



MICROFICHE N°

00311

République Tunisienne

MINISTÈRE DE L'AGRICULTURE

CENTRE NATIONAL DE

DOCUMENTATION AGRICOLE

TUNIS

الجمهورية التونسية

وزارة الزراعة

المركز القومي

للتوثيق الفلاحي

تونس

F

1

Final

PROCEEDINGS

THIRD REGIONAL WHEAT WORKSHOP

- Durum Wheat Improvement
- Weed Control
- Crop Rotation with Annual Forage Legumes
- Seed

Tunis, Tunisia
APRIL 28 - MAY 2, 1975

CONTENTS

Part I. INTRODUCTION

Section	Title	Author	Page
I	Introduction		v
II	Conference Opening	A. Ben Hachem and M. J. Le Moine	1

Part II. DURUM WHEAT

1	Importance of Durum Wheat in the World Food Supply	C. T. Somerville Muynck	4
2	COMAF's International Role in Improving Durum Wheat	G. Fingra, B. Guibone, and E. J. Anderson	29
3	Recent Developments in Durum Wheat Research in Italy	A. Rossi	35
4	Wheat of Durum Wheat in the North African and Near and Middle East Regions	G. Varughese	53
5	Durum Wheat in the Near East	A. Barakat	68
6	Genetic Studies on Durum Wheat in Tunisia	A. R. Basmouni	75
7	Durum Wheat Situation in Turkey	F. Böler, A. E. Fırat, C. Düllo, and A. Aksoy	88
8	Programme de la Division Agronomique relative aux blés dur	H. Kayyal	96
9	Major Disease Problems of Durum Wheat and Their Distribution within the Region	J. R. Prescott and E. E. Saari	104
10	Performance of Durum Varieties in the Regional Nurseries	J. F. Grivasova	117

Part III. FOOD PRODUCTION

11	Food Industry Development Needs and Opportunities for the Region	J. E. Douglas	140
12	Production of Domestic Gas Reserves in the Near East	M. Korki	149

Section 1. General Provisions

Article 1. Purpose and Scope

1.1	The purpose of this Agreement is to establish the terms and conditions for the provision of services by the Contractor to the Client.	1.1	1.1
1.2	The scope of the Agreement includes the provision of services as described in the attached schedule of work.	1.2	1.2
1.3	The Contractor shall be responsible for the timely completion of the work and for the quality of the results.	1.3	1.3
1.4	The Client shall be responsible for providing the necessary resources and information to the Contractor.	1.4	1.4
1.5	The Agreement shall be governed by the laws of the State of New York.	1.5	1.5

Article 2. Definitions

2.1	The term "Contractor" shall mean the individual or entity performing the services under this Agreement.	2.1	2.1
2.2	The term "Client" shall mean the individual or entity receiving the services under this Agreement.	2.2	2.2
2.3	The term "Services" shall mean the work to be performed by the Contractor as described in the attached schedule of work.	2.3	2.3
2.4	The term "Term" shall mean the period of time during which the Contractor shall perform the Services.	2.4	2.4
2.5	The term "Fees" shall mean the compensation to be paid by the Client to the Contractor for the Services.	2.5	2.5
2.6	The term "Materials" shall mean the supplies and equipment necessary for the performance of the Services.	2.6	2.6
2.7	The term "Confidential Information" shall mean any information that is disclosed by the Client to the Contractor in confidence.	2.7	2.7
2.8	The term "Intellectual Property" shall mean any patents, trademarks, or other proprietary rights owned by the Client.	2.8	2.8

Article 3. Terms and Conditions of Service

3.1	The Contractor shall be responsible for the timely completion of the work and for the quality of the results.	3.1	3.1
3.2	The Client shall be responsible for providing the necessary resources and information to the Contractor.	3.2	3.2
3.3	The Contractor shall be responsible for the timely completion of the work and for the quality of the results.	3.3	3.3
3.4	The Client shall be responsible for providing the necessary resources and information to the Contractor.	3.4	3.4
3.5	The Contractor shall be responsible for the timely completion of the work and for the quality of the results.	3.5	3.5
3.6	The Client shall be responsible for providing the necessary resources and information to the Contractor.	3.6	3.6

1945-1946

$\frac{1}{2} \log \frac{1}{2}$ $\frac{1}{2} \log \frac{1}{2}$ $\frac{1}{2} \log \frac{1}{2}$ $\frac{1}{2} \log \frac{1}{2}$ $\frac{1}{2} \log \frac{1}{2}$

[illegible]

