

Agricultural Policy Implementation Project

Ministry of Agriculture, General Directorate for Development Planning and Agricultural Investments (DGPDLA)
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PN-1986-122

68202

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POSSIBILITIES FOR IMPROVING THE MARKETING OF CHEMICAL FERTILIZERS AND THEIR USE IN FARMING OPERATIONS

by

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February 1989

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Supported by USAID/Tunis Special Mission for Economic and Technical Cooperation

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AGRICULTURAL POLICY IMPLEMENTATION PROJECT**

**Ministry of Agriculture, General Agricultural Planning,
Development and Investment Administration (DGPDI)**

**Project Office: Boite Postale 241003, Cité El Khadra, Tunis,
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**Under the auspices of the United States Special USAID
Economic and Technical Cooperation Mission**

TABLE OF CONTENTS

	Page
LIST OF ABBREVIATIONS USED.....	x
INTRODUCTION.....	1
SUMMARY.....	3
CHAPTER I: USE OF FERTILIZERS IN FARMING OPERATIONS.....	8
A. The Agricultural Sector: Land Resources and Organization.....	8
B. Chemical Fertilizers as Factors of Productivity and Intensification.....	8
C. Present Conditions.....	9
1. Evolution of the Consumption of chemical Fertilizers.....	9
2. Structure of Consumption.....	10
3. Agricultural Research on Fertilizer Use.....	10
4. Recommended Fertilizers.....	11
5. Increased Yield Owing to Mineral Fertilizers..	11
6. Profitability of Fertilizer Use.....	12
7. Obstacles to Fertilizer Use by Farmers.....	13
D. Future Outlook.....	13
1. Evolution of Potential Chemical Fertilizer Needs.....	14
2. Advantage of Organic Fertilizers.....	15
3. Research.....	15
4. Fertilizer Use Analysis Laboratories.....	16
5. Some Related Measures.....	15
E. Conclusions and Recommendations.....	18
CHAPTER II: POSSIBILITIES FOR IMPROVING FERTILIZER MARKETING.....	33
A. Introduction.....	33
B. Important Points.....	33

C. Possible Improvements in Fertilizer Marketing.....	35
1. Elimination of De Facto Monopolies in Local Production, Importing and Distribution.....	36
2. Creation of a Network of Wholesalers to Compete with STEC.....	41
3. Economic Motivation of Intermediary- Retailers.....	45
4. Improvement of Distribution Means.....	46
5. Improvement of Fertilizer Availability.....	47
6. Product Cost Reduction.....	49
7. Marketing Cost Reduction.....	49
D. Conclusions and Recommendations.....	53
1. Conclusions.....	53
2. Recommendations.....	54
CHAPTER III: POSSIBILITIES FOR IMPROVING THE PRICE SETTING SYSTEM.....	59
A. Introduction.....	59
B. Prices Charged and their Impact on the Operation of the Fertilizer Market.....	59
1. Prices Charged.....	59
2. Impact of the Current Price Structure on the Operation of the Fertilizer Market.....	61
C. New Proposed Pricing System.....	67
1. Basic Principles to be Observed.....	67
2. Determining the Proposed Pricing system.....	68
D. Minimum Break-even Point.....	72
1. Characteristics of a Hypothetical Distributor..	72
2. Operating Coefficients and Hypotheses Used.....	72
3. Calculating the Break-even point.....	76
CHAPTER IV: ROLE AND RESPONSIBILITIES OF THE PUBLIC SERVICES.....	79
A. Objectives.....	79
B. Strategy.....	79
C. Means.....	79
D. Responsibilities of an Inputs Unit.....	80

E. Training of Inputs Unit Personnel	82
F. Public Relations.....	83

LIST OF ANNEXES

	Page
ANNEX 1: TERMS OF REFERENCE.....	84
ANNEX 2: BIBLIOGRAPHY.....	87
ANNEX 3: PERSONS AND ORGANIZATIONS VISITED.....	91
ANNEX 4: CURRENT SITUATION OF THE MARKETING OF FERTILIZERS IN TUNISIA.....	98
ANNEX 5: SUMMARY OF THE RECOMMENDATIONS OF THE CCE AND AGRER, SA TECHNICAL ASSISTANCE PROJECT TO STEC.....	145
ANNEX 6: RESULTS OF THE SURVEY OF THIRTEEN FERTILIZER INTERMEDIARIES.....	152
ANNEX 7: WITHDRAWAL OF PUBLIC ORGANIZATIONS FROM FERTILIZER MARKETING.....	162

LIST OF TABLES

	Page
Table 1: Classification of Farm Land under Cultivation....	21
Table 2: Consumption of Fertilizers by Type of Farming Operations during the 1979-80 Growing Season.....	22
Table 3: Use of the Three Major Fertilizers (AN, TSP, SSP) by Type of Crop and in Tons.....	23
Table 4: Use of AN by Type of Crop.....	24
Table 5: Use of TSP by Type of Crop.....	25
Table 6: Use of SSP by Type of Crop.....	26
Table 7: Consumption of Fertilizers by Major Agro-Ecological Regions.....	27
Table 8: Recommended Fertilizer Formulas.....	28
Table 9: Profitability of the Use of Fertilizers on Cereals.....	29
Table 10: Main Reasons for Failing to use Chemical Fertilizers on Cereals.....	30
Table 11: Distribution by Crop of the Potential Needs Deficits in the Use of Fertilizers in 1986-87.....	31
Table 12: Example of the Positive and Prolonged Effects of Fertilizer.....	32
Table 13: SNCFT Transport Costs for Fertilizer Supply.....	65
Table 14: Average SNCFT Transport Cost Per Distribution Center.....	66
Table 14 bis: Estimated Unit Subsidy Level for the 1987/88 and 1988/89 Growing Seasons.....	71
Table 15: Relative Volumes of Different Fertilizers in the Bou Salem Region.....	73
Table 16: Sales Volumes for Different Fertilizers.....	73
Table 17: Selected Marketing Costs.....	74

Table 18: SNCFT Transport Costs.....	74
Table 19: Fertilizer Pricing Structure.....	75
Table 20: Fertilizer Costs.....	75
Table 21: Revenues.....	76
Table 22: Project Cash Flow.....	77
Table 23: Sensitivity Analysis for the Domestic Rate of Return.....	78
Table 24: Gross Marketing Margin and Subsidies.....	78
Table A 4-1: Fertilizer Storage Locations and Capacities.....	105
Table A 4-2: Breakdown of Fertilizer Sales on Credit.....	109
Table A 4-3: Summary of Fertilizer Sales.....	111
Table A 4-4: Locations and Storage Capacities of Fertilizers.....	116
Table A 4-5: Monthly Fertilizer Sales.....	117
Table A 4-6: Payment Facilities.....	122
Table A 4-7: Breakdown of Intermediary-Retailers.....	126
Table A 4-8: Comparison of Average Fertilizer Tonnages....	128
Table A 4-9: Change in Geographical Distribution of STEC Customer Accounts.....	129
Table A 4-10: Geographical Distribution of Storage Capacities.....	132
Table A 4-11: Marketing Costs and Margins for Fertilizers Delivered by STEC.....	138
Table A 4-12: Evolution from 1985 to 1988 of Gross Margins for Fertilizer Distribution.....	139
Table A 4-13: Costs and Net Marketing Margins for AN and TSP.....	142

Table A 4-14: Comparison of Costs and Net Marketing Margins for Fertilizers in Various Asian Countries.....	143
Table A 4-15: Comparison of Costs and Marketing Margins for Fertilizers in Various Asian Countries..	144
Table A 6-1: Purchase and Selling Prices Charged by Intermediaries.....	155
Table A 6-2: Gross Margins Earned by Types of Fertilizers.....	156
Table A 6-3: Sales by Types of Fertilizers by the Intermediaries Surveyed.....	157
Table A 6-4: Marketing Costs for Fertilizers Distributed by the Intermediaries Surveyed.....	158
Table A 6-5: Net Marketing Margins Earned by the Intermediaries Surveyed.....	159
Table A 6-6: Credit extended for Fertilizer Sales by the Intermediaries Surveyed.....	160
Table A 6-7: Means of Transport and Storage Capacities...	161

LIST OF FIGURES

	Page
Figure 1: Fertilizer Consumption in Tons of Fertilizer Elements from 1960 to 1984.....	20
Figure A 4-1: (Map) Location of the STEC Warehouses (8) and Points of Sale (2) on the SNCFT Rail Network.....	104
Figure A 4-2: (Diagram): Breakdown of Average Monthly Fertilizer Sales (AN, TSP, and SSP) from 1980 to 1985.....	118

LIST OF ABBREVIATIONS USED

AIRD	Associates for International Resources and Development
AGCD	General Administration for Cooperation in Development (Brussels)
AN	"Ammonitre" or Ammonium Nitrate
APIA	Agricultural Investment Promotion Office
APAME	
APIP	Agricultural Policy Implementation Project (idem PMOPA)
bdv	Sales Office (STEC)
BEI	European Investment Bank
càd	i.e.
CAF	Cost, Insurance and Freight (idem CIF)
CAPV	Plant Production Arrondissement Chief
CCE	Commission of European Communities (Brussels)
CCGC	Central Major Crops Cooperative
CCSPS	Central Selected Seeds and Plant Cooperative
cdd	Distribution Center (STEC)
CEE	European Economic Community (Brussels)
CFA	French Nitrogen Syndicate (France)
CGC	General Compensation Fund (MEN)
ch cdd	Distribution Center Chief (STEC)
CI	Inputs Unit
CIF	Cost, Insurance and Freight (idem CAF)
COCEBLE	Central Wheat Cooperative
CRDA	Regional Agricultural Development Commissionership
CRDI	International Research and Development Center (Ottawa)
CSA	Agricultural Services Cooperative

CTV	Territorial Extension Group (MINAG, DG/PV)
DGA	Deputy General Manager
DCAP	Production Coordination and Assistance Administration (MINAG)
DG/PDIA	General Agricultural Planning, Development and Investment Administration (MINAG) (formerly DPSAE)
DG/FE	General Financing and Incentives Administration (MINAG)
DG/PV	General Plant Production Administration (MINAG)
DIMGE	Integrated Development of Medium and Large Companies
\$US	US Dollars
DPCE	Price and Economic Control Administration (MEN)
DPSAE	Planning, Statistics and Economic Analysis Administration (MINAG) (replaced by DG/DPIA)
DT	Tunisian Dinar
DVA	Agricultural Extension Administration (DG/PV, MINAG)
ESAK	Le Kef School of Advanced Agriculture
FADINAP	Fertilizer Advisory Development and Information Network for Asia and the Pacific (Bangkok)
FIDA	International Fund for Agricultural Development (United Nations, Rome)
FOB	Free on Board
FPA	Fertilizer and Pesticides Authority (Philippines)
GTZ	Deutsche Gesellschaft fur Technische Zusammenarbeit (West Germany)
ha	Hectare
h-a	man-year
h-jr	man-day
ICARDA	International Center for Agricultural Research in Dry Areas (Damascus)

