and pig products will in all probability continue to find increasing outlets.

Figures representing poultry numbers in recent FAO Production Yearbooks suggest a static situation which, it is believed, does not reflect the true position. In most North African countries, and in particular the U.A.R. and Morocco, modern poultry ventures based on poultry of improved genetic capability, fed on balanced poultry feeds according to modern conceptions of poultry nutrition are finding increased favour. As there is no evidence that traditionally managed poultry are decreasing in numbers, the net effect must be that poultry productivity is increasing.

With expansion of the wheat milling of agro-industry, coupled with an increasing flow of by-products from oil-seed mills, a substantial increase of egg and poultry meat production is technically feasible. On the basis of need to increase the total production of meats of all kinds and recognizing the current low levels of productivity obtainable from beef cattle, sheep and goats, a further strong case for increased poultry production can be supported. In all the circumstances, it is strongly advocated that governments give increasing support to the development of their poultry industries as a means of meeting a likely situation of increasing meat shortage.

HORSES, MULES AND ASSES

With increasing need for communication and an intensification of arable cultivation, horses and mules are expected to play an increasing role over the next two decades in North Africa, but as road communications improve and tractor power becomes more readily available on farms, reliance on these types of domestic farm animals may be expected to steadily decrease.

Statistics indicate that there has been a decline in the use of asses (1960-1965) as pack animals, but as agricultural productivity increases, as inevitably it must, then numbers must be expected to increase until road transport becomes more readily available at rates which offer inducement to change to more modern means of transporting produce to and from markets.

Until such time as traditional farming units evolve into units of greater size, and this may be expected to take some time, the changeover from animal to motorized haulage may be slow.

CAMELS

Camel numbers appear to be fairly static in most North African countries. It may be expected, however, that some considerable time must elapse before this valuable animal gives way to modernization. In the difficult terrain where camels provide transport, farm power, milk and meat at relatively low cost, it may be expected that with increasing pressures of population and need for increased agricultural production over the next two decades, the camel will remain in these situations and will probably even increase in number.

CHAPTER VI

SELECTED AGRICULTURAL INPUTS

Introduction

Yields and outputs are variously affected, in agriculture, by quantitative and qualitative aspects of numerous input factors such as irrigation, seed, fertilizers, insecticides, equipment and extension services. For the purpose of this study attention is directed only to fertilizers, number of tractors and insecticides, fungicides, herbicides and the like in North African agriculture.

Available information on these inputs is rather scanty. However, a brief assessment of present and future situations is presented here.

A. Fertilizers

Consumption of fertilizers in North African countries is confined to the use of nitrogenous, phosphatic and potassic fertilizers in addition to use of ground rock phosphate in Morocco, Algeria and Tunisia. Patterns and quantities of fertilizers used including ground rock phosphate are shown in Table 1. Use of fertilizers in terms of plant nutrients in the six North African countries are indicated in Table 2.

The heaviest rate of fertilizer application per hectare of arable land and land under permanent crops is found in the U.A.R. as indicated in Table 2. With 103.3 kg. (plant nutrients) per hectare this amounts to 19 times more than Morocco, 41 times more than Algeria, 22 times more than Tunisia, 33 times more than Libya and 31 times more than Sudan. Morocco, Algeria and Tunisia use more phosphates as compared with nitrogenous fertilizer. Libya applies more nitrogenous than phosphatic fertilizer. In the U.A.R. and the Sudan the use of nitrogenous fertilizer is much more pronounced than that of phosphate. The use of potassic fertilizers is negligible within the six countries of the sub-region.

Rates of fertilizer application vary according to pattern of crop production, intensification of agriculture, use of irrigation and other similar factors. For instance, percentage of irrigated areas of arable land and land under permanent crops amounts to 100 per cent in the U.A.R., 11.1 per cent in Sudan, 5.8 per cent in Libya, 3.9 per cent in Algeria, 3.4 per cent in Morocco and 1.8 per cent in Tunisia. These percentages would, to a certain extent, account for variability in fertilizer application among the six North African countries.

Fertilizer import-consumption ratios also vary among the six countries considered. The latest information available indicates that these ratios amount to 67 per cent for Morocco, probably 100 per cent for each of Algeria and Libya, 47 per cent for Tunisia, 21 per cent for U.A.R. and 100 per cent for Sudan as indicated in Table 1. In other words, the U.A.R. is the leading consumer and producer of fertilizers in the North African sub-region, followed by Tunisia and Morocco. Algeria, Libya and Sudan are light users of fertilizers, and consequently, these countries have been dependent so far on imports for the whole of their domestic fertilizer needs.

B. Tractors

Number of tractors in agricultural use in the six North African countries are shown in Table 3. Tractors per 1,000 hectares of arable land and land under permanent crops are indicated as follows:

Country	Arable land and land a/ under permanent crops (1,000 hectares)	Tractors b/ (number)	Tractors per 1,000 hectares
Morocco	7,860	10,915	1.4
Algeria	7,066	26,800	3.8
Tunisia	4,334	12,429	2.9
Libya	2,509	2,500	1.0
<u>Maghreb</u>	<u>21,769</u>	<u>52,884</u>	<u>2.4</u>
U.A.R.	2,672	10,994	4.1
Sudan	7,100	215	0.03
<u>Sub-region</u>	<u>31,541</u>	<u>64,093</u>	<u>2.0</u>

a/ Production Yearbook, FAO, 1966.

b/ Table 3.