10-20-11 11:11 AM 11/20/11 11:11 AM 11/20/11 11:11 AM

第 1 题	某企业 2015 年 12 月 31 日资产负债表显示：流动资产 1000 万元，非流动资产 2000 万元，流动负债 600 万元，非流动负债 400 万元，所有者权益 1000 万元。 2016 年 1 月 1 日，该企业发生以下业务： （1）购入固定资产 500 万元，支付增值税 85 万元，款项以银行存款支付。 （2）销售商品 1000 万元，款项以银行存款支付。 （3）购入原材料 200 万元，款项以应付账款支付。 （4）支付工资 100 万元，款项以银行存款支付。 （5）支付利息 50 万元，款项以银行存款支付。 （6）支付税金 20 万元，款项以银行存款支付。 （7）支付其他费用 10 万元，款项以银行存款支付。 （8）收到应收账款 500 万元，款项以银行存款支付。 （9）支付应付账款 100 万元，款项以银行存款支付。 （10）支付其他应付款 50 万元，款项以银行存款支付。 （11）支付其他负债 20 万元，款项以银行存款支付。 （12）支付其他资产 10 万元，款项以银行存款支付。 （13）支付其他收入 10 万元，款项以银行存款支付。 （14）支付其他支出 10 万元，款项以银行存款支付。 （15）支付其他费用 10 万元，款项以银行存款支付。 （16）支付其他税金 10 万元，款项以银行存款支付。 （17）支付其他利息 10 万元，款项以银行存款支付。 （18）支付其他工资 10 万元，款项以银行存款支付。 （19）支付其他材料 10 万元，款项以应付账款支付。 （20）支付其他固定资产 10 万元，款项以银行存款支付。 （21）支付其他流动资产 10 万元，款项以银行存款支付。 （22）支付其他非流动资产 10 万元，款项以银行存款支付。 （23）支付其他流动负债 10 万元，款项以银行存款支付。 （24）支付其他非流动负债 10 万元，款项以银行存款支付。 （25）支付其他所有者权益 10 万元，款项以银行存款支付。	第 1 题
第 2 题	某企业 2015 年 12 月 31 日资产负债表显示：流动资产 1000 万元，非流动资产 2000 万元，流动负债 600 万元，非流动负债 400 万元，所有者权益 1000 万元。 2016 年 1 月 1 日，该企业发生以下业务： （1）购入固定资产 500 万元，支付增值税 85 万元，款项以银行存款支付。 （2）销售商品 1000 万元，款项以银行存款支付。 （3）购入原材料 200 万元，款项以应付账款支付。 （4）支付工资 100 万元，款项以银行存款支付。 （5）支付利息 50 万元，款项以银行存款支付。 （6）支付税金 20 万元，款项以银行存款支付。 （7）支付其他费用 10 万元，款项以银行存款支付。 （8）收到应收账款 500 万元，款项以银行存款支付。 （9）支付应付账款 100 万元，款项以银行存款支付。 （10）支付其他应付款 50 万元，款项以银行存款支付。 （11）支付其他负债 20 万元，款项以银行存款支付。 （12）支付其他资产 10 万元，款项以银行存款支付。 （13）支付其他收入 10 万元，款项以银行存款支付。 （14）支付其他支出 10 万元，款项以银行存款支付。 （15）支付其他费用 10 万元，款项以银行存款支付。 （16）支付其他税金 10 万元，款项以银行存款支付。 （17）支付其他利息 10 万元，款项以银行存款支付。 （18）支付其他工资 10 万元，款项以银行存款支付。 （19）支付其他材料 10 万元，款项以应付账款支付。 （20）支付其他固定资产 10 万元，款项以银行存款支付。 （21）支付其他流动资产 10 万元，款项以银行存款支付。 （22）支付其他非流动资产 10 万元，款项以银行存款支付。 （23）支付其他流动负债 10 万元，款项以银行存款支付。 （24）支付其他非流动负债 10 万元，款项以银行存款支付。 （25）支付其他所有者权益 10 万元，款项以银行存款支付。	第 2 题

一、二、三、四、五、六、七、八、九、十、十一、十二、十三、十四、十五、十六、十七、十八、十九、二十、二十一、二十二、二十三、二十四、二十五、二十六、二十七、二十八、二十九、三十、三十一、三十二、三十三、三十四、三十五、三十六、三十七、三十八、三十九、四十、四十一、四十二、四十三、四十四、四十五、四十六、四十七、四十八、四十九、五十、五十一、五十二、五十三、五十四、五十五、五十六、五十七、五十八、五十九、六十、六十一、六十二、六十三、六十四、六十五、六十六、六十七、六十八、六十九、七十、七十一、七十二、七十三、七十四、七十五、七十六、七十七、七十八、七十九、八十、八十一、八十二、八十三、八十四、八十五、八十六、八十七、八十八、八十九、九十、九十一、九十二、九十三、九十四、九十五、九十六、九十七、九十八、九十九、一百。

[illegible]

1944-1945

第 5 题: 某企业 2010 年 12 月 31 日应收账款余额为 100 万元, 坏账准备余额为 10 万元。2011 年 1 月 1 日, 该企业应收账款余额为 120 万元, 坏账准备余额为 12 万元。2011 年 1 月 1 日, 该企业应收账款余额为 120 万元, 坏账准备余额为 12 万元。2011 年 1 月 1 日, 该企业应收账款余额为 120 万元, 坏账准备余额为 12 万元。

THE VALUE OF THE CEREAL-PASTURE LAND RATIO IN
THE WILDER EAST AND THE WILDER WEST

P. W. LAMBERT

Introduction

The maintenance of soil productivity by crop production is an old problem in mixed farming. While crops are harvested the nitrogen is removed and the soil must be replenished. Some nitrogen is released in the soil as the decomposed plant material in the soil and is lost as an at least partially - the physical condition of the soil for nitrogen and plant growth. A nitrogen deficiency is often associated with the cropping system.

The production of the value of nitrogen in crop production is also very old and even though the knowledge that there is a nitrogen deficiency is a building of nitrogen in the soil is not new, it is not necessarily solved in the soil, is not necessarily solved. Nitrogen deficiency is not a deficiency in the soil, the accumulation of plant material and the most important contribution to crop production. Now, the use of fertilizer has provided more flexibility in production practices because crop yields are not limited by the natural fertility of the land and its management. In addition, increased use of power and mechanization have provided opportunities for more precise and timely operations. Even so, production is still an important part of crop management because each crop is affected by the preceding crop and soil condition, just as it will affect succeeding crops. The crop production process must be planned in a long-term perspective; and cannot regard each crop in isolation.

Optimal farming contains a large element of risk because of the great variability in weather conditions. Rainfall, in particular, is extremely variable and available both in amount and distribution, leading to wide fluctuations in crop production. Under these conditions, farmers tend to keep to proven practices and rotations, not necessarily for maximum yields but to obtain an assured minimum yield and to maintain a measure of yield stability. Introducing new rotations, crops or practices may lead to failure. Not only that, subsequent crops may also be affected and the production cycle spent for a number of years. Farmers cannot afford to take unnecessary risks.

Considerable scope exists in the region for improvement of dry farming practices which would lead to increased production. There is evidence that the introduction of a pasture system could cause several crop yields as well as improved grazing conditions. Some evidence indicates that the introduction of crop-pasture systems and the related improvements of changing to more a rotation must be established. These changes are only likely if sufficient number of farmers are induced and that is the aim of the project. The limited of the change are observed in a relatively short time. This would require the introduction and related improvements of introducing a pasture system in the dry to similar results caused previously over a of the region.

The use of fertility in crop production

Current crops obtained the soil by various methods. Improvements of methods and equipment will result in more of soil resources. Utilization of a pasture system in the region is a well established practice to increase the physical condition and fertility of the soil and to increase soil productivity. This practice forms the basis of dry farming of farming. Soil fertility accumulation under the dry and is subsequently released by cropping. The fertility of the dry depends on the production of soil and the amount of organic fertility through dry matter production and nitrogen fixation by leguminous plants in the soil.