INRAT	National Institute for Agricultural Research of Tunisia
INAT	National Agricultural Institute of Tunisia
IFA	International Fertilizer Industry Association, Ltd., Paris
IFAD	International Fund for Agricultural Development (United Nations, Rome) (idem FIDA)
IFDC	International Fertilizer Development Center (USA)
IrAIGX	Engineer who has graduated from the School of Agricul- tural Sciences of Gembloux (Belgium)
ISG	Advanced Management Institute
K2o	Potassium oxide [sic]
Kg	Kilogram
m DT	Millions of Tunisian Dinars
MEN	Ministry of the National Economy
MINAG	Ministry of Agriculture
MTASAP	Medium-Term Agricultural Sector Adjustment Program (Tunisia)
N	Nitrogen
NACI	North African Commercial and Industrial (Tunisia)
Nb	Number
No	Number
ODESYANO	Office for Northwest Forestry and Pastoral Development (Tunisia)
OC	Cereals Office
OMIVA	Development Office (idem OMV)
OMV	Development Office (idem OMIVA)
OMVVM	Medjerdah Valley Development Office
ONU	United Nations
OTD	Office of National Lands

Pzos	Phosphonic Oxide
PASA	Agricultural Structural Adjustment Program
PDG	President and Managing Director
Q	Quintal
Qx	Quintals
p.ex.	For Example
PMOPA	Agricultural Policy Implementation Program (idem APIF)
ppv	Advertising, promotion and sales
RDP	Private intermediary-Retailer
RT	Republic of Tunisia
SA	Public company
SARL	Limited liability company
sau	Usable agricultural surface
SCIA	Agricultural Inputs Control Service
SCPA	Potash and Nitrogen Trading Company (France)
sef	Economically fertilizable surface area
SEPCM	Fertilizer and Chemical Company of the Megrine
SMADEA	El Mardja Agricultural Development Company
SSP	Single Superphosphate, or Super 16%
STEC	Tunisian Chemical Fertilizer Company
STIPCE	Tunisian Industrial Chemicals and Fertilizers Company
TRI	Domestic profitability rate
TSP	Triple Superphosphate, or Super 45%
UCP	Union of Production Cooperatives
UNA	National Farmers' Union
USAID	United States Agency for International Development

US\$ **United States Dollars**

UTICA **Tunisian Union of Industry, Trade and Crafts**

INTRODUCTION

This study of fertilizer marketing and utilization in Tunisia is part of the Agricultural Structural Adjustment Program (PASA) which has four basic objectives:

- To strengthen the role of market forces in determining the price of inputs and agricultural products;
- To enhance the role of the private sector in the marketing of inputs and agricultural products, both locally and internationally;
- To consolidate the efficacy of government agencies in assisting agricultural production and its marketing;
- To protect the welfare of the economically deprived.

In the context of these objectives, the study therefore aims to examine how the use and marketing of fertilizers and, in particular, their distribution can be improved technically, financially and economically¹.

Before reviewing the condition of fertilizer marketing in Tunisia, some universal principles should be stated. For example, it must be stressed that to be viable liberalization of the fertilizer sub-sector must be total and be part of a general liberalization policy applying not only to the agricultural sector but also to others, such as the transportation sector. This is explained, in particular, by the narrowness - in comparison to other distribution activities - of the gross margin to be divided among financial operators involved in the fertilizer marketing chain.

This margin, after production (or import), is generally not sufficient in the competing markets if it is not supplemented by a portion of the production margin. Certain marketing costs, such as those of product promotion and credit are often absorbed by the producers or the importers. This implies a certain integration of distribution from the producer to the ultimate retailer who has direct contact with the user.

The slenderness of the margin finally left to the retailers and the seasonal nature of fertilizer sales almost always forces them to diversify into other sectors. That is why the marketing of fertilizers is often associated with that of other inputs (pesticides, seeds, agricultural equipment, fuel, spare parts, building materials, etc.) and/or with that of agricultural production. This integration often makes it possible to mitigate the inadequacy of institutional seasonal credits.

¹See the terms of reference in Annex 5.

With regard to the distribution of bulk materials such as fertilizers, there are interesting interrelationships with the transportation sector where one private operator may handle several products, including some that are entirely unrelated to the agricultural sector.

SUMMARY

A. USE OF FERTILIZER IN FARMING OPERATIONS

(see Chapter I)

1. Analysis

Present conditions can be characterized as follows:

a. Since 1960, total annual fertilizer consumption, expressed in tons of fertilizer elements, has grown from 10,000 tons to 100,000 tons, i.e. about 250,000 tons of products at the present time. While use of phosphate and nitrate fertilizers is growing constantly, that of potassium fertilizers is stagnant if not decreasing.

b. Over 50% of fertilizers are used in farms of more than 100 ha. Cereal cultivation uses up 45 to 50%. 90% of fertilizers are marketed in the North.

c. After dealing with important questions of agricultural research up to 1970, studies related to fertilizer use have since been scanty. Despite its importance, laboratory soil analysis has followed the same path.

d. Recommendations regarding manures are based on (frequently old) research findings, bibliographic data and specialist advice, and most often they represent a compromise between or extrapolation from these three sources of information.

e. The intensity of crop response to manures and fertilizer profitability relates to many factors. If rainfall conditions are favorable this response can be very significant.

f. The reasons for not using fertilizers are tied primarily to financial resources in the North and to rainfall in the South.

2. Future Outlook

a. Agricultural production potential is still underutilized and expansion of useful agricultural surface areas remains very limited. As a result, increased production must necessarily involve intensified cultivation methods, and fertilizer use is one of the essential factors.

b. The present potential deficit in the use of nitrogen fertilizers is on the order of 50%; for phosphate fertilizers it is about 40%.

3. Recommendations

a. Revitalize agricultural research on plant nutrition and orient its work toward an integrated approach by returning crops to their environment. A report of the results should be prepared periodically.

b. Designate or create a central laboratory responsible nationally for analyses relating to the use of fertilizers (soil, plant, irrigation water, fertilizer), and develop the frame of reference required for pertinent recommendations.

c. Study farmer motivation with respect to intensified cultivation and especially fertilizer use.

d. Improve the procedures for granting seasonal credits.

e. Promote certain simple and inexpensive techniques that farmers can use (regular spreading of fertilizers, use of organic fertilizers).

B. FERTILIZER MARKETING

(see Chapters II & III and Annexes 4, 6 & 7)

1. Analysis

The present conditions are characterized by:

a. Commercial lethargy on the part of the parastatal undertakings at the apex of the pyramid of fertilizer marketing channels, be it the local producers (SIAPE, SAEPA), importer-distributor STEC, or the cereal warehousing organizations (OC, CCGC, COCEBLE) acting as wholesalers (9,000 to 50,000 tons of fertilizer per year).

Reasons:

- The de facto monopoly enjoyed by SIAPE, SAEPA and STEC because the system under which STEC (import-distribution) makes late payments (delays of 12 to 18 months) is evidently discouraging the private sector;

- As to wholesalers (OC, CCGC, COCEBLE), the margin left to them would not enable them to afford the cost of a sales network. And the collecting of cereal being more profitable than fertilizer distribution, their priority will go to assigning human and material resources to such collecting.

b. The growing network of private intermediary-retailers (RDPs) and the emergence of some Agricultural Service Cooperatives (CSAs)¹ whose gross sales now exceed those of the warehousing organizations, but which are inequitably distributed geographically, are poorly managed upstream, and carry a wide variety of products (pesticides, building materials, hardware, farm equipment, spare parts, etc.).

c. The warehousing organizations' shortage of fertilizer storage capacity at the beginning of the growing season (because the peak seasons coincide), prohibitive if applicable to fertilizer alone (cf. STEC buffer warehousing) but feasible on farmer property and in certain sectors whose "peak season" does not coincide with that of fertilizers (e.g. building materials).

d. The lack of available funds on a timely basis for the purchase of fertilizers when they are needed. Even the credit granted to OC by STEC is only partially passed on to the farmers².

e. A gross marketing margin that is adequate on the whole but that needs to be redistributed among the various levels (from the producer to the RDP), particularly at the wholesale level, and at STEC (import-distribution) expense.

2. Recommendations

a. Objectives

. Revitalize distribution channels to enhance the quality of services to the farmer (availability, transportation, credit, technical information) through compensation that will motivate the distribution channels.

. Encourage the storage of fertilizers where it is feasible - i.e. on farm property - and the warehousing of bulk material whose seasonal activity is complementary (e.g. building materials)

¹ Annual sales by RDPs and CSAs have grown from a few hundred tons to 4,000 tons of fertilizer in 1987/88 (the twelve months ending on 8/31/88). During this period, the RDPs represented 42% and the CSAs 7% of STEC's gross sales, while they had been only 19 and 5%, respectively, in 1984 (see Annex. 4, Table A4-3 bis).

² STEC credit sales (3 months) to OC amounted to DT 5 million in 1987/88, while payment facilities granted by OC to the farmers cover about DT 2 million per year (see Annex 4, Tables A4-3 & A4-6).

at commercial locations in order to enhance availability and reduce distribution costs.

b. Strategy

By implementing the following program, gradually break up the de facto monopolies enjoyed by the local producers, SIAPE and SAEPA, and importer-distributor STEC:

. In a first stage, (1989), allow a new class of wholesalers to buy their stock directly from the producers, SIAPE and SAEPA, under the same terms as STEC. To that effect, make the payments to the producers who will remit them to their distributor-wholesalers, invoiced at their choice FOB factory or CAF destination, and to whom they will grant payment terms for pre-season deliveries. This measure should permit the constitution of reserve stocks at the farm without the need to wait for the late release of seasonal credits.

. In a second stage (1990), adopt a zone differential for transportation billing or, better still, bill it at actual cost.

. In a third stage (1992) - when subsidies have ceased - eliminate import duties (15% on CAF) and, if not already done, bill transportation at actual cost. These measures will allow wholesalers to become importer-distributors and will eliminate the de facto monopoly enjoyed by local producers. The latter will thus have had three years to prepare for foreign competition on the local market, just as they are already accustomed to doing with respect to exports.

This gradual change will also give STEC time to adjust to the competition that will arise at its level on the local market; in particular STEC will have to find a way to rid itself of its buffer warehouses (by transferring them to a sector that has complementary activities). The buffer stocks¹, could be kept by the distribution network in compensation for payment facilities (chargeable to a disaster insurance fund?).

¹30% of annual consumption according to AGRER S.A. (see Bibliography No. 4), i.e. 80,000 to 100,000 tons at the present time.

C. **ROLE AND RESPONSIBILITY OF THE PUBLIC SERVICES**

(see Chapter IV)

Along with gradual government disengagement in the area of fertilizer marketing, measures must be taken to safeguard a balance between the interests of the consumers and those of the economic operators serving the public; to this effect, healthy and adequate competition that generates services is to be promoted.

To design, coordinate, monitor and control this fertilizer policy and to evaluate the results we suggest that a unit be created to take care of these and other factors of intensification through existing executive agencies; such a unit must have the required competence and be granted effective authority through ready and regular access to decision makers.