1/ Computed from FAO Production Yearbook, 1966.

The U.A.R., Algeria and Tunisia are relatively superior in agricultural use of tractors. Morocco and Libya are next in order, but Sudan's agriculture is least associated with tractor use. The contemporary agricultural development associated with the growing implementation of co-operative organizations in agriculture will most likely increase the tractor/land ratio in most, or at least in some, of these North African countries. This increase will probably become relatively more pronounced in the next decade.

C. Protective chemicals

Modern farming is increasingly associated with the application of protective chemicals such as insecticides, fungicides, fumigants, herbicides, and other chemicals providing similar functions. Table 4 indicates the pattern of applying protective chemicals in the North African agriculture. Available rates of application are summarized below:

Country	Arable land and land a/ under permanent crops (1,000 hectares)	Protective chemicals b/ (metric tons)	Metric tons per 1,000 ha
Morocco	7,860	1,318.0	0.17
Algeria	7,066	975.6	0.14
Tunisia	4,334	24,264.0	5.60
Libya	2,509	38.7	0.02
<u>Maghreb</u>	<u>21,769</u>	<u>26,596.3</u>	<u>1.22</u>
U.A.R.	2,672	14,772.3	5.53
Sudan	7,100	--	--
<u>Sub-region</u>	<u>31,541</u>	<u>41,368.6</u>	<u>1.31</u>

a/ FAO Production Yearbook, 1966.

b/ Table 4.

Tunisia and U.A.R. are relatively active in applying protective chemicals to their agriculture. Morocco and Algeria are still behind in this respect, while Libya and Sudan are not significant users of these protective chemicals. With the spread of technical knowledge among the North African farmers, chemical practice in agriculture will inevitably become more common in the next few years.

D. Projections

Increase in the technical level of the sub-region's agricultural producers will certainly have an influence on future agricultural practice. Promotion of the latter will obviously necessitate increase in fertilizer use, use of tractors, and the wider use of protective chemicals. In projecting the increase in the quantity of these inputs the projected growth rates of gross output of the agricultural sector have been applied.^{1/} Projected amounts of total fertilizer inputs are shown below:

Fertilizers (1,000 metric tons)

Country	1970	1975	1980
Morocco	48.5	56.2	65.2
Algeria	19.9	22.5	26.1
Tunisia	22.5	26.1	30.3
Libya	8.7	9.6	10.6
<u>Maghreb</u>	<u>99.6</u>	<u>114.4</u>	<u>132.2</u>
U.A.R.	327.9	399.0	485.5
Sudan	28.1	35.0	43.6
Sub-region	455.6	548.4	661.3

^{1/} The projected growth rates of gross output in agriculture are estimated as follows:

Country	1961 -1964-1970	1970-1975	1975-1980
Morocco	2.5	3.0	3.0
Algeria	2.0	2.5	3.0
Tunisia	2.5	3.0	3.0
Libya	2.0	2.0	2.0
U.A.R.	3.5	4.0	4.0
Sudan	4.0	4.5	4.5

The projections of the number of tractors are indicated below:

Number of tractors in agriculture

<u>Country</u>	<u>1970</u>	<u>1975</u>	<u>1980</u>
Morocco	13,153	15,248	17,677
Algeria	32,026	36,234	42,006
Tunisia	14,062	16,302	18,899
Libya	2,872	3,171	3,501
Maghreb	62,113	70,955	82,083
U.A.R.	14,983	18,230	22,180
Sudan	306	381	475
Sub-region	77,402	89,556	104,738

Likewise the projections of protective chemicals are indicated below:

Protective chemicals (metric tons)

<u>Country</u>	<u>1970</u>	<u>1975</u>	<u>1980</u>
Morocco	1,567	1,817	2,106
Algeria	1,166	1,319	1,529
Tunisia	27,452	31,825	36,895
Libya	44	49	54
Maghreb	30,229	35,010	40,584
U.A.R./Sudan	17,544	21,346	25,972
Sub-region	47,773	56,356	66,556

a/ Application of protective chemicals throughout the projection period may prove to be relatively insignificant.

Increase in the use of the above mentioned inputs is likely to be achieved through intensification of agriculture, at least for most of the countries taken into consideration, rather than through expansion of agricultural land area. Such trends will probably lead to a more intensive input/land ratio by 1970, 1975 and 1980.

Table 1 : North African sub-region - Production, exports, imports, and consumption ('000, M.T.)