In intensive systems, nitrogen can be applied as fertilizer to increase late dry matter production and nitrogen in the soil in the soil and in the growing animals. These crops, however, contain a proportion of nitrogen or more is present. The nitrogen which is fixed in the soil is the most abundant, and is therefore mostly in the organic form. Mineralization of organic nitrogen depends on factors including temperature, mineral nutrient status, pH, water-soluble activity and so on. The C/N ratio of the soil material influences the release of nitrogen from the organic matter for use by growing plants. If the C/N ratio is high, as for instance in a grass humus layer, the nitrogen availability may be reduced.

It is particularly the increased soil nitrogen that results in improved crop production. Experiments have shown that, in a humid, temperate environment, sowing wheat after a winter clover ley can lead to yield increases of approximately 5 ton/ha, provided that phosphorus and potassium are adequate (Table 1). Under the same conditions it has been shown that an average three-year ley adds to the soil as much as suitable about 5-6 tons of dry organic matter. This is equivalent to about 25-30 tons of farm yard manure and the physical condition of the soil is considerably improved.

- * Arable land used between 75 for pasture.
- ** Soil or grassland cover.

The first of these is the fact that the
 government has been unable to raise
 the necessary funds to carry out
 its policy. This is due to the
 fact that the government has been
 unable to raise the necessary funds
 to carry out its policy. This is
 due to the fact that the government
 has been unable to raise the
 necessary funds to carry out its
 policy. This is due to the fact
 that the government has been unable
 to raise the necessary funds to
 carry out its policy. This is due
 to the fact that the government has
 been unable to raise the necessary
 funds to carry out its policy.

[illegible]

These results, however, do tend to corroborate the effect of long rotation of different crops under various conditions of soil, rainfall and management in the region. Preliminary results indicate that cereal yields are generally higher after winter than after fallow. On the basis of Australian experience, cereal increases in yield are unlikely to be spectacular because of other limiting factors, mainly moisture and temperature. However, the building of fertility is a continuous process over time and yields should continue to rise over a number of long crop cycles. Only after several cycles will the true impact of the system on yield and stability become evident. Even so, yield increases of 15% or more could be expected in the early stages under suitable management. Success of the system will depend on the efficiency of the

area of livestock with stable herding, since the longevity and productivity of animals as generating pasture is largely dependent on grazing management.

Climate and soils in the region in relation to annual legume pastures

Climate in the arid grazing areas of the region, varies from semiarid to continental. Winters are wet and mild while summers are dry and hot. Annual rainfall, but, in general, is low and variable and fluctuates widely from year to year in amount, intensity and distribution. Evapotranspiration rates tend to be high because of a high percentage of sunshine and high average temperatures. The bulk of the rain falls, however, during the winter and early spring when evapotranspiration rates are lowest. For this reason, semiarid pastures can be obtained with winter cereals even though annual amounts of precipitation is low. Much of the dryland winter cereals are grown in the range from 100-300 mm rainfall. Differences in elevation and proximity to the coast cause considerable changes in local temperatures and rainfall. Thus, although most of the region is arid, rather than semiarid, locally the growing season, there are also considerable areas where temperature is as equally or more limiting factor, notably in Iran and Turkey. A description of climatic conditions as found in upland and plateau areas has been given in a previous paper, using Iran as an illustration (12).

It has been suggested that the impact of annual pasture legumes in a coastal situation will be greatest in the 250-500 mm rainfall zone. Pastures in the semiarid zone are limited to winter cereals and under higher rainfall annual cropping and other alternatives must also be considered. Since the annual pasture legumes are drought tolerant, they tend to be less drought resistant than cereals and need more frequent rain. The annual legumes in the arid zone are not particularly well suited to a hot arid climate and are not as well suited to a semiarid climate as some naturally occurring species. With increased rainfall, the lower limit of temperature tolerance is reached when the average monthly minimum temperature is around 5°C. At Hareham and Hareham in Southern Australia, in the heart of the whole-sheep farming area, the average minimum monthly temperature during the coldest month are 1.5°C and 5.1°C respectively. In much of the North African and Middle East region temperatures will not be limiting to the growth of known cultivars of pasture legumes, and there are large areas with rain between 250-500 mm where the introduction of a leg system is climatically feasible. At higher elevations, as for instance in Iran and Turkey, with their extensive, cold high-plateau and upland areas of up to 2000 m, the use of the system in its present form will be limited because of temperature restrictions (12).

As would be expected, soils vary tremendously over such a large region in many instances. Detailed information is still lacking. There are, however, some broad generalizations that can be made. In the drier areas, towards the desert, soils are micaceous grading into desert sands and lithomels. Reddish brown soils are predominant in the 250-500 mm zone where most of the dryland wheat is grown. Black and grey-brown rendzinas

are also common, as are sandstone-terre-rosse complexes on lower slopes of hills. Good, deep soils of alluvial or colluvial origin are found in the valleys. Soils are generally calcareous throughout the region. Many have a high salt or clay content and, at least in the dryland regions, organic matter and consequently nitrogen content is extremely low. Phosphorus is also deficient, but generally not as limiting as nitrogen. The heavy texture of many of the soils presents some management problems. They may set hard with deep cracks when dry, and become sticky when wet. Soil crusting may be formed in spite of limited soil moisture intake, excessive run-off and erosion. Shallow soils, with limited moisture storing capacity, are also widespread.

Generally, soils of the region pose a special problem to the establishment of productive stands of annual pasture legumes, although there may be localized problems. Because of their alkaline nature and heavy texture they are more suited to species of mesic origin than trifolium. In low rainfall areas, shallow soils with limited moisture holding capacity reduce chances of satisfactory plant growth, particularly of shallow-rooted pasture plants. Similarly, the presence of calcium carbonate or other impervious layers in the soil profile, which occur over substantial areas, may have a detrimental effect on plant establishment and growth. Problems of impeded drainage and salinity, not uncommon in local situations, can, to some extent, be overcome by using species and cultivars tolerant to these conditions (9). However, more extensive measures of land reclamation may prove necessary.

Roughness of land surface and stoniness also present difficulties in parts of the region in the year of pasture establishment. Pasture legumes are small-seeded and need a reasonably well-prepared, firm seedbed for satisfactory establishment. Depth of seeding is extremely important. Machinery and equipment presently used or available in the region is, for the most part, unsatisfactory or inadequate for proper and timely land preparation and pasture seeding. Construction is not sufficiently rugged to deal with the heavy soils, rough landscapes and rocky conditions. Depreciation of machinery is therefore high and breakdowns are frequent. It is difficult to keep equipment in proper adjustment and working order. Carter (9) has suggested that some of the machinery designed for Australian conditions may be more suitable than that presently used. Particularly, the "stump-jump" principle should be incorporated in machinery designs, wheels should be large and clearance wide. There should also be a concerted effort to train operators in the proper maintenance, adjustment and operation of their equipment.