CHAPTER I

USE OF FERTILIZERS IN FARMING OPERATIONS

A. THE AGRICULTURAL SECTOR - LAND RESOURCES AND ORGANIZATION

Tunisia's total land area of 16.2 million hectares is divided unequally into three large ecological regions. The northern region is the most fertile and has the best rainfall levels, 400 to 1,000 mm, but it represents only 25% of the territory; the central region represents 15% and lies between the 200 and 400 mm isohyets; the remaining, southern region represents 60% of the total land area and comprises desert and semi-desert areas. Only 8.4 million hectares are suitable for agriculture and grazing; 4.7 million hectares are truly arable land.

The most important factor limiting yield is the water available for plants. The area north of the watershed usually receives adequate water in winter and early spring but rain distribution is often highly irregular and there are years when yield falls off significantly.

There are 250,000 ha of potentially irrigable land but only 205,000 ha are properly equipped at present and only 80% effectively irrigated.

Soil quality is very uneven but most of it contains calcium ions with $\text{pH} > 7$, except in the North and Southeast where the sandy mother rock has created non-calcareous, acidic, leached and poor soil.

Land use is characterized by a preponderance of small farms: 45% of the farmers own less than 5 ha and have only 7% of the S.A.U.¹. By contrast only 4% of the farmers have more than 50 ha and own more than 40% of S.A.U. (see Table No. 1).

Breakdown of these farms by size is greatly affected by the natural milieu: large farms in the northern plains; almost exclusively small farms in mountain or forest regions and wherever there are steep inclines; large proportion of small and medium-size farms in the areas of poor rainfall.

B. CHEMICAL FERTILIZERS AS FACTORS OF PRODUCTIVITY AND INTENSIFICATION

The land's potential yield depends on the soil's intrinsic characteristics, the growing techniques used and the climate.

Increased productivity requires several factors affecting

¹S.A.U. = useful agricultural surface area.

intensification. Use of fertilizers is only one of these factors. Its effectiveness and importance depend closely on the type of crop involved and on the conditions under which it is used.

Intensity of response when fertilizer is applied to major crops (cereals, fodder, legumes, etc.) usually cultivated in pluvial farming is linked to many other parameters. Among the most important are: water supply (quantity and distribution); weed-killing ability; potential of varieties and species grown; choice of rotation mode and of crops; sowing conditions (date, density, depth, seed quality, etc.); use of organic fertilizer; plant health protection; the working of the land.

For vegetable growing, emphasis must be placed on selecting high-quality seeds and plants; using organic fertilizer; mastering the art of irrigation; and ensuring effective plant health protection. For intensive tree farming, an additional important factor is the quality of pruning.

C. PRESENT CONDITIONS

1. Evolution in the consumption of chemical fertilizers

The growing use of fertilizers since 1960, expressed in tons of fertilizer elements (N, P205, K20 and total) is shown in Chart 1. Within less than 30 years the overall annual consumption of fertilizer elements has grown from about 10,000 tons to 100,000 tons (i.e. about 250,000 tons of products at the present time).

While the use of K20 has stagnated or even decreased in the last few years, consumption of nitrogen and consumption of P205 have had parallel growth.

The chart clearly shows two periods of significant growth: 1970/71, coinciding with intensified popularization of fertilizer use (Cereal Project, Fertilizer Program) and the introduction of high-yield wheat, and 1980/81 (the curve is irregular before 1983/84, mainly because of import problems).

With regard to types of fertilizer used, we note that Ammonitre 33.5% and Super 45% are growing steadily while Super 16% has been clearly decreasing since 1978/79. The quantities of potassium fertilizer (sulfate, chloride and nitrate) and the various formulas of N-P-K fertilizer compounds represent only limited tonnage. Since 1986-87, when D.A.P. (18-46-0) appeared on the market, we note rapidly growing farmer interest in this fertilizer which is particularly attractive as to both cost and utilization (reduced transportation and handling).

2. Structure of Consumption

A study of consumption versus farm size (Table 2) conducted in 1979/80 shows that 56% of Super 45 and 47% of Ammonitire 33.5% is used in farms of more than 100 ha. Each of the other strata uses about 10% of the overall amount.

Examination of consumption versus type of crop (Tables 3 - 6) shows that cereal growing uses about 45% of all marketed fertilizers, up to 50% in a good year (1986-87). Vegetable growing uses about 20%, fodder 13-14%, tree farming 11-12%, legumes less than 5%, and the rest less than 3%.

The northern portion of Tunisia, which is limited in area but enjoys the best climatic conditions, consumes 90% of the fertilizers on the market (Table 7).

3. Agricultural research on fertilizer use

INRAT's agricultural research on soil fertility and plant nutrition was deeply influenced by studies done by Yankovitch and Capitaine some years ago. Findings of field tests run by Capitaine in the late sixties have resulted in recommendations on fertilizer use for the various crops, especially cereals. In 1970, when the high-yield varieties of wheat were introduced, INRAT unfortunately abandoned its research on the effects of fertilizer on cereals and shifted its focus to sugar beets, citrus fruit and, more recently, to grape growing.

In addition to its extension effort, FAO's fertilizer program (1968-71) involved significant experimentation with fertilizer use; this is also the period when applied agricultural research was taken on by the "Cereal Expansion Project" which was later incorporated into the Cereal Office's technical department. The latter has a considerable volume of findings which are unfortunately only partially analyzed and applied. The Frétissa Model and Demonstration Farm project also studied the fertilizing of major dry-rotated crops in the sub-humid zone. The efficacy of nitrogen fertilizers, nitrogen application and the latent fertility of dry-cultivated or irrigated soils were studied in the semi-arid upper valley of the Medjerda. The findings, exclusive of nitrogen and humus norms, should be confirmed in the areas neighboring those that were studied.

INRAT has recently established a new approach to Development Research based on a study of technical farm resources; projects are now under way, involving ICARDA/CRDI in particular.

The Olive Tree Institute has been studying olive tree mineral nourishment and fertilizing for more than ten years.

Laboratory soil analysis has evolved in the same manner as

agricultural fertilizer research. The results of laboratory soil analysis by INRAT, Beni Khalled and the Le Kef National Advanced Agricultural Institute are still too limited for specific recommendations in the near future regarding fertilizer use, other than for citrus fruit growing.

The results obtained by the Kef laboratory seem to indicate that a significant portion of the region's soil is very rich in phosphates: 85% of the soil samples analyzed contain over 10 ppm of P, 45% more than 30 ppm, whereas the accepted norm for cereal crops is now 5 to 7 ppm.

The numerous requests for analysis the Beni Khalled laboratory receives reveal the farmer's growing interest in individually-tailored recommendations; they are no longer satisfied with standard formulas for fertilizer use.

4. Recommended fertilizers

Fertilizer recommendations by the extension services are the result of available research findings, bibliographic data and specialist advice or, in most cases, from a compromise or an extrapolation of the three sources of information. There are consequently standardized recommendations per area and per crop that do not adequately take other factor into account. The "Guide Pratique du Technicien Agricole" [Practical Guide for the Agricultural Specialist] published from 1979 to 1981 still serves as the reference document on this topic.

Considering, on the one hand, that no results are yet available on the use of potash (K₂O) and, on the other hand, that no trace-element deficiencies have yet been reported, recommendations for major and industrial crops involve only principal elements: nitrogen (N) and phosphorous (P₂O₅). However, application of potash (K₂O) is recommended for beets. The example of fertilizers recommended for cereals is shown in Table 8.

For intensive tree farming and for vegetable growing emphasis is placed on organic fertilizers, a clear distinction being made between basic fertilizer and maintenance fertilizer; all three elements - nitrogen, phosphorus and potassium - are used for mineral fertilizers. The recommended fertilizers are more varied than for major crops. The problem of trace-element deficiency is taken into consideration.

5. Increased yield owing to mineral fertilizers

The intensity of crop response to fertilizer application is tied to many factors and consequently variable, but certain results observed in this country are worth noting.

In cereal growing, the findings of agricultural research in

the sixties and of the Fertilizer Program (1968/71) demonstrations have shown increases of 5 to 7 quintals for ordinary varieties of wheat receiving 40-45-0 fertilizer. Under these conditions average yield per kilogram of fertilizer element is about 6 kg of seed for hard wheat and 8 kg for soft wheat. More recent tests on high-yield wheat and triticum show good response to nitrate fertilizers. Average yield for 1 kg of nitrogen is 10 kg of seed for 100-unit applications, and 20 kg for smaller applications of 30 units.

Yield rise in fodder cultivation (oat-vetch) can be spectacular, even with modest 33-45-0 fertilizer use. Many tests have shown yield increase in the order of 50%.

According to the Olive Tree Institute, yield increase resulting from the application of 3 kg of Ammonitre per olive tree is 13%; for 4 kg it is over 27%.

In citrus fruit growing the results of demonstrations run by the Fertilizer Program have shown that the addition of 0.75 kg of nitrogen per mandarin orange tree increases yield by an average 17.7 kg of fruit, i.e., 26%.

6. Profitability of fertilizer use

It is generally recognized that interest in fertilizer use is linked to sufficient profitability, i.e., that the ratio (V/C) between the increased yield due to the fertilizers and fertilizer cost (C) be at least equal to 2.

With the results available it is at present difficult to estimate the actual yield increase due to the use of fertilizers. The most accurate data pertain to cereals.

Taking these results into account and striving to be objective, the following average yield per kilogram of fertilizer element (N & P₂O₅) was established for high-yield cereal varieties and for the recommended amounts of fertilizer used:

	Sub-humid zone	Semi-arid zone
Hard wheat	8 kg	6 kg
Soft wheat	8 kg	6 kg
Triticum	8 kg	6 kg
Barley	7 kg	6 kg

Table 9 shows profitability figures for fertilizer use on cereals and oat-vetch fodder.

Under price subsidy conditions, profitability of fertilizers on cereals and oat-vetch fodder is assured for hard or soft wheat, barley, triticum and oat-vetch. The elimination of subsidies,

while reducing the net profit, still allows sufficient profitability in both zones for wheat, triticum and oat-vetch. Profitability for barley is borderline in the semi-arid zone; for the V/C ratio to reach 2, the producer would have to be paid D 14.55 instead of D 14 per quintal.

7. Obstacles to fertilizer use by farmers

Table 10 shows that for cereals, which consume almost half of all fertilizers, over 20% of northern farmers and almost all the farmers in the central and southern regions do not use chemical fertilizers.

In the North, this is essentially due to the lack of financial means (66.5% of the time) and in part (11% of the time) to the use of manure. Very few farmers (4.5%) state that they are not convinced; 3.2% complain of non-availability, and only 0.3% invoke insufficient rain.

In the center and in the South, conditions are different: more than 50% do not use fertilizers because of insufficient rainfall (37.7%) or because they doubt their usefulness (12.6%), which is understandable since rainfall is scarce and irregular. Lack of funds is the other major cause, applying to 32% of the farms. Non-availability applies only to 0.17%.