	Fertilizers (in plant nutrients)										Ground Rock Phosphate			
	1959-1960					1962-1963					1964-1965			
	N	Ph	Po	Total		N	Ph	Po	Total		N	Ph	Po	Total
Morocco	P. 6.6	15.7				15.6					27.2	8		
	E. 6.6	1.5	5.2	13.3	13.8	2.4	8.3	24.5	18.3	2.1	8.3	28.7		
	I. 6.6	17.1	5.2	28.9	15.8	18.4	10.1	44.3	15.3	20.0	7.6	42.0		
	C. 6.6													
Algeria	P. 15.4													
	E. 13.6	11.2	16.8	41.6										
	I. 13.6	26.6	16.8	57.0	15.0			15.0	18.0 ^a			18.0		
	C. 13.6													
Tunisia	P. 62.0													
	E. 53.0													
	I. 1.8	0.2	2.2	4.2	4.0				5.7 ^a		3.7 ^a	9.4 ^a		
	C. 1.8	9.2	2.2	13.2	4.0				5.7 ^a	10.5 ^a	3.7 ^a	19.9 ^a		
Libya ^{b/}	P.													
	E.													
	I.								4.4	3.4	0.1	7.0		
	C.													
Maghreb	P.	93.1				15.6								
	E.	53.0												
	I. 48.5	12.9	24.2	85.6	17.8	2.4	8.3	28.5	24.0	2.1	12.0	38.1		
	C. 48.5	52.9	24.2	125.6	34.8	18.4	10.1	63.3	43.4	33.9	11.4	88.7		
U.A.R.	P. 38.1	25.0			120.4	34.2								
	E. 0.1	1.3												
	I. 67.8			67.8										
	C. 105.7	25.0		130.7	196.1	41.6	1.2	238.9	227.1 ^a	48.0 ^a	1.0 ^a	276.1 ^a		
Sudan	P.													
	E.													
	I. 11.4	0.1	0.1	11.6	18.7	0.5		19.2	23.1			23.1		
	C. 11.4	0.1	0.1	11.6	18.7	0.5		19.2	23.1			23.1		
Sub-region	P. 38.1	118.1			120.4	49.8								
	E. 0.1	54.3												
	I. 127.7	13.0	24.3	165.0	36.5	2.9	8.3	47.7	105.9	2.1	12.0	120.0		
	C. 165.6	78.0	24.3	267.9	249.6	60.5	11.3	321.4	293.6	81.9	12.4	387.0		

Source: Fertilizers, FAO, 1966.

P = Production; E = Exports; I = Imports; C = Consumption; N = Nitrogenous; Ph = Phosphates; Po = Potash.

^{b/} The use of fertilizers in 1965 Bulletin No. 3.^{a/} 1963/1964.

Table 2 : Rates of fertilizer application (North African sub-region)

Country	Arable land and land under permanent crops (1,000 hectares)	Fertilizers used (in terms of plant nutrients, '000 M.T.)	Kg. per hectare
Morocco	7,860	42.9	5.5
Algeria	7,066	18.0	2.5
Tunisia	4,334	19.9	4.6
Libya	2,509	7.0	3.1
Maghreb	21,769	88.7	4.1
U.A.R.	2,672	276.1	103.3
Sudan	7,100	23.1	3.3
Sub-region	31,541	387.9	12.3

a/ FAO Production Yearbook, 1966.

b/ Table 1.

Table 3 : Number of tractors in agriculture use (North African sub-region)

Country	1961	1963	1965
Morocco	11,454	10,915 ^{a/}	
Algeria	26,800		
Tunisia		11,594	12,429 ^{c/}
Libya	2,562	2,500	
Maghreb			
U.A.R.	10,994		
Sudan	215 ^{b/}		
Sub-region			

Source: FAO Production Yearbook, 1966.

a/ 1962.

b/ 1952-1956.

c/ 1964.

Table 4 : North African sub-region - Application of insecticides, fungicides, fumigants, herbicides and the like (metric tons)

Country	Input	1961	1963	1965
Morocco	Insecticides	415.6	434.4 ^{b/}	-
	Fungicides	855.0	617.0 ^{b/}	-
	Fumigants	160.0	178.0 ^{b/}	-
	Herbicides	67.2	72.0 ^{b/}	-
	Others	16.6	16.6	-
Algeria	Insecticides	727.6	-	-
	Fungicides	132.0	-	-
	Fumigants	-	-	-
	Herbicides	108.0	-	-
	Others	8.0	-	-
Tunisia	Insecticides	-	-	-
	Fungicides	-	12,148	24,264 ^{c/}
	Fumigants	-	-	-
	Herbicides	-	-	-
	Others	-	1,948	1,737
Libya	Insecticides	16.3	7.4 ^{b/}	-
	Fungicides	-	31.3 ^{b/}	-
	Fumigants	-	-	-
	Herbicides	-	-	-
	Others	-	-	-
Maghreb	Insecticides	-	-	-
	Fungicides	-	-	-
	Fumigants	-	-	-
	Herbicides	-	-	-
	Others	-	-	-
U.A.R.	Insecticides	6,761.5	4,738.8	9,189.3
	Fungicides	6,360.0	3,766.0	5,583.0
	Fumigants	108.0	-	-
	Herbicides	94.0	-	-
	Others	-	-	-
Sudan	Insecticides	-	-	-
	Fungicides	-	-	-
	Fumigants	-	-	-
	Herbicides	-	-	-
	Others	-	-	-
Sub-region	Insecticides	-	-	-
	Fungicides	-	-	-
	Fumigants	-	-	-
	Herbicides	-	-	-
	Others	-	-	-

Source: FAO Production Yearbook, 1966. a/ 1952-1956. b/ 1962. c/ 1964.