Another problem, not so much of soils but of soil management, is the wide-spread practice of deep plowing. The success of a ley system based on self-regenerating annual legume species depends on the presence of adequate numbers of seed pods, of different ages, in the surface soil. When phosphorus is adequate and moisture and temperature allow, seeds in these pods germinate resulting in natural regeneration of the pasture. A degree of dormancy and hard-seedness prevent all seeds germinating at once, thus providing a buffer against the pasture under adverse condi-

more. The effect of deep plowing is to turn the pods to a depth where it is impossible for most to germinate or seedlings to emerge. The opportunity for seed germination of the pasture is thus eliminated. It is for this reason that naturally occurring species are mostly found at roadside and in undisturbed ground rather than in plowed fields.

The purpose of deep plowing is probably to obtain a measure of soil control and to overcome some of the structural defects of a soil cultivated continuously for many years (8). With present technology, its effectiveness and necessity is doubtful. Recent research in Lebanon shows no advantages from deep plowing over shallow cultivation. In addition, it is a practice which is expensive and extremely wasteful of power. For the successful introduction of a dry farming system it is imperative that a system of shallow cultivation be adopted. A series of progressively shallower cultivations will provide a seedbed. This cultivation sequence is recommended for pasture sowing. It will also ensure that a sufficient quantity of legume seeds remain in the upper 15 cm of soil.

The importance of the rotation in the region

In a greater or lesser extent the entire region, cropping for many years has suffered soil fertility, deteriorated soil structure and exposed the land to drought or erosion. In some areas, however, the use of power has improved soil fertility and soil structure. In other areas, however, the use of power has led to soil erosion and soil fertility has declined.

The use of the tractor is also having its effect on livestock production. Available land is decreasing and the land that is available is being used for pasture purposes. Less land is available for grazing and, since there has not been a proportionate increase in livestock numbers, most natural grazing land is currently overgrazed. The quantity and quality of natural grazing is decreasing rapidly and the range supplies less livestock now than before. The reason is that the land is not only used for crop production but with that of livestock as well. Grazing pressure on the range should be reduced. Possibilities for increased livestock production only exist in farming areas.

It has been estimated that some 40 million ha in the region lie idle in fallow. The relevance of the legume rotation to the region lies in the possibility of turning some of these idle hectares into productive soil fertility restoration pastures, using shallow-rooting legumes, which make use of winter and spring rains and can be plowed in before moisture in the soil profile is entirely depleted.

In general terms, the advantages are obvious. Use would be made of unproductive fallow lands. Soil organic matter and structure would be improved leading to better soil fertility, lower drought requirements, less

as reproductive rates. A better and more constant plane of nutrition is essential for efficient, high level production. There is, therefore, considerable scope for improving management practices to make the animal production process more efficient and to take advantage of the extra feed produced.

Concluding Remarks

The broad estimates given in this paper of the feasibility and benefits of a key system of farming for dryfarming areas of the region are impressive. No doubt, the figures can be questioned and, as more detailed studies are made and knowledge increases, inaccuracies will surface. At this time, however, these estimates serve not only to draw attention to the great productive potential of the system but also to point to the steps to be taken - and to put these steps within a reasonable time-frame - for this potential to be achieved. However, national level averages do not mean much to individual farmers, particularly those who farm areas where climate is variable and unpredictable, yields low and uncertain, risks high and incomes low. The questions, therefore, are: is a system of integrated crop-livestock production compatible with the farm structure and organization as found in the region; or if it is acceptable, and what will be the benefits for individual producers?

Results from Australia show that increases in the productive capacity of single farms are, in many cases, spectacular. Comprehensive schemes for whole farm improvement including pasture improvement, erosion control, fodder conservation and proper rotations have led to trebling of crop yields while simultaneously doubling stock carrying capacity. Incomes are not only higher but also more stable since assets and risks are spread over crop and livestock enterprises. But farm structure in Australia is entirely different from that found in this region, as table 12 shows. The average Australian wheat-sheep grower farms a total of about 1,000 ha, crops about 200 ha annually, and runs a flock of some 2,000 sheep. His operation is capital-intensive and highly mechanized. The output per unit of labor is high.

In this region, holdings are predominantly small, fragmented and often patterned in such a way that improvement in mechanization, drainage, erosion control, etc. are impracticable. Access to inputs is often limited. The majority of farmers are still at, or little above, subsistence level. Crop and livestock production have been traditionally separated. Yet, although this separation has often been stressed as a limitation, the Turkomans in Iran, traditionally pastoralists, have adopted settled agriculture to a considerable extent, and there are other examples. Some of the socioeconomic implications of introducing an integrated crop-livestock system under such conditions were dealt within an earlier paper (12). At least in the short term, it seems clear that changes will have to be acceptable in the existing patterns

of production. Such changes will therefore have to be compatible with the needs of producers within largely subsistence agricultural and pastoral economies. A different strategy will be needed for the lesser number of market-oriented producers with larger holdings who, nevertheless, may represent quite a large proportion of the area in question. The most rapid progress could probably be made with the latter group.

Comparatively little is yet known about existing production systems, herds and flocks, breeds and numbers. If knowledge of existing farming systems is incomplete, even less is known about the animal producer. Like in the farming sector, the average operational unit or size of flock owned per household appears to be small. There appears to be a skew in the distribution of ownership with, in many cases, the largest number of animals being owned by a small proportion of the total households. Apparently the number of men in the household unit has an important bearing on flock size since most of the work is done by men. Many flocks are too small even for subsistence, in which case owners work for larger operators as shepherds and, where possible, carry on some subsistence cropping.

To plan a more efficient integration of livestock enterprises with arable farming, a more accurate and complete picture of occupation and utilization of range and marginal lands is needed. Ownership and migration patterns of flocks should be established, for these could have an important bearing on the manner in which animal and crop production could most effectively be integrated. Some migration will be necessary to utilize rangeland land and a large number of animals could and should be "scattered" in arable areas. The task now is to ensure that should be carefully established taking into account the present organizational structure. It is possible that cooperatives or other corporate organizations could perhaps assist in regulating grazing and food supplies, as well as marketing crop and livestock products. Inasmuch as crop and livestock production are carried out as separate enterprises, such organizations could act as a sort of intermediary or bridge for vertical integration of crop and livestock enterprises involving separate or multiple ownership. This may speed up integration in the initial phase of establishing the system. One could expect horizontal integration to gradually evolve at later stages.