These figures must be interpreted with great care, however, since the available data cover only those farmers who did not use fertilizers. There is no way to know what problems the other farmers face, particularly with respect to fertilizer availability at the proper time and in the quantities needed and with respect to the difficulties and delays involved in obtaining seasonal credits.

From information gathered in the field it appears that these factors also bear on the effective use of fertilizers.

D. FUTURE OUTLOOK

In Tunisia potential agricultural production is still underutilized. Expansion of useful agricultural surface areas cannot be considered without the reclamation of certain regions now under way, but it will hardly make up for losses due to the expansion of areas devoted to housing, industrial zones and the creation of other infrastructures, etc. An increase in production necessarily implies intensified growing methods. Effective use of fertilizers is one of the essential requirements for intensified growing.

1. Evolution in potential chemical fertilizer needs

An estimate of potential chemical fertilizer needs was included in the final report on a technical assistance project (SEM 02/212/007) submitted to STEC in 1986. In this study, needs were computed by multiplying the fertilizer use per hectare recommended for each crop in the "Practical Guide for the Agricultural Specialist" by the surface area that can be fertilized economically according to the "Enquête Agricole de Base 1985" [Basic Agricultural Survey for 1985]. "Surface area that can be fertilized economically" is defined as all crops located in the north and only the irrigated ones in the center and in the south. This is only an estimate by default, especially in regard to fruit growing, especially olive trees for which mineral fertilizers are an essential yield-increasing factor, even in the central and southern areas.

Overall needs thus calculated amounted to 477,000 tons, broken down into 295,000 tons of Ammonitre and 182,000 of Super 45 equivalents. The present potential deficit for nitrogen fertilizer use would thus be on the order of 50% - and for phosphate fertilizers, 40%.

An analysis of potential needs per crop (Table 11) shows that in 1987 - when the harvest was very favorable and Tunisia's fertilizer use was the largest ever:

- By far the largest deficits were in cereals which reached 53% of the potential for Ammonitre (96,000 tons) and 5% for phosphates (59,000 tons).
- Fruit tree growing (limited to northern governorates and to open-field cultivations) already has a 60% deficit, i.e., 36,750 tons, including 27,000 tons of Ammonitre (66% deficit).
- Annual fodder cultivations also have a significant nitrate fertilizer deficit of 57%, that of industrial crops being 40%.
- It is the vegetable crops that are the best fertilized, with theoretical and apparent phosphate surplus; nonetheless they present a 14% Ammonitre deficit, i.e., 5,000 tons.

Future trends in these potential needs will depend mainly on:

- The degree of intensification in agricultural production systems;
- The relative development of areas devoted to each crop;

- The integration of animal husbandry with cultivation (organic fertilizers, rotation based on fodder legumes, etc.);
- Research findings, particularly regarding fertilizer use, plant improvement, etc.

2. Advantages of organic fertilizers

The concept of fertilization, too often based on mineral fertilizers alone, must be expanded to a more general view of integrated plant nutrition, also taking into account all aspects of use of organic fertilizer: farm manure input, raking in of wheat straw, biological nitrogen fixation, residue of past harvests, etc. Organic fertilizers condition mineral fertilizers, especially in the mediterranean regions where soils are often humus-poor.

The effect of organic matter input (farm manure, crop residue, etc.) is to increase the soil's organic content appreciably (from 1.8 to 2.6 within 15 years at the Frétissa farm), to contribute sizeable amounts of (major and minor) nutritive elements, to improve soil structure and to increase its water-retention capacity. The result is not only to enhance fertility but also to achieve relatively stable yield by reducing the soil's - and thus the crop's - sensitivity to drought. In large-scale growing, it can be estimated that such regular input will increase yield by 15 to 20% (Table 12).

Biological fixation of atmospheric nitrogen is a natural function of legumes, resulting from the symbiotic action of leguminous plants and rhizobia that are more or less species-specific. The increase in areas planted with seed and fodder legumes is a favorable factor in the improvement of nitrogen soil fertility.

3. Research

Effective fertilizer use is one of the important factors in crop intensification. It is thus essential to have baseline data available that are continuously updated and refined by research.

Some very interesting data are still insufficiently used. In cereal growing, an analysis of the many test findings and demonstrations run on farms by the Cereal Office for nearly twenty years should rapidly achieve more streamlined and economical recommendations. A similar assessment should be made periodically for each crop.

It is recommended that agricultural research on plant nutrition be revitalized and that such work be oriented toward an

integrated approach by returning crops to their environment. A permanent system of mineral fertilizer tests should be created to this effect for the species to be studied so as to obtain fertilizer element response curves (yields and profits) for each agroclimatic zone, taking into consideration major soil types, crop rotation, biological nitrogen fixation, irrigation possibilities, varieties, etc. This work should be closely coordinated with the soil analysis laboratories.

Special attention should be paid to determining, along with crop fertilization needs, conditions of implementation, choice of the most appropriate equipment (handling, spreading, etc.) and most effective fertilizers (simple, compound or complex fertilizers, urea use, etc.).

4. Fertilizer use analysis laboratories

The results of analyses run by INRAT, Beni Khalled and Kef laboratories as well as growing farmer demand are convincing proof of the interest in pursuing research in this field. Ultimately, the extension of fertilizer use should no longer be standardized for each region but rather be based on individual analyses and in accordance with the conditions under which growing will take place.

It should be noted, however, that it is not possible to select a fertilizer based merely on a soil analysis bulletin until numerous supplementary studies have been completed: soil analysis, foliar analysis and field observations would provide a great number of correlations between field results and laboratory studies.

Within this framework the laboratories must reach an agreement to develop standard analysis and sampling methods adapted to Tunisia's agricultural, soil and climate conditions.

To this effect, it is recommended that a central laboratory be designated or created to be responsible at the national level for analyses relating to fertilizer use - soil, plant, irrigation water - and of commercial fertilizer quality control. It should also be responsible for coordinating the overall experimentation in the field necessary to create the frame of reference needed for fertilizer recommendations. The equipment for such a laboratory must be designed to run assembly-line analyses and ultimately to provide individual fertilizer recommendations tailored to each crop.

Other existing laboratories would continue their current research, training or service activities while collaborating to the extent possible with the central laboratory.

5. Some related measures

Compared to potential utilization, overall use of fertilizers

remains weak, especially in small and medium-size farms. Financial constraints appear to be a major obstacle to more intensive use of chemical fertilizers. A survey of farmer motivation toward intensified growing should provide a clearer understanding of the other constraints affecting the use of fertilizers. A reorientation of the extension effort is necessary to ensure a more effective use of fertilizers. Farmers could quickly adapt some simple and inexpensive methods.

Input pricing policy is studied elsewhere. Of course, the subsidy policy implemented up to now has been a valuable aid in extension by making the farmers aware of the advantages of chemical fertilizers and is a useful factor for the increased use of fertilizers. Paragraph C-6 stated that, although cancellation of fertilizer subsidies reduced net profits appreciably, the crops involved still generate sufficient profit.

Several institutions grant seasonal credits under highly variable terms:

- Cash bank credits granted by BNT [Central Bank of Tunisia] and commercial banks, that apply only to farms that can offer sufficient guaranties (mainly large farms);
- Supervised credit run by projects that supervise small farmers (< 50 ha) such as the Assistance Project for Small and Medium-Size Northeast Farmers (APMANE) and the FIDA Project (Le Kef and Siliana). Seasonal credit is paid out in kind for agricultural inputs;
- Customer cards supplied by the Cereal Office and by the Cooperatives (CCGC, COCEBLE) allowing their holders to obtain privileged access to credit;
- Mutual security companies (generally for large farms only) which grant their members credit limited to 20 times their capital holdings.

Many organizations thus offer short term credit but only a minority of farmers - less than 15% - use them. As many producers as possible should be reached, in particular by strengthening supervised credit and by considering it as a connection to bank credit. The procedures for extending seasonal credit should be further simplified and shortened so that credit can be received early enough to build up effective agricultural input stocks.

The farmer's motivation and problems with regard to intensified growing are still poorly understood. At present, assessment factors are rarely based on in-depth surveys of the farmers themselves - who, after all, are the interested parties. It would be of the greatest interest to understand more fully the

deep motivations that promote or inhibit intensification of farming in the various areas and regions of the country.

Extension, which is undergoing complete reorganization, is characterized by both a mass approach using the mass media to disseminate its messages (radio, television, newspapers, etc.) and an on-site orientation based on the establishment of local extension units (CTVs). The CTV chief must by definition be a versatile individual; he carries out his mission through "training visits" which should systematically take into account the entire gamut of farmer problems. Unfortunately, this program - which was started in 1980 - does not yet cover the entire country; extension topics offer little variety and they are generally sector-oriented or theme-oriented and do not take into account overall farm operation. Dissemination of updated research findings suitable for extension, especially regarding fertilizer use, is not done systematically and newly acquired knowledge is not translated effectively into simple and practical language.

This lack of a connection between the research and extension sectors also inhibits feedback which could give rise to more effectively targeted research programs responsive to the farmer's major concerns.

The development program for research and agricultural extension must lead to improvement in both areas.

Fertilizer distributors, for their part, must above all ensure adequate and timely product availability at the best possible price and as close to the farmer as possible. They should also be able to provide their customers with advice on product utilization in coordination with the advice given by the regional CTVs, or direct them to these specialized services.

Farmers who use fertilizers still have a long way to go regarding regular intervals between spreading operations. Systematic marking for seeding purposes (tracks for the wheels) and effective spreader adjustment would bring about decisive progress at below cost.

E. CONCLUSIONS AND RECOMMENDATIONS

Tunisia's agricultural production potential remains underutilized. Raising productivity implies intensification of growing techniques, and the use of fertilizers is an essential factor in this effort.

Although use of fertilizers has grown ten-fold since 1960, present consumption represents only 50% of potential needs. Fertilizers are used most effectively in vegetable growing.

Intensified use of chemical fertilizers really took off in

1970 as the result of special research and extension efforts.

The intensity of crop response to fertilizers and the profitability of fertilizer use are very satisfactory at present but apparently do not provide sufficient motivation for expanded and more effective application.

In order to enhance fertilizer use on the farm, it is recommended:

- That a more thorough survey of farmer motivation be carried out to permit a better understanding of the factors that inhibit or encourage the process of intensifying farming operations;
- That agricultural research and extension regarding plant nutrition be revitalized and that this work be oriented toward an integrated approach by returning crops to their environment. An assessment of the results should be made periodically;
- That a central analysis laboratory devoted to fertilizer use be designated or created;
- That the procedures for granting seasonal credits be further improved;
- That farmers be taught certain simple and inexpensive techniques that can improve the efficiency of the fertilizers they buy (e.g.: regular spreading intervals);
- That organic fertilizer use be encouraged in all its aspects: manure input (integration of husbandry with crops), raking in of wheat straw (prohibition of incineration), biological nitrogen fixation (expansion of seed and fodder legumes, etc.)