ANNEX

METHODOLOGY AND CRITERIA USED IN THE PROJECTIONS

Introduction

Methodology and criteria used in preparation of the foregoing quantitative projections are products of discussion and agreement between Messrs. A.S.B. Wilson, A.Z. Sheira and S.E. Shehata, the three experts who participated in the preparation of the report on the agricultural sector pertaining to the ECA Study on Industrialization and Economic Cooperation for North Africa.

A. Overall assumption

(a) The year 1963 was chosen as the base year for the projections since it was considered to be reasonably normal and recent. Whenever figures were unavailable or substantially high or low, either 1960 or 1965 was used as the base year;

(b) The full projection period, covering 17 years, has been divided into three sub-periods, 1963 (or substitute) - 1970, 1970-1975 and 1975-80.

(c) Population growth rates selected are based on recent ECA demographic projections. Country and sub-periodic annual rates are indicated as follows:

Country	1963-70	1970-75	1975-80
Morocco	3.1	3.4	3.5
Algeria	3.3	3.0	3.0
Tunisia	2.2	2.4	2.3
Libya	2.6	2.4	2.1
MAGHREB	3.0	3.0	3.1
U.A.R.	2.9	3.1	3.1
Sudan	2.5	2.5	2.6
Sub-region	2.9	3.0	3.0

(d) Annual rate of growth of the gross domestic product and per capita income were taken from provisional macro-economic data based on the sub-region's actual and projected economic development during the period 1964-1980. The following basic data on total and per capita GDP, suggested by Professor Bos, coordinator of the entire ECA Industry-Division project, have been used as guidelines in the projections.

Country	1963-1970 ^{a/}	1970-1975	1975-1980
Morocco			
Total GDP	4.0	5.0	6.0
Item <u>per capita</u>	1.0	2.1	3.0
Algeria			
Total GDP	4.5	5.0	5.5
Item <u>per capita</u>	1.6	2.1	2.6
Tunisia			
Total GDP	5.8	6.3	6.8
Item <u>per capita</u>	2.8	3.3	3.8
Libya			
Total GDP	15.0	7.0	7.0
Item <u>per capita</u>	11.5	4.0	4.0
U.A.R.			
Total GDP	5.5	6.0	7.0
Item <u>per capita</u>	2.8	3.2	4.2
Sudan			
Total GDP	4.0	5.0	6.0
Item <u>per capita</u>	0.9	1.9	3.1

^{a/} Minor deviations in length of period have occasionally been used.

(e) Coefficients for income elasticity of demand for a number of commodities plus other projection patterns, were taken from the FAO Agricultural Commodities Projections for 1975 and 1985, Volumes I and II, Rome 1967.

(f) The guidelines, suggested by Prof. Bos, for the preparation of these projections have been followed as nearly as possible. Otherwise, meetings between the three experts have arrived at decisions concerning the relevant criteria.

B. Demand projections

(a) Cereals: Domestic demand has been assumed according to circumstances, as dependent either on increase in population or on increase relative to population and per capita income. Rates used are:

Wheat and wheat flour: Projection coefficients allow for population rates and income elasticity of demand. Country coefficients calculated for the three sub-periods are:

<u>Country</u>	<u>1963-1970</u>	<u>1970-1975</u>	<u>1975-1980</u>	<u>Income elasticity</u>
Morocco	3.5	4.2	4.7	0.4
Algeria	3.6	3.4	3.5	0.2
Tunisia	3.3	3.7	3.8	0.4
Libya	7.2	4.0	3.7	0.4
U.A.R.	3.7	4.1	4.4	0.3
Sudan	3.1	3.8	4.8	0.7

Barley: In view of the 1960-1965 downward trend, projection coefficients were based on population rates only.

Maise: Both population rates and income elasticity of demand (for coarse grains) were taken into account. Coefficients used were:

<u>Country</u>	<u>1963-1970</u>	<u>1970-1975</u>	<u>1975-1980</u>	<u>Income elasticity</u>
Morocco	3.3	3.8	4.1	0.2
Algeria	3.6	3.4	3.5	0.2
Tunisia	2.8	3.1	3.1	0.2
Libya	4.9	3.2	2.9	0.2
U.A.R.	3.5	3.7	3.9	0.2
Sudan	2.7	2.9	3.2	0.3

Rice (paddy): Population rates and income elasticity were taken into consideration:

<u>Country</u>	<u>1963-1970</u>	<u>1970-1975</u>	<u>1975-1980</u>	<u>Income elasticity</u>
Morocco	3.5	4.2	4.7	0.4
Algeria	3.9	3.8	4.0	0.4
Tunisia	3.3	3.7	3.8	0.4
Libya	8.4	4.4	4.1	0.5
U.A.R.	3.7	4.1	4.4	0.3
Sudan	3.6	4.8	6.3	1.2

Millet and sorghum: As coarse grains, maize coefficients were used to project domestic demand (-1 per cent for U.A.R.)

(b) Starchy roots

Potatoes: For this commodity, elasticity coefficients were combined with population rates. The calculated rates were:

<u>Country</u>	<u>1963-1970</u>	<u>1970-1975</u>	<u>1975-1980</u>	<u>Income elasticity</u>
Morocco	3.3	3.8	4.1	0.2
Algeria	3.5	3.2	3.3	0.1
Tunisia	2.8	3.1	3.1	0.2
Libya	4.9	3.2	2.9	0.2
U.A.R.	3.5	3.7	3.9	0.2
Sudan	2.9	3.4	4.2	0.5

Sweet potatoes: Production has been assumed to satisfy domestic demand.