To ensure rapid progress in the adoption and spread of the system, there is a great need to step up activities in the region at all levels. At present, there are only about five scientists working with country programs at the international level. In national programs, only a handful of scientists are concerned with aspects of the problem, and a few have received specialized training. The Arab Lands Agricultural Development (ALAD) Program has recently made a modest start to study existing farming systems in order to provide the background information necessary for planning change. Scientists, administrators and policymakers alike need to know more about farm operations and the decision-making process at the farmers' level. It will take time, money, technical manpower and a systematic, well-planned approach to transform the broad potentials presented in this paper into reality.

REFERENCES

1. CIMMYT Annual Report, Algeria 1974-75, 25p.
2. CIMMYT Progress Report, Tunisia 1973-74, 80p.
3. Department of Statistics, The Hashemite Kingdom of Jordan, 1973, Agriculture Statistical Yearbook and Agricultural Sample Survey.
4. Ministry of Agriculture, The Hashemite Kingdom of Jordan, 1974, Report on Agricultural Laying - A Working Paper, Amman.
5. Proceedings of the First Ragi and Wheat Workshop, Lebanon, February 14-17, 1973.
6. Proceedings of the Second Regional Wheat Workshop, Turkey, May 6-11, 1974.
7. Arneek, Gasser, Kresdy, Majed and Sami Rashed, 1973, Indexed Agricultural Statistics in Ranked Order for Countries of the Near East Region, ALAD-The Ford Foundation, Beirut.
8. Callaghan, A.R. and A.J. Millington, 1958, The Wheat industry in Australia, Angus and Robertson, Sydney, 486p.
9. Carter, E.D. 1973, The Potential for Increasing Cereal and Livestock Production in Algeria, Centro Internacional de Mejoramiento de Maiz and Trigo, Mexico City, 56p.
10. Driver, C.M. 1955, Principles of Crop Rotation, N.Z. Institute of Agricultural Sci., Proc.
11. Geytschick, Peter E. 1974, The Integration of Cereals, Pastures and Sheep in the Agriculture of Southern Australia, Regional Workshop for Sheep and Forage Production, ALAD-The Ford Foundation, Beirut.
12. Lemerle, D.M. 1974, Notes on the Introduction of a Ley-Farming System for Integrated Cereal-Livestock Production in Rainfed Areas of the Middle East, Regional Workshop for Sheep and Forage Production, ALAD-The Ford Foundation, Beirut.
13. Lemerle, D.M. 1974, Farming Systems in the Mediterranean Region, Proc. Workshop on Farming Systems, ICRIAT, Hyderabad.
14. Williams, T.E., Clement, C.R. and A.J. Heard, 1960, Soil Nitrogen Status of Lays and Subsequent Wheat Yields, Proc. Eighth Int. Grassland Congress.

REFERENCES

1. CIMMYT Annual Report, Algeria 1973-75, 25p.
2. CIMMYT Progress Report, Tunisia 1973-74, 80p.
3. Department of Statistics, The Hashemite Kingdom of Jordan, 1973, Agriculture Statistical Yearbook and Agricultural Sample Survey.
4. Ministry of Agriculture, The Hashemite Kingdom of Jordan, 1974, Report on Agricultural Lending - A Working Paper, Amman.
5. Proceedings of the First Regional Wheat Workshop, Lebanon, February 14-17, 1973.
6. Proceedings of the Second Regional Wheat Workshop, Turkey, May 6-11, 1974.
7. Arsenik, Oduvar, Kreidy, Majed and Sami Rashed, 1973, Selected Agricultural Statistics in Ranked Order for Countries of the Near East Region, ALAD-The Ford Foundation, Beirut.
8. Callaghan, A. R. and A. J. Millington, 1956, The Wheat Industry in Australia, Angus and Robertson, Sydney, 486p.
9. Carter, E. B., 1973, The Potential for Increasing Cereal and Livestock Production in Algeria, Centro Internacional de Mejoramiento de Maiz and Trigo, Mexico City, 54p.
10. Driver, C. M., 1953, Principles of Crop Rotation, N. Z. Institute of Agricultural Sci. Proc.
11. Geystenbeck, Peter E., 1974, The Integration of Cereals, Pastures and Sheep in the Agriculture of Southern Australia, Regional Workshop for Sheep and Forage Production, ALAD-The Ford Foundation, Beirut.
12. Loeuwerik, D. M., 1974, Notes on the Introduction of a Ley-Farming System for Integrated Cereal-Livestock Production in Rainfed Areas of the Middle East, Regional Workshop for Sheep and Forage Production, ALAD-The Ford Foundation, Beirut.
13. Loeuwerik, D. M., 1974, Farming Systems in the Mediterranean Region, Proc. Workshop on Farming Systems, ICRISAT, Hyderabad.
14. Williams, T. E., Clement, C. R. and A. J. Heard, 1960, Soil Nitrogen Status of Leys and Subsequent Wheat Yields, Proc. Eighth Int. Grassland Congress.

of production. Such changes will therefore have to be compatible with the needs of producers who are largely subsistence agricultural and pastoral communities. A different strategy will be needed for the larger number of commercial-oriented producers and larger holdings who, nonetheless, may represent quite a large proportion of the area in question. The most rapid progress could probably be made with the latter group.

Comparatively little is yet known about existing production systems, livestock systems, breeds and varieties. If knowledge of existing farming systems is to be developed, much more is known about the animal producer. Like in the farming sector, the strategy operational unit or unit of flock owned per household appears to be small. There appears to be a skew in the distribution of ownership with, in many cases, the larger number of animals being owned by a small proportion of the total population. Apparently the number of men in the household and the size of household holding are not directly related. The unit of flock is small and the small owner for subsistence, in which case animals are for larger quantities as a commodity and, where possible, used for other activities.