FIGURE 1

FERTILIZER CONSUMPTION IN TONS OF FERTILIZER ELEMENTS

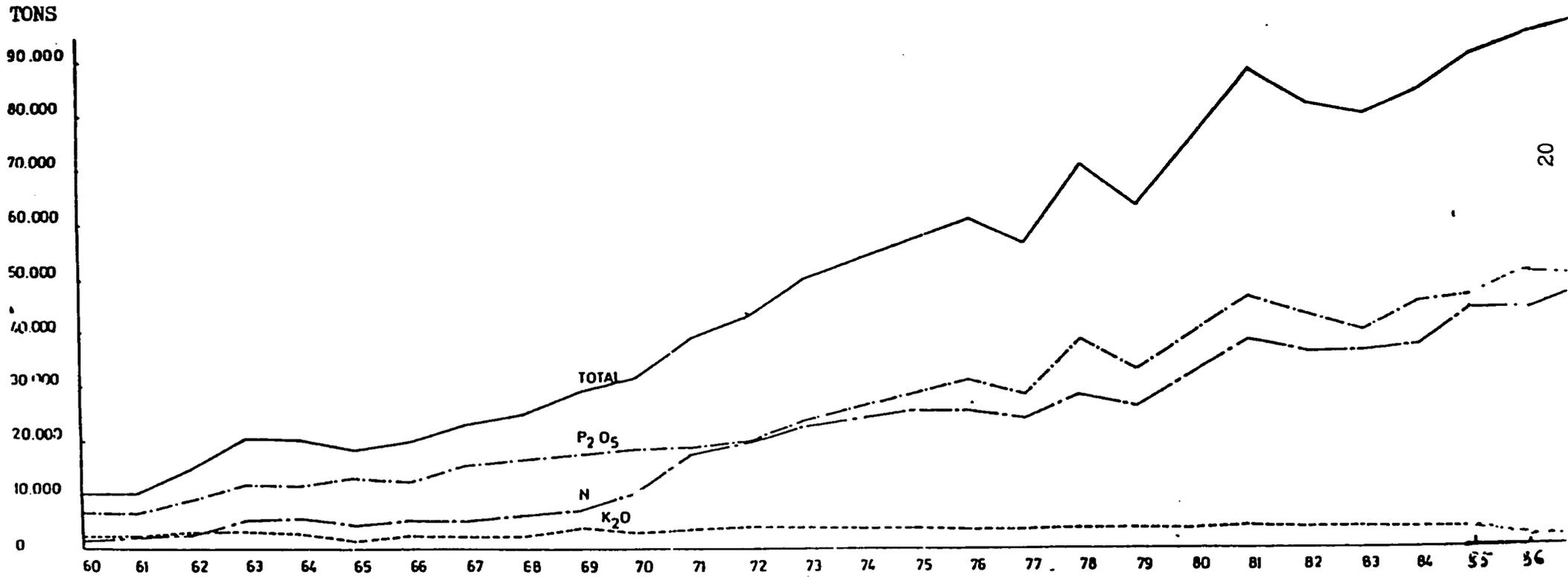


TABLE 1: CLASSIFICATION OF FARMLAND UNDER CULTIVATION

<u>Surface Area Category</u>	<u>Farming Operations</u>		<u>Surface Area Farmed</u>	
	Number (in thousands)	(%)	Number (in thousands)	(%)
0-5 hectares	156	44.6	348	6.8
5-10 ha	80	22.9	599	11.7
10-20 ha	61	17.5	891	17.4
20-50 ha	39	11.0	1,219	23.8
50-100 ha	9	2.5	635	12.4
over 100 ha	5	1.5	1,428	27.9
Totals: ha	350	100.0	5,120	100.00

Source: 1979 Baseline Agricultural Survey, MINAG, DPSAE

**TABLE 2: CONSUMPTION OF FERTILIZERS BY TYPE OF FARMING OPERATION
DURING THE 1979/80 GROWING SEASON**

Size of Farming Operation	<u>Super 4%</u>		<u>Super 16%</u>		<u>"Ammonitre" 33.5%</u>	
	(TSP)		(SSP)		(AN)	
	(in 000s)	(%)	(in 000s)	(%)	(in 000s)	(%)
0-5 ha	5.6	8.7	7.8	23.4	7.3	9.8
5-10 ha	4.7	7.9	3.5	10.5	9.2	12.3
10-20 ha	6.5	10.1	5.4	16.2	9.4	12.6
20-50 ha	6.0	9.3	6.4	19.2	6.7	9.0
50-100 ha	5.5	8.5	4.6	13.7	6.6	8.8
more than 100 ha	36.3	56.1	5.7	17	35.5	47.5
Totals: t	64.6	100.0	33.4	100.0	74.7	100.0

Source: Ministry of Agriculture, DG/PDIA

TABLE 3: USE OF THE THREE MAJOR FERTILIZERS (AN, TSP, SSP) FROM 1975/76 TO 1986/87, BY TYPE OF CROP, EXPRESSED IN TONS

Crop: YEARS	Cereals	Leguminous Plants	Fodder	Vegetable Crops	Tree Farming	Other Crops	TOTALS
1986/87	138520.0	11298.0	32960.0	52270.0	28090.0	4900.0	268030.0
1985/86	112350.0	9630.0	36120.0	67820.0	28910.0	9250.0	264080.0
1984/85	107777.1	11342.7	39569.1	58344.2	21652.2	7240.8	245926.0
1983/84	109272.0	12136.5	28079.9	41741.9	20659.5	7827.7	219717.5
1982/83	100721.0	8413.4	26050.3	41039.2	22482.1	5067.3	203774.2
1981/82	97073.3	12125.4	26008.6	39080.5	20343.0	8418.6	203049.3
1980/81	88495.7		20798.4	37827.3	14007.3	17003.2	178131.9
1979/80	96236.9		21312.8	27171.3	14452.4	20220.1	179393.5
1978/79	107278.9		20519.1	20385.0	15853.8	10658.6	174695.4
1977/78	69441.2		19029.5	15184.8	26900.1	8156.1	138711.8
1976/77	87059.9		12966.5	15735.5	20456.4	7144.1	14336262.
1975/76	84254.2		13152.5	12922.4	40441.5	4835.2	155605.9

Source: ABT Ass., Inc., Washington (study on reduction of subsidies)
 MINAG, DG/PDIA Baseline Agricultural Survey, corrected using STEC data
 (see Bibliography, no. 4)

TABLE 4: USE OF "AMMONITRE" 33% (AN) BY TYPE OF CROP FROM 1975/76 TO 1986/87, IN TONS

Crops YEARS	Cereals	Leguminous Plants	Fodder	Vegetable Crops	Tree Farming	Other Crops	TOTALS
1986/87	85270.0	530.0	17970.0	21800.0	14130.0	2640.0	142340.0
1985/86	59710.0	570.0	18810.0	27420.0	19350.0	4070.0	129930.0
1984/85	62260.0	900.0	24450.0	22740.0	12870.0	3660.0	126880.0
1983/84	58081.6	298.3	13867.2	15739.4	11943.5	2324.9	102880.0
1982/83	50490.0	700.0	14230.0	17550.0	13050.0	1870.0	102254.9
1981/82	45502.1	384.2	12417.8	15082.9	11314.2	3417.2	97880.0
1980/81	38989.9	0.0	9429.8	15131.7	7786.1	2084.2	88118.3
1979/80	37246.8	0.0	8611.2	10161.6	9106.2	4641.8	73421.6
1978/79	43466.1	0.0	8346.1	7681.8	11720.9	1296.4	69767.7
1977/78	25207.0	0.0	7936.1	6213.1	13378.9	2321.0	72511.7
1976/77	33387.2	0.0	4617.4	5195.8	12238.6	1441.0	55056.1
1975/76	39568.4	0.0	5446.8	6260.3	30712.6	1890.5	83878.5

Source: ABT Ass., Inc. (study on reduction of subsidies)
 MINAG-DG/PDIA Baseline Agricultural Survey, corrected using STEC data
 (see Bibliography, no. 4)

TABLE 5: USE OF SUPERPHOSPHATE 45% (TSP) BY TYPE OF CROP
FROM 1975/76 TO 1986/87, IN TONS

Crops	Cereals	Leguminous Plants	Fodder	Veg-table Crops	Tree Farming	Other Crops	TOTALS
YEARS							
1986/87	50880.0	7720.0	12700.0	14410.0	9090.0	1990.0	96790.0
1985/86	49510.0	7280.0	14190.0	19200.0	5970.0	3310.0	99460.0
1984/85	40440.0	7380.0	12560.0	12480.0	7220.0	2440.0	82520.0
1983/84	44100.4	7118.1	11122.7	10892.5	5296.1	2432.8	80962.6
1982/83	39772.7	3877.3	7255.0	10183.0	5446.3	1868.7	68403.0
1981/82	35016.8	6788.8	8239.0	8082.1	5783.8	2904.6	66815.1
1980/81	24273.2		6660.8	9198.7	3528.6	6333.1	49994.4
1979/80	26051.9		7206.0	6969.7	3496.7	7158.8	50883.1
1978/79	22590.7		5368.5	4076.8	1850.0	4379.6	38265.6
1977/78	18214.5		4748.9	3043.2	5027.2	3321.5	34355.2
1976/77	24553.6		3513.1	4712.4	4646.3	3003.1	40428.5
1975/76	19416.0		3083.1	3696.9	6843.5	1377.3	34416.7

Source: ABT Ass., Inc. Washington (study on subsidy reduction)
MINAG-PG/PDIA BASELINE AGRICULTURAL SURVEY, corrected using STEC data
(see Bibliography, no. 10)

TABLE 6: USE OF SUPERPHOSPHATE 16% (SSP) BY TYPE OF CROP
FROM 1975/76 TO 1986/87, IN TONS

Crops: YEARS	Cereals	Leguminous Plants	Fodder	Vegetable Crops	Tree Farming	Other Crops	TOTALS
1986/87	2370.0	3040.0	2290.0	16060.0	4870.0	270.0	28900.0
1985/86	3130.0	1780.0	3120.0	21200.0	3590.0	1870.0	34690.0
1984/85	5077.1	3062.7	2559.1	23124.2	1562.2	1140.8	36526.0
1983/84	7090.1	4720.0	3090.0	15110.0	3420.0	3070.0	36500.0
1982/83	10469.2	3836.0	4565.3	13306.2	3985.9	1328.6	37491.2
1981/82	16554.5	4952.4	5351.8	15915.5	3245.0	2096.8	48115.9
1980/81	25232.6		4707.8	13496.9	2692.6	8585.9	54715.9
1979/80	32938.2		5495.6	10040.0	1849.5	8419.5	58742.7
1978/79	41222.2		6804.5	8626.4	2282.8	4982.7	63918.5
1977/78	26019.7		6344.6	5928.5	8494.1	2513.6	49300.5
1976/77	29119.1		4836.1	5827.2	3571.5	2700.0	46053.9
1975/76	25269.8		4622.7	2965.3	2885.4	1567.5	37310.7

Source: ABT Ass., Inc., Washington (study on subsidy reduction)