(c) Sugar: Figures were compiled and projected on a raw sugar basis. Coefficients used have been based on population rates and income elasticity.

<u>Country</u>	<u>1963-1970</u>	<u>1970-1975</u>	<u>1975-1980</u>	<u>Income elasticity</u>
Morocco	3.6	4.4	0.5	0.5
Algeria	4.4	4.5	4.8	0.7
Tunisia	4.4	5.0	5.3	0.8
Libya	11.8	5.6	5.3	0.8
U.A.R.	5.4	6.0	6.9	0.9
Sudan	3.3	4.2	5.4	0.9

(d) Pulses and groundnuts: Population rates and income elasticity have been applied to establish the following coefficients:

<u>Country</u>	<u>1963-1970</u>	<u>1970-1975</u>	<u>1975-1980</u>	<u>Income elasticity</u>
Morocco	3.4	4.0	4.4	0.3
Algeria	4.1	4.0	4.3	0.5
Tunisia	3.9	3.7	3.8	0.4
Libya	6.0	3.6	3.3	0.3
U.A.R.	4.3	4.7	5.2	0.5
Sudan	2.8	3.1	3.5	0.3

(e) Vegetables: This commodity group includes tomatoes, onions and other vegetables. Domestic demand for the former two items has been projected on the basis of population rates and income elasticity. The following coefficients were used:

<u>Country</u>	<u>1963-1970</u>	<u>1970-1975</u>	<u>1975-1980</u>	<u>Income elasticity</u>
Morocco	3.6	4.4	5.0	0.5
Algeria	3.9	3.8	4.0	0.4
Tunisia	4.2	4.7	5.0	0.7
Libya	4.9	3.2	2.9	0.2
U.A.R.	3.7	4.1	4.4	0.3
Sudan	3.1	3.8	4.8	0.7

Meanwhile, domestic demand for other vegetables has been projected on the basis of pre-projected production equating with domestic demand.

(f) Fruits: This group of commodities includes citrus (all varieties), bananas, and other fruits. The latter includes dates, apples, pears and figs (fresh basis). The three sets of coefficients used have been based on population rates and income elasticity. Citrus coefficients are indicated as follows:

<u>Country</u>	<u>1963-1970</u>	<u>1970-1975</u>	<u>1975-1980</u>	<u>Income elasticity</u>
Morocco	3.7	4.7	5.3	0.6
Algeria	4.3	4.3	4.6	0.6
Tunisia	3.9	4.4	4.6	0.6
Libya	9.5	4.8	4.5	0.6
U.A.R.	5.7	6.3	7.3	1.0
Sudan	3.1	3.8	4.8	0.7

Coefficients used for bananas are as follows:

<u>Country</u>	<u>1963-1970</u>	<u>1970-1975</u>	<u>1975-1980</u>	<u>Income elasticity</u>
Morocco	3.6	4.4	5.0	0.5
Algeria	4.1	4.0	4.3	0.5
Tunisia	3.9	3.7	3.8	0.4
Libya	4.9	3.2	2.9	0.2
U.A.R.	4.3	4.7	5.2	0.5
Sudan	3.1	3.8	4.8	0.7

Domestic demand for other fruits indicated above has been projected on the basis of the following coefficients:

<u>Country</u>	<u>1963-1970</u>	<u>1970-1975</u>	<u>1975-1980</u>	<u>Income elasticity</u>
Morocco	3.6	4.4	5.0	0.5
Algeria	4.1	4.0	4.3	0.5
Tunisia	3.9	3.7	3.8	0.4
Libya	7.2	4.0	3.7	0.4
U.A.R.	4.6	5.0	5.6	0.6
Sudan	3.1	3.8	4.8	0.7

Domestic demand for other fruits, namely, grapes, (in terms of wine)^{1/} olives, peaches and apricots have been projected on somewhat different assumptions. Domestic demand for wine has been projected on rates of growth of total GDP as follows:

Country	1963-1970	1970-1975	1975-1980
Morocco	4.0	5.0	6.0
Algeria	4.5	5.0	5.5
Tunisia	5.8	6.3	6.8
Libya	15.0	7.0	7.0
U.A.R.	5.5	6.0	7.0
Sudan	4.0	5.0	6.0

Domestic demand for olives in the Maghreb countries has been estimated by projecting both production and exports on the basis of population rates and by subtracting the latter from the former. For each of U.A.R. and Sudan domestic demand for olives has been estimated on the assumption that per capita consumption of olives in these countries amounts to one tenth of that in the Maghreb countries.

Domestic demand for each of peaches and apricots has been assumed to equal production which has been projected on the basis of rates of population growth.