To plan a more effective integration of livestock enterprises with other farming, a more accurate and complete picture of occupation and production of range and improved systems is needed. Ownership and migration patterns of livestock should be established, for these could have an important bearing on the manner in which animals are used and the effort involved in production. Some migration will be necessary to utilize rangeland and to have a large number of animals and should be "active" in arid areas. The most way to achieve this should be carefully established taking into account the general environmental conditions. It is possible that cooperatives or other organizations could be established in some regions to regulate grazing and feed animals, as well as to market and process products. Inasmuch as crop and livestock production are interrelated and as separate enterprises, such organizations could act as a sort of intermediary or bridge unit for vertical integration of crop and livestock enterprises involving separate or multiple ownership. This may require an integration in the initial phase of establishing the system. One would expect livestock integration to gradually evolve in later stages.

The major rapid progress in the adoption and spread of the system, there is a great need to step up activities in the region at all levels. At present, there are only about ten scientists working with country programs at the international level. In national programs, only a handful of scientists are concerned with aspects of the problem, and a few have received specialized training. The Arab Lands Agricultural Development (ALAD) Program has recently made a modest start to study existing farming systems in order to provide the background information necessary for planning change. Scientists, extensionists and policymakers all need to know more about farm operations and the decision-making process at the farmers' level. It will take time, money, technical manpower and a systematic, well-planned approach to transform the broad potentials presented in this paper into reality.

of production. Such changes will therefore have to be compatible with the needs of producers within largely subsistence agricultural and pastoral economies. A different strategy will be needed for the larger number of medium- and large-scale producers with larger holdings who, nonetheless, may represent quite a large proportion of the area in question. The most rapid progress would probably be made with the latter group.

Comparatively little is yet known about existing production systems, farm sizes, needs and motives. If knowledge of existing farming systems is to be useful, some form of census about the actual producer. Like in the farming sector, the average operation will be small. The distribution of landholdings and in some cases, the number of animals being owned by a small proportion of the total population. Apparently the number of men in the household and the number of animals owned are not directly related to the size of the farm. Many farms are too small even for subsistence, in which case owners work for larger operators as shepherds and, where possible, carry on some subsistence cropping.

To plan a more effective integration of livestock enterprises with other farming, a more accurate and complete picture of occupation and production is needed. Ownership and migration patterns are important. For there could be an important bearing on the manner in which animal and crop production could most effectively be integrated. Some migration will be necessary to utilize rangeland and other areas in which this should be carefully established taking into account the present organizational structure. It is possible that cooperatives or other organizations could perhaps assist in regulating grazing and feed supplies, as well as marketing crop and livestock products. Inasmuch as crop and livestock production are separate enterprises, such organizations could act as a sort of bridge or for vertical integration of crop and livestock enterprises involving separate or multiple ownership. The way toward integration is the initial phase of establishing the system. One could expect horizontal integration to gradually evolve in later stages.

To ensure rapid progress in the adoption and spread of the system, there is a great need to step up activities in the region at all levels. At present, there are only about five institutes working with country programs at the international level. In national programs, only a handful of scientists are concerned with aspects of the problem, and a few have received specialized training. The Arab Lands Agricultural Development (ALAD) Program has recently made a concerted effort to study existing farming systems in order to provide the background information necessary for planning change. Scientists, administrators and policymakers also need to know more about farm operations and the decision-making process at the farmers' level. It will take time, money, trained manpower and a systematic, well-planned approach to transform the broad potentials presented in this paper into reality.

of production. Such changes will therefore have to be compatible with the needs of producers within largely subsistence agricultural and pastoral economies. A different strategy will be needed for the lesser number of market-oriented producers with larger holdings who, nonetheless, may represent quite a large proportion of the area in question. The most rapid progress could probably be made with the latter group.

Comparatively little is yet known about existing production systems, farmers' values, needs and motives. If knowledge of existing farming systems is incomplete, even less is known about the animal producer. Like in the farming areas, the average operational unit or size of flock owned per household appears to be small. There appears to be a skew in the distribution of ownership with, in many cases, the largest number of animals being owned by a small proportion of the total households. Apparently the number of men in the household will have an important bearing on flock size since most of the work is done by men. Many flocks are too small even for subsistence, in which case owners work for larger operators as shepherds and, where possible, carry on some subsistence cropping.

To plan a more effective integration of livestock enterprises with arable farming, a more accurate and complete picture of occupation and utilization of range and marginal croplands is needed. Ownership and migration patterns of flocks should be established, for these could have an important bearing on the manner in which animal and crop production could most effectively be integrated. Some migration will be necessary to utilize rangeland land but a large number of animals could and should be "settled" in arable areas. The best way to achieve this should be carefully established taking into account the present organizational structure. It is possible that cooperatives or other community organizations could perhaps assist in regulating grazing and feed supplies, as well as marketing crop and livestock products. Inasmuch as crop and livestock production are carried out as separate enterprises, such organizations could act as a sort of management or bridging unit for vertical integration of crop and livestock enterprises involving separate or multiple ownership. This may speed up integration in the initial phases of establishing the system. One would expect horizontal integration to gradually evolve in later stages.

To ensure rapid progress in the adoption and spread of the system, there is a great need to step up activities in the region at all levels. At present, there are only about five scientists working with country programs at the international level. In national programs, only a handful of scientists are concerned with aspects of the problem, and a few have received specialized training. The Arid Lands Agricultural Development (ALAD) Program has recently made a modest start to study existing farming systems in order to provide the background information necessary for planning change. Scientists, administrators and policymakers alike need to know more about farm operations and the decision-making process at the farmers' level. It will take time, money, trained manpower and a systematic, well-planned approach to translate the broad potentials presented in this paper into reality.