MINAG-DG/PDIA Baseline Agricultural Survey, corrected using STEC data
(see Bibliography, no. 10)

TABLE 7: CONSUMPTION OF FERTILIZER BY MAJOR AGRICULTURAL-ECOLOGICAL REGION
IN 1985/86 AND 1986/87

Agricultural- Ecological Region	"Ammonitre" 33.5		Super 45		Super 16		Others		TOTALS	
	tons	%	tons	%	tons	%	tons	%	tons	%
<u>1985/86</u>										
North	117,530	90.7	88,430	88.9	30,670	88.4	2,650	82.8	239,280	89.5
Central	9,120	7.0	7,020	7.0	730	2.1	520	16.3	17,390	6.5
South	3,280	2.3	4,010	4.1	3,290	9.5	30	0.9	10,610	4
Tunisia	129,930	100	99,460	100	34,690		3,200	100	267,280	100
<u>1986/87</u>										
North	130,110	91.5	89,340	92.4	26,260	90.9	3,190	87.2	248,900	91.6
Central	10,120	7.1	6,010	6.2	1,930	6.7	410	11.2	18,470	6.8
South	2,110	1.4	1,440	1.4	710	2.4	60	1.6	4,320	1.6
Tunisia	142,230	100	96,790	100	28,900	100	3,660	100	271,690	100

Source: MINAG-D/PSAE 1986/87 Baseline Agricultural Survey
(see Bibliography, nos. 26 and 27)

TABLE 8: RECOMMENDED FERTILIZER FORMULAS, IN KG OF N-P205-K20/ha

Pluviometry	Hard and Soft Wheat (high-yield varieties)	Barley
500 to 600 mm	100-67-0	67-45-0
400 to 500 mm	67-45-0	50-45-0
300 to 400 mm	67-40-0	33.5-45-0
450 mm cold winter	50-40-0	50-45-0
with supplemental irrigation	100-67-0	-

Source: *Le Guide pratique du technicien agricole, Vol. 3; Grandes cultures et cultures industrielles, MINAG, PDV, December 1980 (see Bibliography, no. 32)*

TABLE 9: PROFITABILITY OF THE USE OF FERTILIZERS ON CEREALS

SH = Sub-Humid; SA = Semi-Arid

	Hard Wheat		Soft Wheat		Barley		Triticum		Oat Vetch	
	SH	SA	SH	SA	SH	SA	SH	SA	SH	SA
Fert. Kg of N-P205/ha	100-67	50-45	100-67	50-45	67-45	33.5-45	100-67	50-45	50-45	33.5-45
Increase in yields due to fertilizers kg/ha	1340	570	1340	570	670	470	1340	570	2,000	1,250
Value of the increase in yields DT/ha (1)	282.740	120.270	254.600	108.300	109.760	65.800	227.100	96.900	120,000	75,000
Cost of fert. use DT/ha										
- subsidized fert. (2)	50.169	27.810	50.169	27.810	33.445	22.173	50.169	27.810	27.810	22.173
- non-subsidized fert. (3)	74.826	42.129	74.826	42.129	50.064	34.194	74.826	42.129	42.129	34.194
Net profit DT/ha										
- subsidized fert.	232.571	92.460	204.431	80.490	76.315	43.627	177.631	69.09	92.190	52.824
- unsubsidized fertilizer	207.941	78.141	179.774	66.171	59.696	31.606	152.964	54.771	77.871	40.806
Cost/benefit ratio (4)										
- subsidized fert.	5.6	4.3	5.1	3.9	3.3	3.0	4.5	3.5	4.3	3.4
- unsubsidized fertilizer	3.8	2.9	3.4	2.6	2.2	1.9	3.0	2.3	2.8	2.2

(1) Price per quintal of hard wheat; DT 21.100; soft wheat; DT 19.000; barley; DT 14.000; triticum; DT 17.000; oat-vetch; DT 6.000.

(2) Price per quintal of "ammonitro" 33.5; L7 11.273; Super 45; DT 10.900.

(3) Price per quintal of "ammonitro" 33.5; DT 15.870; Super 45; DT 18.324.

(4) Value of the increase resulting from fertilizers/cost of fertilizers used.

GR 10/20/1988

TABLE 10: MAIN REASONS FOR FAILING TO USE CHEMICAL FERTILIZERS ON CEREALS
BY MAJOR AGRICULTURAL-ECOLOGICAL REGION

Data Regions	Farmers			Main reasons for failing to use fertilizer (in %)						TOTAL
	growing cereals (no.)	not using fertilizers (no.)	not using fertilizers (%)	insufficient rain	not avail.	Use of manure	Not convinced	Limited finances	Others	
Northeast	25,700	4,600	17.9	1.2	2.1	10.0	10.0	58.8	17.9	100.0
Northwest	56,400	13,400	23.8		3.6	11.3	2.7	68.9	13.5	100.0
Total										
North	82,100	18,000	21.9	0.3	3.2	10.9	4.5	66.5	14.6	100.0
Central-East	47,300	45,000	95.1	22.5		7.1	16.1	25.3	29.0	100.0
Central-West	54,900	53,500	97.4	27.4	1.7	2.4	12.9	46.0	9.6	100.0
South	37,400	37,400	100.0	68.6		1.5	8.2	17.0	4.1	100.0
Central-South	139,600	135,900	97.3	37.7	0.1	3.3	12.6	31.9	14.5	100.0
Tunisia	221,700	153,900	69.4	33.2	0.1	4.6	11.7	35.9	14.5	100.0

Source: MINAG-DPSAE Baseline Agricultural Survey
(see Bibliography, no. 25)

TABLE 11: DISTRIBUTION BY CROP OF POTENTIAL NEEDS AND DEFICITS IN THE USE OF FERTILIZERS IN 1986/87

	Units	Cereals	Leguminous Plants	Annual Fodders	Irrigated Vegetable Crops	Full Tree Farming	Other Crops	TOTALS
Potential for use of phosphated fertilizers ¹	tons	110,925	13,319	20,343	13,418	20,520	3,381	181,909
Current use ³	tons	51,507	8,756	13,442	19,779	10,727	2,803	107,214
Deficit	tons	59,218	4,563	6,901	- 6,361	9,793	578	74,695
	%	53	34	34	-47	48	17	41
Potential for use of nitrogenous fertilizers ²	tons	181,190	-	40,686	26,838	41,040	5,408	295,162
Current use ³		85,238	569	17,298	21,772	14,088	3,235	142,300
Deficit		95,952	-569	23,388	5,066	26,952	2,173	152,862
	%	53	-	57	19	66	40	52

¹ Expressed in TSP equivalent

(1) and (2) Sources: AGRER, SA Report, Brussels (see Bibliography)

² Expressed in "ammonitro" equivalent

³ MINAG-D/PSAE Baseline Agricultural Survey (see Bibliography, no. 27)

**TABLE 12: EXAMPLES OF THE POSITIVE AND PROLONGED EFFECTS OF MANURE,
IN QUINTALS PER HECTARE**

The effect of a normal application of 30 tons of manure in 1975 was measured in Frétissa during one complete rotation, on two 30-hectare plots.

Season	Crops	Yields in Quintals per Hectare	
		Manured Plot	Control Not Manured
1975/76	Sefrou Peas - oats	74.9 of MS	52.0 of MS
1976/77		Beets	Field Beans
1977/78	Maghrebi Hard Wheat	58.84	45.97
1978/79	Avon Oats	46.15	37.07

Source: Final Report, Frétissa Model Farm Project, 1986
(see Bibliography, no. 13)

CHAPTER II
POSSIBILITIES FOR IMPROVING
THE MARKETING OF FERTILIZERS

A. INTRODUCTION

The following pages are intended to provide an analysis of the chemical fertilizer marketing situation in Tunisia. Measures which might contribute to its improvement, within the context of the Agricultural Structural Adjustment program (PASA), are proposed here. They are based on an analysis of the current situation in the marketing of fertilizers in Tunisia conducted during the study, which is fully defined in Annex 4.

First of all, let us recall that within the context of fertilizer marketing, distribution is aimed at supplying farmers fertilizer adequate for their crops, in the desired quantities, as close as possible to where they will be used and in a timely manner.

In return, farmers must make suitable compensation for this service by allowing the distributor a return on his investment at least equivalent to the opportunity cost for his capital and his work.

It is up to the distributors to convince the farmers that the products he distributes are suitable for the latter's needs, in both the plant health and economic aspects.

B. IMPORTANT POINTS CONCERNING TUNISIAN AGRICULTURE

Tunisian agriculture in general and cereal growing in particular, which consumes half the fertilizer used in the country, are in a particularly favorable position in terms of fertilizer use compared to many developing countries. Indeed:

- Available local production can supply them with all the fertilizers needed, in quantity, quality and all necessary combinations;
- Tunisia's particularly well-developed rail and road infrastructures can generally deliver these products to where they are needed, within the desired time and at moderate cost;
- The country has strategic storage and security capability in all the regions distant from the production centers in Sfax and Gabès, which means that they are protected from possible natural disasters (such as the floods of

1972);

- Several of the uncertainties inherent in agriculture have been mastered, notably in cereal growing where agriculture indeed has the following at its disposal:
- * Constantly improved varieties, well-adapted to the local soil and climatic conditions;
- * Pre-established production prices, at an advantageous level in relation to world prices;
- * Adequate pesticides, imported in sufficient quantities, adapted to Tunisian conditions (possibility of local formulation), of good quality (Ministry of Agriculture control laboratory) and at competitive prices (12 importer-distributors);
- * Low priced "strategic" agricultural inputs (primarily seed, fertilizer, plant health products) which to date have been widely subsidized;
- Relatively fertile agricultural lands which, as indicated in the preceding chapter, need only moderate quantities of phosphorus and potassium for cereal growing;
- Budding competition in fertilizer at the retail commercial level due to the private sector's entrance on the scene, generating a decline in prices in the farmers's favor;
- A partial liberalization of road transport for light utility vehicles (less than 10 tons) apparently improves the delivery of fertilizers to farmers, a sector in a particularly unfavorable position in recent years.

In the area of constraints inherent in Tunisian agriculture, we can primarily cite the following:

- Tunisia's climatic uncertainties due to its position in the transition zone between the sub-humid and semi-arid climates;
- Insufficient coverage of farmer's short-term financial needs, especially due to the little they may have to offer as guaranties (unavailability of property titles), the late availability of institutional seasonal credits and lack of informal credit.

The following constraints must be cited with regard to agricultural input marketing:

- Long delays in paying the amounts owed fertilizer importer-distributors as compensation, a particularly damaging constraint for an industry with marginal profitability levels such as those of fertilizers, which have had the consequence of eliminating all private importers, thus creating a de facto monopoly in favor of parastatal producers and distributors;
- Relatively high customs duties and taxes on inputs and components entering into their manufacture, which cancel out part of the subsidies, still at the expense of the Public Treasury;
- The system of purchasing by requests for proposals, dominating and causing stagnation in other agricultural inputs sub-sectors, especially that of pesticides, where the economic and commercial complementarity with the fertilizer industry is commonly known and indissociable; stagnation because, like the significant delays in making payments for fertilizers, it has caused the exodus of international producers who generate the necessary financial means, competition and above all, the constant exchange of the latest technological developments.