(g) Livestock numbers: Pre-projected total numbers are assumed to equate with net numbers, in all countries of the sub-region, for all classes of cattle, poultry, camels, horses, mules, asses and pigs. Net numbers of sheep and goats have been projected on the basis of FAO projection figures for per capita consumption of mutton and lamb.^{2/}

(h) Livestock products: Items covered under this head are eggs in shell, greasy wool, milk and milk products. Domestic demand for eggs in shell have been projected for Libya on the basis of population rates plus income elasticity. Coefficients used for Libya were 16.4 - 7.2 - 6.9 (elasticity, 1.2). Domestic demand for eggs in shell for other countries of the sub-region has been projected as being equal to production plus or minus foreign trade. The latter being calculated on the basis of 1965 relative trade (as measured against production). This approach was found to be much more satisfactory.

- 1/ About 90 per cent of the sub-region's grapes are used for the production of wine.
- 2/ Agricultural Commodities Projections for 1957 & 1985, Vol. II, Rome 1963.

Domestic demand for greasy wool was projected (except for the Sudan), on rates of growth of total GDP previously indicated. Domestic demand for liquid milk has been assumed equal to levels of production. Data on production of milk products¹ are not available and therefore projection of foreign trade of these and butter commodities has been undertaken using population growth rates of 3 per cent for the latter.²

However, the projection of milk production has been undertaken. Coefficients used for projecting imports of milk products have been calculated as follows:

Country	1963-1970	1970-1975	1975-1980	Income elasticity
Morocco	3.9	5.1	5.9	0.8
Algeria	4.4	4.5	4.8	0.7
Tunisia	5.0	5.7	6.1	1.0
Libya	11.8	5.6	5.3	0.8
U.A.R.	5.1	5.7	6.5	0.8
Sudan	3.0	3.4	4.2	0.5

Coefficients used to project imports of butter are indicated as follows:

Country	1963-1970	1970-1975	1975-1980	Income elasticity
Morocco	3.6	4.4	5.0	0.5
Algeria	4.9	5.1	5.6	1.0
Tunisia	3.6	4.0	4.2	1.5
Libya	14.1	6.4	6.1	1.0
U.A.R.	5.1	5.7	6.5	0.8
Sudan	3.2	4.0	5.1	0.8

¹/ Evaporated, condensed or dried milk, cheese and curd.

²/ Fresh, chilled, frozen and canned, and meat preparations.

Likewise, domestic demand for meats traded^{1/} were assumed to equal the balance between imports and exports. The latter were projected on 0 per cent annual rate of increase, and the former on population rates and income elasticity figures. Coefficients used were:

Country	1963-1970	1970-1975	1975-1980	Income elasticity
Morocco	4.0	5.3	6.2	0.9
Algeria	5.1	5.3	5.9	1.1
Tunisia	4.7	5.4	5.7	0.9
Libya	14.1	6.4	6.1	1.0
U.A.R.	5.4	6.0	6.9	0.9
Sudan	3.1	3.8	4.8	0.7

(i) Fats and oils: This group of commodities includes olive oil and oil seeds, namely cotton seed, linseed, sunflower seed, castor beans, and sesame seed. Domestic demand for these commodities has been projected on the basis of population rates and income elasticity. The coefficients used were:

Country	1963-1970	1970-1975	1975-1980	Income elasticity
Morocco	3.8	4.9	5.6	0.7
Algeria	4.9	5.1	5.6	1.0
Tunisia	4.4	5.0	5.3	0.8
Libya	11.8	5.6	5.3	0.8
U.A.R.	5.4	6.0	6.9	0.9
Sudan	3.1	3.8	4.8	0.7

(j) Others: This group of commodities includes alfa, cork, cotton, lint and unmanufactured tobacco. For cotton and tobacco, domestic demand has been projected on rates of growth of total GDP. Those of cork have been calculated as the residual of constant production and constant exports. Domestic demand for alfa has been projected on the basis of decreasing rates of production and exports, namely, -1 per cent and -2 per cent respectively, per annum.

^{1/} Fresh, chilled, frozen and canned, and meat preparations.

C. Production projections

In view of discussions held between the three experts, feasible projection targets have been indicated as follows:

(a) Cereals:

Wheat^{1/} With the exception of Algeria and U.A.R. it was felt that rates of growth for the whole projection period would in varying degree fall short of the high rates achieved in the previous five years. The relevant rates for these projections have been taken as 2.9 per cent for Morocco, 2.7 per cent for Tunisia, 2.5 per cent for Libya and 6 per cent for Sudan. Both Algeria and U.A.R. are thought to be capable of increasing wheat production, over the projection period, at an annual rate of 2.5 per cent for the former and 3.1 per cent for the latter.

Barley: In view of the pronounced downward trend of production over the 1960-1965 period, an annual rate of 1 per cent increase has been adopted throughout the projection period for each of the sub-region's six countries.

Maize: Production is mainly confined to U.A.R. and Morocco. Relevant rates assumed for projection purposes in these two countries, have been taken as 3.5 per cent and 2 per cent per annum, respectively. Each of the other Maghreb countries have been treated as for Morocco, but the projection for the Sudan has been calculated on the basis of 1 per cent annual rate of increase.

Rice: Taking into account both land and water availability, production of rice was projected at 4 per cent annual rate of increase in Morocco, 1 per cent for Algeria and 4.5 per cent in the U.A.R. For the Sudan, production was assumed to satisfy the pre-projected domestic demand for the crop.

Millet and sorghum: Production projections have been based on the assumed criterion of satisfying the pre-projected domestic demand.