REFERENCES

1. CIMMYT Annual Report, Algeria 1974-75, 27p.
2. CIMMYT Progress Report, Tunisia 1973-74, 80p.
3. Department of Statistics, The Hashemite Kingdom of Jordan, 1973, Agriculture Statistical Yearbook and Agricultural Sample Survey.
4. Ministry of Agriculture, The Hashemite Kingdom of Jordan, 1974, Report on Agricultural Zoning - A Working Paper, Amman.
5. Proceedings of the First Regional Wheat Workshop, Lebanon, February 14-17, 1972.
6. Proceedings of the Second Regional Wheat Workshop, Turkey, May 4-11, 1974.
7. Arsenik, Odmar, Keady, Majed and Sami Rashed, 1973, Selected Agricultural Statistics in Ranked Order for Countries of the Near East Region, ALAD-The Ford Foundation, Beirut.
8. Collingwood, A.R. and A.J. Millington, 1966, The Wheat Industry in Australia, Angus and Robertson, Sydney, 486p.
9. Carter, E.D., 1971, The Potential for Increasing Cereal and Livestock Production in Algeria, Centro Internacional de Mejoramiento de Maiz and Trigo, Mexico City, 54p.
10. Driver, C.W., 1958, Principles of Crop Rotation, N.Z. Institute of Agricultural Sci. Proc.
11. Geytenbeek, Peter E., 1974, The Integration of Cereals, Pastures and Sheep in the Agriculture of Southern Australia, Regional Workshop for Sheep and Forage Production, ALAD-The Ford Foundation, Beirut.
12. Loeferik, D.M., 1974, Notes on the Introduction of a Ley-Farming System for Integrated Cereal-Livestock Production in Rainfed Areas of the Middle East, Regional Workshop for Sheep and Forage Production, ALAD-The Ford Foundation, Beirut.
13. Loeferik, D.M., 1974, Farming Systems in the Mediterranean Region, Proc. Workshop on Farming Systems, ICRIAT, Hyderabad.
14. Williams, T.E., Clement, C.R. and A.J. Heard, 1960, Soil Nitrogen Status of Leyes and Subsequent Wheat Yields, Proc. Eighth Int. Grassland Congress.

Table 1. Yield of Winter Wheat After Pasture (cwt. per acre)

White clover alone	34.2
Perennial ryegrass and white clover	32.5
Perennial ryegrass only	26.7

Source: T. E. Williams, The value of leys in crop rotation.

Table 3. Some Comparative Agricultural Statistics

		Algeria	South Australia
<u>Total Area (ha)</u>		552,552,000	94,800,000
<u>Distribution of Land by Size</u>			
0-100 ha		2,083,000 ^{1/}	1,002,000
100-1000 ha		1,704,000	2,303,000
1000-10000 ha		6,000,000	8,800,000
10000-100000 ha		2,000,000	3,000,000
100000 ha		224,465,000	87,694,000
<u>Land Used for Agriculture (ha)</u>		82,667,000	82,166,000
<u>1971/72</u>			
Cereals for grain	(ha)	2,034,000 ^{2/}	2,001,000
Other arable crops	(ha)	213,000	111,000
Forage	(ha)	2,707,000	402,000
Vineyards	(ha)	500,000	70,000
Orchards & Plantations	(ha)	212,000	27,000
Pasture	(ha)	27,000	3,100,000
Barrenland	(ha)	86,341,000 ^{3/}	60,272,000
Excluded from Survey	(ha)	1,200,000	0
<u>Major Agricultural Crops (Millions 1966/67 - 1971/72)</u>			
Crop	(Millions T ₂₀)	51,200	60,000
Pasture	(Millions T ₂₀)	0	60,444
<u>Cereals Production (Millions 1961-72)</u>			
Wheat in country	(ha)	1,011,000	1,100,000
Wheat yield	(kg/ha)	424	1,100
Barley in country	(ha)	770,000	501,000
Barley yield	(kg/ha)	410	1,121
<u>Livestock (Million head 1970-72)</u>			
Sheep		2,227,000	12,001,000
Cattle		804,000	1,750,000

- 1/ Includes 1,111,000 ha with slope 35%
 2/ Includes c. 1 million ha in marginal crops
 3/ Includes cereals for hay and green storage crops
 4/ Includes c. 10 million ha of crops

Source: Carter, E. D. 1971. The potential for increasing cereal and livestock production in Algeria.

Table 5. Distribution of land in different categories owned by State farms.

Category	Area (ha)	%
State farms	2, 810, 000	20.4
Collective farms	1, 017, 000	8.5
Private farms	2 177, 000	1.8
Other farms	119, 000	1.0
Total	6, 123, 000	100.0

Source: The National Research Institute

The Ministry of Agriculture 5-year Agricultural Plan
1973-1977, August 1973

Table 2 Distribution of Marine Mollusks in different samples taken at
East Harbor.

<u>Species</u>	<u>Count (No.)</u>	<u>%</u>
<u>Total</u>	<u>511, 700</u>	<u>51. 7</u>
<u>Marine</u>	<u>428, 100</u>	<u>42. 8</u>
<u>Common</u>	<u>1, 100</u>	<u>1. 2</u>
<u>Rare</u>	<u>2, 700</u>	<u>2. 5</u>
<u>Partial</u>	<u>140, 100</u>	<u>13. 9</u>

Table 3 of Count

<u>Total</u>	<u>100 %</u>
<u>Marine</u>	<u>43 %</u>
<u>Common</u>	<u>12 %</u>

Table 7 Consumption of nitrogenous fertilizers in selected countries of the region in 1970-71 and potential amount of nitrogen added by legume pasture (tons of N)

<u>Country</u>	<u>Total consumption tons tons of N</u>	<u>Consumption per ha. cul- tivated land kg of N/ha</u>	<u>Total estimated nitrogen fixed by legume pastures tons of N</u>	<u>Added N as per- centage of total '70/71 consumption</u>
<u>Sweden</u>	500	9.5	2,980	622
<u>Spain</u>	24,000	4.4	32,100	124
<u>Lebanon</u>	14,000	60.3	1,340	6
<u>Morocco</u>	24,000	3.9	67,440	177
<u>Algeria</u>	40,000	5.9	47,400	119
<u>Tunisia</u>	13,500	2.4	20,520	152
<u>Total</u>	105,500		172,700	119

Source of nitrogenous fertilizer consumption data: FAO Production Yearbook

Table 4. Estimation of potential output of various livestock products.

Assumptions: 1. Average annual production of 4,000 kg of milk per cow.

2. Average annual production of 100 kg of wool per sheep.

Country	Estimated number of animals to produce (million)	Estimated annual production of milk (million kg)	Estimated annual production of wool (million kg)
Jordan	1.0	4.0	0.1
Syria	2.0	8.0	0.2
Libanon	0.5	2.0	0.05
Marocco	1.0	4.0	0.1
Algeria	2.0	8.0	0.2
Tunisia	0.5	2.0	0.05
Total	7.0	28.0	0.6

* Assumed an average annual additional production of 4,000 kg of milk per cow (100 kg).