C. POSSIBLE IMPROVEMENTS IN FERTILIZER MARKETING

Under this heading an attempt will be made to assess the principal components of fertilizer marketing and to formulate some recommendations to improve their technical, and above all, economic efficiency, both for the farmer and for the economic operators concerned.

As will be shown, most of the measures suggested must be taken against the parastatal fertilizer manufacturing companies, the Société Industrielle d'Acide Phosphorique et d'Engrais [Industrial Phosphoric Acid Company] (SIAPE) and Société Arabe d'Engrais Phosphorés et Azotés [Arab Phosphate and Nitrate Fertilizer Company] (SAEPA) and their exclusive distributor, Société Tunisienne d'Engrais Chimiques [Tunisian Chemical Fertilizer Company] (STEC), which is also a parastatal company.

Their purpose is substantially to improve the service rendered to the farmer through distribution channels, but also, by making this activity more profitable and consequently more motivating, to attract higher levels of competition. While assuring farmers more favorable prices, all of these measures will allow the public services to exercise selection, which promotes high-quality service, while reinforcing the required conditions (distribution methods, knowledge of products) for obtaining authorizations to sell fertilizers issued by the Regional Agricultural Development Commissioners (CRDA).

1. Elimination of de facto monopolies in local production, importing, and distribution

a. Current situation

Before the local fertilizer manufacturing companies began production and developed spectacularly over recent years, the Tunisian market was open to foreign product imports. These products were marketed in the country by several private Tunisian companies, especially Société Mégrine des Engrais et Produits Chimiques [Mégrine Fertilizer and Chemical Products Company] (SEPCM) and Société Tunisienne Industrielle de Produits Chimiques et d'Engrais [Tunisian Industrial Chemical Products and Fertilizer Company] (STIPCE). As explained above, these companies withdrew from that sector during the previous decade due to lack of financial resources to deal with the long delays in payment from the General Compensation Fund (CGC). This situation created a de facto monopoly in favor of STEC and against the private importer-distributors SEPCM and STIPCE, and in favor of the parastatal companies of the Chemical Group, SIAPE in Sfax and SAEPA in Gabès, in relation to foreign competition.

This monopolistic situation generated unfortunate inertia in the area of commercial management in general, and specifically in the development of fertilizer use and cost reduction. As proof we can cite the long list of improvements suggested to the office of consulting engineers by AGRER S.A., at the conclusion of its technical assistance mission to STEC in 1985/86. These recommendations are summarized in Annex 5, and to date have been of no practical value.

Obviously, in the normal competitive situation, STEC would have been forced to adopt a less passive commercial attitude to survive. Without mentioning imaginative policy, we think of all the conventional techniques for commercial management which could be utilized to develop this sector and which have been totally overlooked to date.

The only initiative we could apparently credit to STEC was to apply the same price rate indiscriminately to its intermediaries for pick-up at the destination station as it does to one of its eight warehouses. This passive pricing policy quite certainly was a substantial contributing factor in the spectacular increase in the number of private intermediaries during recent years. However, its cost to the Public Treasury rose (because of the compensation

¹ See Bibliography N 4.

[Translator's note: No corresponding reference to this footnote is found in the text above.]

system), costing it over DT 3 per ton¹ more for a product transiting through one of the seven STEC warehouses in the interior (over DT 8 per ton more in the Tunis warehouse) than for a delivery made to the destination station.

Concerning strategic storage and security, for example, we might wonder whether it was necessary to have means as costly in terms of investment operation as the STEC buffer storage centers. If this financial effort had to be supported by the STEC suppliers, i.e., by SIAPE and SAEPA, they would obviously have tried to find less expensive solutions and would probably have succeeded in avoiding such heavy investments. For example, we have in mind conventional commercial practices such as giving customers special terms, as follows:

- For pre-season delivery (credit extensions or discounts)
- For minimum orders of 20 t and multiples of 20 t (capacity of a freight car or an SNCFT container compartment delivered free to the destination station.

It would thus have been possible to forestall the critical period during which most SNCFT transport is mobilized to move the cereal harvest as well as to beat the autumn storms which occasionally give rise to natural disasters.

They would probably also have worked out a program to optimize railroad deliveries in cooperation with SNCFT.

b. Foreseeable difficulties

Obviously in order to stimulate the activities of the local producers, SIAPE and SAEPA, on the Tunisian market, as well as those of the importer-distributor, STEC, and force them to upgrade their performance (improved service and reduced costs) to the farmers' benefit, the monopoly they enjoy must be broken up. This, however, will not be easy, because even after surmounting the artificial barrier constituted by the long delays in paying the subsidies at the importer-distributor level (STEC) as proposed below we will run into obstacles inherent to the intrinsic needs of Tunisian agriculture. Indeed, as seen in Chapter I, it is likely that AN, TSP and DAP will still be able to cover most cereal crop needs for a long time to come, with potash needs not being well-known. The latter is apparently needed only for certain crops representing relatively low tonnages. Complete fertilizers, also

¹(Before fees, taxes and amortization (See Annex 4, Table A4-11, Heading (8)). After these charges, but before income tax, a delivery leaving one of the seven interior warehouses amounts to DT 38 per ton, as against DT 24 per ton from Tunis and DT 17 per ton for direct delivery (See Annex 4, Table A4-11, Heading (6)).

manufactured for export in Tunisia, will thus not be in great demand. Finally, urea which could compete with AN, is not used in Tunisia and it is unclear that any foreign producer would devote significant investments to launch this commodity on the Tunisian market. We might thus believe that the Tunisian fertilizer market will attract little attention from foreign competitors of SIAPE and SAEPA. However, during conversations in Paris and Brussels, some of them showed an interest in bulk blending in Tunisia using imported potash and nitrogen and phosphate fertilizers bought from local producers at the same prices as STEC, compensated and reviewed (see below). Some urea producers (enriched with trace-elements, pearl, granulated or super-granulated forms) are also ready to come and launch their products in Tunisia. These developments will be interesting for crops other than cereals (fruit tree growing, vegetable crops, etc.) representing nearly 50% of demand.

Furthermore it should be specified that bagged imports would be particularly expensive and might threaten the competitiveness of foreign imports. This situation would result from the absence of adequate port equipment, which would limit the unloading speed to 800 t per 24 hours, in Tunis, Radès and Bizerte. It would also cost at least DT 6 per ton not counting demurrage (an average of US\$ 10,000 per day), unavoidable at this slow unloading speed. For this reason the Cereal Office (OC) had to buy adequate port facilities to import bulk grains. A survey is necessary to determine whether the existing equipment can be used for fertilizers and, in the contrary case, what returns on investments could be expected. In the case of AN, which cannot be imported in bulk, the possibility of importing it on pallets should be studied. For this purpose, updating the data collected by SWEDFARM¹, which recommends the adoption of this system for replenishing the STEC warehouses in Sfax and Gabès, where SIAPE and SAEPA are already equipped for export on pallets, would be sufficient.

Finally, it is worth indicating that if there are no laws that limit importing of fertilizers into Tunisia, a very recent ministerial decision² did deprive STEC of the possibility of importing AN for the local market, when this product is available abroad at a price lower than SAEPA can get for its exports, an option given exclusively to SAEPA. It is not specified whether SAEPA must allow STEC, and consequently the Compensation Fund, to benefit from these financial advantages. After subsidies on fertilizers are eliminated, this measure will have the effect of making farmers bear part of the cost of protecting domestic industry.

¹ See Bibliography no. 2.

² Letter from the Ministry of National Economy, General Office of Mines, No. 51 LM/HB, 269, addressed to the President and General Manager of STEC, May 24, 1988.

It must be recalled at this point that the fertilizers and inputs imported for manufacture are subject 15% customs duties upon entering Tunisia, the same being true for plastic bagging materials, to which a 6% value-added tax also applies.

These fees and taxes should disappear with the compensation on the price of fertilizers provided in 1991/92 or risk placing part of the burden for the national industrialization policy on the farmers' shoulders.

c. Payment of compensation to local producers

To stimulate fertilizer marketing systems and reduce costs, effective and gradual liberalization of the import and distribution of fertilizers coming from local production works is recommended. Indeed, since no law either prohibits their import or requires that their marketing be concentrated in STEC hands, in order to liberalize imports gradually, it would suffice to pay fertilizer subsidies to local producers instead of STEC, until their complete elimination at the beginning of the next decade. This measure would have the immediate effect of allowing liberalization upstream from the marketing systems. In fact, the liberalization would not become total, i.e., by allowing imports as well, until after the complete elimination of the compensation system. At that time, fertilizer imports would theoretically be equal to local production as long as no customs protection was maintained. Producers would obviously have to pass the compensation on to the distribution networks in the form of discounts to the distributors.

This delay would allow STEC to find a solution with regard to the prohibitive use of their seven new warehouses, from which, let us recall again, the delivery of one ton of fertilizer costs more than DT 38 compared to DT 17 per ton for a direct delivery without transit through a warehouse (amortizations included but before income tax).¹

In the event of liberalized cereal production marketing, these warehouses could be transferred (sale or lease) to operators desiring to adopt the conventional system of integrating the supplying of inputs with collection of agricultural production as the three cereal warehousing organizations currently do.² Some private operators could still utilize them for other purposes complementary to fertilizers, such as construction materials. In exchange reserve stocks could be established at various levels. They could be partially assembled each year in June-July on the

¹See Annex 4, paragraph C, Table A4-11, heading (6).

²See Annex 4, paragraph B4.c.

farm, applying a commercial strategy aiming to stagger the fall delivery points, which from September to November represent 40% of annual demand (payment on September 30 for fertilizers delivered between May and July). Moreover, the importer-distributors and the retailer-wholesalers having storage capacities available and particularly those taking over the STEC warehouses, might be called upon. They would obviously have to be remunerated for establishing these stocks (30% of annual demand).¹ For this purpose, they could be given payment facilities corresponding to the warehousing period, these stocks having to be renewed every year.² This expense, contrary to the expense for establishing pre-season stocks on the farm, should not be incumbent on the suppliers, but could be defrayed by a disaster insurance fund.

d. Zonal standardization of transport costs

To allow the full action of competition at the STEC level it is recommended to adjust the rail transport standardization system while eliminating the current national standardization in order to adopt temporary regional systems by zones as is used in other sectors (oil, for example).

The impact of this measure on the cost of fertilizers, on a region-by-region basis, will be minimal considering the SNCFT transport rate schedule. (See Chapter III, Tables 13 and 14) and the current distribution of national demand³, namely:

Northwest	45%
Northeast	44%
Center & South	11%

Indeed, the increases in SNCFT transport costs for the more distant regions in the Northwest would be on the order of DT 3 per ton for AN and DT 1 per ton for TSP in relation to the standardized costs for the 1987 fiscal year (DT 8,827 per ton for AN and 7,780

¹From the AGRER report (See Bibliography no. 4, p. 74), to reduce the risk of stock depletion to 5% (or a probability of occurrence one year out of 20), stocks of fertilizer equivalent to 30% of the annual demand must be maintained all year.