^{1/} Wheat flour has been added to wheat, using 80 per cent conversion factor.

The foregoing production projections for cereals will necessitate substantial importation of wheat and maize at both Maghreb and ~~sub~~-regional levels. The Maghreb will have to remain net importer of rice but the sub-region will remain a net exporter of the crop.

(b) Starchy roots

Potatoes: Production rates have been assumed to increase at modest rates: say, 1 per cent less than population, in Tunisia, Libya and Sudan. Rates of production increase are expected to equate with population increase in Morocco, Algeria and U.A.R.

Sweet potatoes: As a minor starchy crop, 2 per cent annual rate of increase has been assumed feasible for the producing countries of the sub-region.

(c) Sugar

For the U.A.R., the main sugar producer in the sub-region, production projection has been based on the FAO average rates.^{1/} Continuation of these rates has been assumed until 1980. In view of future expectations in Morocco, Algeria, Tunisia and the Sudan, the same rates were also used for production **projections**. Accordingly, the Maghreb and the sub-region as a whole are expected to remain **net** importers of sugar over the projection period.

(d) Pulses and nuts

Review of future possibilities for production expansion indicates that a reasonable annual rate of production increase for pulses would most likely amount to 3 per cent and 2 per cent for the U.A.R. Other countries in the sub-region are expected to be able to increase production at a rate equal to increase in population. In view of these assumptions, the Maghreb countries and the whole of the sub-region will remain substantial net exporters of pulses over the projected period.

Production increases for groundnuts are likely to follow yet another set of rates. For Morocco and Algeria imports are expected to satisfy the

^{1/} FAO Agricultural Commodities Projections for 1975 and 1985, Vol. 1, P.186.

pre-projected domestic demand for the commodity. Both Libya and the U.A.R., should be able to increase production of groundnuts at rates equating with population increase. The Sudan is expected to increase production at an annual rate of increase of 4 per cent. As a result, the Maghreb is expected to be a more pronounced net importer of groundnuts, but the sub-region to remain a substantial net importer.

(e) Vegetables

This group of commodities covers tomatoes, onions and other vegetables. For the first two, production has been projected at population rates in all countries of the sub-region, excluding the U.A.R. For the latter, annual rates of 4 per cent and 5 per cent were used for tomatoes and onions, respectively. Population rates were used as the basis for production projections of other vegetables in all countries of the sub-region.

Accordingly the Maghreb is expected to become a net importer of tomatoes and onions. The sub-region will also be a net importer of tomatoes and will remain a net exporter of onions.

(f) Fruits

Citrus (all varieties), bananas and other fruits are the principal components of this group. Projections of citrus production are based on FAO patterns of average production/consumption rates.^{1/} Banana production is assumed to equal the pre-projected domestic demand. Production projections for other fruits have been based on a number of criteria as follows:

1. Grapes: Annual rate of 1.5 per cent for Libya and U.A.R. and 0.5 per cent for the other Maghreb countries.

Wines: Production for Morocco has been calculated on the basis of the assumption of continuation of the 1960-1965 trend of wine exports. Algeria's 1960-1965 production trend is assumed to continue until 1980. Tunisia's wine production has been assumed to be equal to the pre-projected domestic demand plus an equivalent volume of wine exports. Production projection for Libya and U.A.R. is assumed to be equal to domestic demand. Sudan can satisfy its domestic demand only through importation of wine.

^{1/} Ibid., Volume I, P.207.

2. Olives: Production has been projected as likely to follow population rates.
Olive oil: The U.A.R. and Sudan will continue to satisfy domestic demand through imports based on population rates.
3. Figs: Production has been assumed to equate with domestic demand.
4. Apples: Production has been assumed to equate with domestic demand minus imports, the latter following the 1960-1965 trend. Libya and Sudan would continue to import all their domestic demand.
5. Pears: Production is assumed to equate with pre-projected domestic demand.
6. Peaches: Population rates have been used to calculate production levels.
7. Apricots: Production projection has been assumed to equate with population rates.
8. Dates: Production has been projected on the basis of population rates.

The foregoing projections for fruits indicate that the Maghreb as well as the whole sub-region will remain net exporters of citrus, wine and olives and net importers of apples, dates and olive oil.

(g) Livestock numbers

Cattle: Total numbers have been projected at 3 per cent annual rate of increase.

Sheep and goats: Total numbers have been projected at 1.5 per cent annual increase for Morocco, Algeria, Tunisia, U.A.R. and Sudan^{1/}. Libya's annual increase has been projected at almost zero rate.^{2/}

^{1/} The base period for Tunisia was the average of 1963 and 1965.
^{2/} Actually 0.3 per cent.

Camels: Numbers have been assumed to increase according to past trends except for Sudan where the rate of increase has been assumed to be 1 per cent annually.

Pigs: Total numbers have been assumed to equate with pre-projected net numbers.

Poultry: Total numbers have been projected at the respective population rates.

In view of the above projections, the Maghreb and the sub-region will become net exporters of sheep and goats.

Horses: Population rates have been used as the basis of projecting numbers.

Mules and asses: Population rates minus 1 per cent have been used as the basis of projections.

(h) Livestock products

Eggs: Production projections for eggs in shell follow those of population rates (as with poultry).