** Assumed that, with proper management, 1 ton of milk will produce 1 ton of wool per year (100 kg).

Table 2. *Mutton and Lamb: Number of animals, weight and production 1972 and production in 1973*

Country	1972		1973		1974		1975		1976		1977	
	Number of animals	Weight (kg)	Number of animals	Weight (kg)	Number of animals	Weight (kg)	Number of animals	Weight (kg)	Number of animals	Weight (kg)	Number of animals	Weight (kg)
Jordan	1,111	1,111	1,111	1,111	1,111	1,111	1,111	1,111	1,111	1,111	1,111	1,111
Syria	1,111	1,111	1,111	1,111	1,111	1,111	1,111	1,111	1,111	1,111	1,111	1,111
Morocco	1,111	1,111	1,111	1,111	1,111	1,111	1,111	1,111	1,111	1,111	1,111	1,111
Algeria	1,111	1,111	1,111	1,111	1,111	1,111	1,111	1,111	1,111	1,111	1,111	1,111
Tunisia	1,111	1,111	1,111	1,111	1,111	1,111	1,111	1,111	1,111	1,111	1,111	1,111
Total	1,111	1,111	1,111	1,111	1,111	1,111	1,111	1,111	1,111	1,111	1,111	1,111

Source: Agricultural Commodity Projections, 1974-1980, p. 200

Table 22 Consumption of phosphate fertilizers in selected
countries of the region in 1970-71

Country	Total consumption tons of P_2O_5	Consumption per ha. cultivated land, kgs. of P_2O_5
Lebanon	1,400	1.1
Syria	12,500	2.1
Libya	12,000	57.0
Marocco	44,500	5.6
Algeria	52,000	7.0
Tunisia	24,000	6.2
Total:	157,000	

Source: FAO Production Yearbook

Table 11. World reserves of phosphate rock
(Containing at least 25% P_2O_5)

Country	Millions of metric tons
Morocco	21,400
U. S. A.	12,526
S. S. S. R.	7,268
Tunisia	2,000
Egypt (Suez Canal)	1,500
Algeria	1,000
Israel	572
French and British Ocean Islands	152
Others (mainly W. Africa)	576
Total	47,758

* Jordan also is not an insignificant producer of phosphates.

Source: The Arab Economist, December 1974.

L'APPLICABILITE DE L'ENSEMBLEMENT A BASE DE CEREALES ET DE PRATICES DE LEGUMINEUSES DANS LES PAYS DU MOYEN-ORIENT ET DE L'AFRIQUE DU NORD

Dr. M. LAMBERT

SUMMARY

On examine les pratiques de légumineuses dans les rotations pour augmenter et maintenir le niveau de la production de sol. En australie l'ensemencement de prairies de légumineuses annuelles à régénération spontanée est associé avec des céréales à un effet de la restauration de la fertilité du sol et de l'augmentation de la production tant végétale qu'animale. Le résultat est un système d'agriculture où la production végétale et animale sont simultanément améliorées.

Une conclusion est tirée de ces données qu'il sera possible d'augmenter la production de sol dans les pays du Moyen-Orient et de l'Afrique du Nord.

Les légumineuses dans les rotations sont une pratique agricole qui a été utilisée pendant longtemps dans les pays du Moyen-Orient et de l'Afrique du Nord. Cette pratique a pour but d'augmenter la production de sol et de maintenir le niveau de la production de sol. Les légumineuses sont associées avec des céréales à un effet de la restauration de la fertilité du sol et de l'augmentation de la production tant végétale qu'animale. Le résultat est un système d'agriculture où la production végétale et animale sont simultanément améliorées.

Dans le pays du Moyen-Orient et de l'Afrique du Nord la température est élevée pendant la majeure partie de l'année, la Syrie, le Liban, le Maroc, l'Algérie et la Tunisie, on estime qu'il sera possible de créer des prairies sur une superficie équivalente à environ 2,000,000 ha. L'ensemencement de prairies de légumineuses annuelles à régénération spontanée est associé avec des céréales à un effet de la restauration de la fertilité du sol et de l'augmentation de la production tant végétale qu'animale. Le résultat est un système d'agriculture où la production végétale et animale sont simultanément améliorées.

Les principes qui ont servi de base à l'élaboration de ce rapport ont été les suivants : à savoir de l'équité, de la justice, de la transparence, de la responsabilité, de la participation, de la coopération, de la solidarité, de la paix, de la démocratie, de la liberté, de la dignité, de la justice sociale, de la justice économique, de la justice culturelle, de la justice environnementale, de la justice intergénérationnelle, de la justice internationale, de la justice universelle.

Dr. Jean-Pierre L. L.

THE UNITED STATES OF AMERICA

IN SENATE

1914

REPORT OF THE COMMISSIONER OF THE GENERAL LAND OFFICE, DEPARTMENT OF THE INTERIOR, FOR THE YEAR 1913.

WASHINGTON: GOVERNMENT PRINTING OFFICE, 1914.

THE CONTENTS OF THIS REPORT ARE AS FOLLOWS:

I. THE LAND OFFICE AND ITS WORK. The land office is the central agency for the management of the public lands. It is responsible for the survey, classification, and disposal of these lands. The office is organized into several divisions, each of which is headed by a chief. The divisions are: the Survey Division, the Classification Division, the Disposal Division, and the General Land Office.

II. THE SURVEY DIVISION. The Survey Division is responsible for the survey of the public lands. It is organized into several sections, each of which is headed by a chief. The sections are: the Surveying Section, the Mapping Section, and the Record Section. The Surveying Section is responsible for the survey of the public lands. It is organized into several sections, each of which is headed by a chief. The sections are: the Surveying Section, the Mapping Section, and the Record Section.

III. THE CLASSIFICATION DIVISION. The Classification Division is responsible for the classification of the public lands. It is organized into several sections, each of which is headed by a chief. The sections are: the Classification Section, the Mapping Section, and the Record Section.

IV. THE DISPOSAL DIVISION. The Disposal Division is responsible for the disposal of the public lands. It is organized into several sections, each of which is headed by a chief. The sections are: the Disposal Section, the Mapping Section, and the Record Section.

V. THE GENERAL LAND OFFICE. The General Land Office is the central agency for the management of the public lands. It is organized into several sections, each of which is headed by a chief. The sections are: the Survey Division, the Classification Division, the Disposal Division, and the General Land Office.

VI. THE LAND OFFICE AND ITS WORK. The land office is the central agency for the management of the public lands. It is responsible for the survey, classification, and disposal of these lands. The office is organized into several divisions, each of which is headed by a chief. The divisions are: the Survey Division, the Classification Division, the Disposal Division, and the General Land Office.

FIN

31

VUES