Wool: Except for Sudan, rates identical to those for sheep and goats have been used for projection.

Milk: An annual rate of 3 per cent has been taken, as with cattle, as the base for projections.

Milk products: Production figures do not exist. Imports have been projected on population rates plus income elasticity as previously indicated. Exports follow a 3 per cent annual increase pattern.

Trade meat: Same procedures have been used as milk products, except that exports have been assumed, constant in absolute terms.

It becomes obvious that the Maghreb and the whole of the sub-region will become considerable net importers of eggs and wool.

(i) Fats and oils

Olive oil: See Olives.

Cottonseed: Production has been projected according to FAO main patterns of average production/consumption ratios.^{1/} In other cases projections were calculated as being proportionate to cotton production.

Linseed: For Morocco, an increase of one thousand metric tons each year has been assumed. For Tunisia and U.A.R., production has been assumed as being equal to the pre-projected domestic demand.

Sunflower seed: Production for Morocco (the only major producer) has been projected on the basis of population rates.

Castor beans: Production for Libya and Sudan has been inflated by a 4 per cent annual rate.

Sesame seed: Annual rate of production increase has been assumed as 3 per cent for the U.A.R. and 4 per cent for the Sudan.

The sub-region will become a net importer of cottonseed but a substantial net exporter of sesame seed, linseed and castor beans.

(j) Others

Alfa: Production has been assumed to decrease at the rate of 1 per cent per annum.

Cork: Production will probably remain constant in absolute terms.

Cotton lint: Production has been projected on the basis of FAO average production/consumption ratios.^{2/}

1/ FAO Projections (Volume I), Ibid PP. 267 & 273 (for U.A.R. and Sudan).

2/ As of cottonseed, Morocco's production at a yearly increase of one thousand metric tons; Algeria 10 per cent annual increase.

Unmanufactured tobacco: Production has been calculated as equal to the pre-projected domestic demand (as for Libya) or equal to domestic demand plus or minus the pre-projected exports or imports.

The sub-region will remain a large net exporter of cotton lint, alfa and cork but will also remain a significant net importer of unmanufactured tobacco.

D. General evaluation of the projections

These projections meet in general two main criteria:

1. To the experts' knowledge, they appear reasonably feasible provided production techniques are substantially modernized.

2. For most of the commodities considered, these projections allow for a reasonable rise in levels of living, in both the Maghreb and the sub-region, expressed as per capita share in domestic demand.

The per capita share of domestic demand (in kg) has been calculated as follows for the years 1963, 1970, 1975 and 1980, for both the Maghreb and the sub-region.

Per capita share of domestic demand (kg) (years 1963, 1970, 1975 and 1980 respectively)

	Maghreb				Sub-region				
	1963	1970	1975	1980	1963	1970	1975	1980	
Wheat plus wheat flour	141.7	148.2	153.2	160.0	110.5	116.5	121.9	129.0	
Maize	12.4	15.4	14.7	14.0	34.8	37.4	38.2	39.3	
Rice (paddy)	1.2	1.3	1.4	1.5	26.9	28.5	30.1	32.2	
Sugar (raw)	24.0	26.1	28.1	30.8	18.0	20.2	22.3	25.4	
Potatoes	17.8	18.3	18.6	19.0	12.8	13.2	13.6	14.0	
Citrus	13.9	13.2	14.1	15.4	12.0	13.0	14.7	17.2	
Cotton lint	0.20	0.31	0.34	0.39	2.0	3.3	3.8	4.6	
Tobacco (unmanufactured)	0.55	0.64	0.72	0.83	0.40	0.48	0.55	0.64	
Groundnuts in shell	0.5	1.7	1.8	1.9	2.7	3.2	3.3	3.5	
Olive oil	4.2	5.6	6.2	6.9	1.7	2.4	2.6	2.9	
Sesame seed	0.05	0.06	0.05	0.05	5.3	5.1	5.0	4.9	
Wines	27.0	30.0	33.1	37.5	11.2	12.5	13.9	15.8	
Sunflower seed	0.32	0.34	0.38	0.43	0.13	0.14	0.16	0.18	
Castor beans					0.01	0.04	0.015	0.018	
Cotton seed	0.5	0.5	0.6	0.6	15.3	17.9	20.5	24.6	
Linseed	0.12	0.13	0.15	0.17	0.21	0.24	0.28	0.33	
Alfa		Decreasing					Decreasing		
Cork		Decreasing					Decreasing		
Wool (greasy)	0.6	1.3	1.4	1.6	0.3	0.9	1.0	1.2	
Eggs in shell	2.6	2.7	2.8	2.8	1.9	1.9	1.9	2.0	
Liquid milk	38.0	38.0	37.9	37.7	51.3	51.7	51.7	51.7	
Tomatoes	19.5	21.0	22.0	23.2	Excluding Sudan				
Onions	4.0	4.2	4.5	4.7	9.5	10.1	10.6	11.4	
Pulses	3.0	3.2	3.4	3.6	4.6	4.8	5.0	5.3	
Dates	7.6	8.3	8.7	9.3	10.2	11.3	12.2	13.6	
Figs	8.2	8.8	9.2	10.0	3.5	3.8	4.0	4.3	