²Again from the AGRER report (See Bibliography no. 4, pp. 12 and 129) the average life of low-density polyethylene bags (PEBD) containing TSP is guaranteed 9 to 12 months when stacked at temperatures under 50°C in the shade. Otherwise the guarantee drops to 3 to 4 months. For AN, this material may not be stacked more than 10 bags deep for over twelve months without risk of permanent deformation.

³According to the AGRER report, see Bibliography no. 4, p. 303.

for TSP, i.e., an increase in current retail fertilizer prices of less than 3% for AN and less than 1% for TSP.

On the other hand, the most agriculturally disadvantaged governorates in the Center and the South, which are, nonetheless, closest to the production centers, will benefit from this measure.

This zone standardization system is not necessary unless the public services wish to continue to control fertilizer prices to a certain extent while establishing retail ceilings from the middleman's facilities. (See Chapter III). This could be lifted as soon as the authorities are satisfied that the level of competition is adequate throughout the country.

If this method of recovering the rail transport costs is combined with a complete liberalization of the road transport of fertilizers, it could be an additional incentive for the private sector to serve the more distant regions by road.

2 - Creation of a network of wholesalers to compete with STEC

As shown above, the parastatal sector monopolizes fertilizer marketing, and consequently its distribution, on the import, local production and distribution levels.

On the other hand, downstream from these stages, i.e., with the intermediaries, the private sector has taken hold again during the last five years, making very clear advances since 1986/87. Indeed, its share at this level in the distribution systems for inputs (pesticides and fertilizers) marketed by STEC¹ increased from 19.4% in 1984 to 42.4% in 1987/88 in terms of STEC gross sales. At the intermediary level (wholesalers and retailers) it is the uncontested leader, in fertilizers with 43.5% of national demand (STEC gross sales) as against 36.3% for all three parastatal organizations², (OC, Central Cooperative for Major Crops (CCGC) and Central Wheat Cooperative (COCEBLE), combined.

a. Improving the wholesale profitability

The development of the private sector in terms of reselling fertilizers occurred naturally to fill a gap left by the inertia of the parastatal warehousing organizations, which were established

¹According to the AGRER report (See Bibliography no. 4) STEC was the leader in the pesticide market 1984, in front of SEPCM and about ten other importer-distributors, all belonging to the private sector.

²See Annex 4, Section B.5.1, Table A4-3 bis.

to store cereals, an activity which by far exceeds inputs in terms of volume handled and consequently in revenues. Furthermore, the cereal harvest is in direct competition with the beginning of the fertilizer season. This competition manifests itself in the areas of availability of personnel, financial resources and storage and transport capacities. We can thus understand why these warehousing organizations consider input distribution a secondary activity, a service activity which would make them lose money and from which they would like to withdraw, though without injuring their members.

We must also add in their defense that the warehousing organizations, and some land improvement offices (OMVs) such as the Medjerda Valley Improvement Office (OMVVM) are actually wholesalers that have a network of retail outlets (p.d.v.)¹.

OC, CCGC and COCEBLE in fact distributed their fertilizers, respectively 51,700 t, 13,700 t and 9,400 t² in 1987/88³ through the intermediary of their 112 sales outlets in the northern part of the country. It is thus understandable that they would have serious difficulties in covering their expenses with their allowed gross margin⁴ (DT 7,900 per ton by weight of fertilizer)⁵ which is the same as the agricultural service cooperatives (CSAs) and private retail intermediaries (RDPs) which most often have only the most modest means of distribution and generally sell less than 1000 t per year⁶. It should also be noted that certain consumers⁷ benefit unfairly from the same margin as the warehousing organizations.

According to the OC, they would need a 15% margin, or DT 14,300 per ton, considering that the gross intermediary margin by weight per ton of fertilizer is currently 8.3%⁸, to cover their expenses.

¹See Annex 4, section B.4.c and Table A4-4.

²See Annex 4, section B.4.a, Table A4-3.

³During the 12 months ending August 31, 1988.

⁴Marketing costs + net margin.

⁵See Annex 4, section C, Table A4-12, NB.

⁶See Annex 4, section B.5.a, Table A4-7: 73 CSAs and 308 RDPs sold less than 1000 t. of fertilizer each in 1987/88.

⁷OEP, OTD, ONH, UCPs and certain individual farmers.

⁸During the same period (2), one RDP sold 4,100 t, another close to 3,700 t, and eight others, between 1,900 and 2,900 t (9). Only two other CSAs sold between 1,900 and 2,900 t (wine coopera-

For these organizations, STEC's gross marketing margin giving them an additional 20 dinars or so, would theoretically solve this problem. (See section B7 below). Indeed, STEC's gross margin was raised to DT 58,567 per ton for AN and DT 55,328 per ton for TSP during the 1987 fiscal period (see Annex 4, Table A4-13, under heading (2)), as against DT 9,730 per ton and DT 7,000 per ton for the intermediaries (see Annex 4, Table A4-12). For this purpose it would suffice for CGC, instead of STEC to pay manufacturers (SAEPA and SIAPE) the subsidies, and for the warehousing organizations to be authorized to obtain their supplies directly from the fertilizer producers in Sfax and Gabès from the fertilizer producers at the same price as those STEC enjoys.

b. Identification of the characteristics of potential wholesalers

To prevent warehousing organizations in turn from foundering in the commercial conservatism that seems to characterize STEC as well as SIAPE and SAEPA with regard to the Tunisian market, it would be wise to build up this future level of wholesale distributors, primarily through the promotion of dynamic parastatal organizations and private intermediaries, perhaps more modest but seeming to offer an interesting development potential. Among them we can identify the OMVs, OMVVM, OMIVA, OMVPI and OMIVAN, which respectively handled 4,200 t, 3,000 t, 2,300 t and 900 t of fertilizer¹ in 1987/88², which ranks them among the major private intermediaries.³

Except for the three warehousing organizations, OMVVM and OMIVAK, the major commercial intermediary organizations (OMVs, CSAs and RDPs), particularly their storage and transport capacities, and the number of available sales outlets they have could not be assessed during this study. It is therefore difficult to identify the companies showing a profile as future wholesalers on an a priori basis at this time.

tives) and two more, between 1,000 and 1,900 t (9) in 1987/88 (2).

¹See Annex 4, section B4.a, Table A4-3.

²During the 12 months ending August 31, 1988.

³During the same period (2), one RDP sold 4,100 t, another, nearly 3,700 t; and eight others, between 1,900 and 2,900 t (5). Only two CSAs sold between 1,900 and 2,900 t (wine cooperatives) and two others, between 1,000 and 1,900 t (5) in 1987/88 (2).

Furthermore, intermediary marketing costs must be evaluated¹ primarily to determine the sales volume at which intermediary-wholesalers can switch from STEC services to obtaining their supplies directly from local producers in Sfax and Gabès at STEC prices.

This evaluation should also make it possible to estimate the annual net margin and the rate of return on capital likely to attract real wholesalers. For this purpose it will be necessary to evaluate the amounts of fixed assets needed (particularly storage, transport and stocks) as well as the minimum tonnage to be handled, and thus to determine net margin necessary to provide an attractive return on these fixed assets, it being understood that compensation for the operator's work is normally included in the gross marketing margin (category (b) "storage" in Table A4-13 of Annex 4, section C.) In other words, it is necessary to evaluate the break-even point acceptable to the wholesalers that obtain their supplies directly in Sfax and Gabès. The bases for this calculation are developed in Chapter III.

This by-passing of the STEC for around 60% of demand² should make it possible to reduce considerably the DT 58,567 per ton for AN and the DT 55,328 per ton for TSP its cost in gross marketing margin for STEC to market these two products during the 1987 fiscal period³.

c. Observing sales prices

To supplement this set of measures to establish a healthy competition at the highest level of the fertilizer distribution chain, the STEC should abandon its current practice of billing the same price for pick-up from the destination station or from one of its eight warehouses.

It actually costs STEC, and consequently the Public Treasury, DT 3,230 (and this is before taxes, fees and amortizations) to have STEC transit a ton of fertilizer through one of its eight warehouses in the interior (an additional DT 8,540 per ton for transit from

¹The cost analysis for 13 intermediaries provided in Annex 6 is a good approximation but cannot be considered as statistically representative.

² The warehousing organizations + OMVs + CSAs and RDPs, involving more than 1000 t (See Annex 4, section B.5.a, Table A4-7) account for 138,000 t of the 226,000 sold by STEC during the 12 months ending August 31, 1988.

³See Annex 4, section C, Table A4-13, category (2).

the Djebel Djelloud warehouse to Tunis)¹ instead of delivering it directly to the customer at the destination station. In any event, STEC can no longer afford this generosity after the subsidies are eliminated or if they are initially paid to the local producers.

Thus STEC must reinstate the two rate levels for delivery free-destination station (incorrectly designated "sale price at works") and for delivery from the STEC warehouse (designated "sale price at STEC distribution centers." This measure will make it possible to reduce the long waiting lines at the STEC warehouses during the peak seasons.

3. Economic motivation of intermediary-retailers

a. Profitability study

Like at the wholesaler level, the acceptable break-even point (amount of fixed assets, minimum tonnage, motivating net margin rate and amount) must be calculated for the RDPs in each governorate (such as the one prepared in Chapter III for a hypothetical intermediary). This parameter should make it possible to estimate, as a function of their respective demand levels, the adequate number of RDPs and CSAs in each region² and to decide which incentives to adopt to attract them if necessary. For example, we have in mind the adoption of the zonal (instead of national) standardization for transports, or even no cross subsidy, which could encourage the distributors that have the appropriate transportation means to establish sales outlets in the more distant regions.

During this study, the intermediary-retailer need for short, medium and long-term financing (warehouses, vehicles, working capital) should also be evaluated. We roughly estimate the necessary investments in warehouses at DT 3 m (See Annex 4, section B.5.d).

b. Elimination of the pseudo-intermediaries

Finally, STEC should stop bypassing its network of intermediaries and apply the consumer rate to all their customers unfairly

¹See Annex 4, section C, Table A4-11.

²See current situation in Annex 4, section B.5.b, Table A4-9 which shows that in the number of intermediaries the northwest, where the local demand equals 45% of national fertilizer consumption, only has 10% of the intermediaries who sell STEC inputs (pesticides and fertilizer) as against 62% of the intermediaries in the Northeast for the same consumption (44%) and 28% of the intermediaries in the South-center for a demand of 11%.

benefiting from the intermediary rate, i.e., on an a priori basis, approximately 45 pseudo-intermediary customers (agricultural cooperatives, UCPs, agricultural development companies, OEP, ONH, CRDAs) amounting to DT 964,540 and representing 8800 t in 1987/88¹. Therefore the Input Control Service (SCIA) of MINAG (PG/PV) should issue stricter directives concerning the fertilizer sale authorizations issued by the CRDAs.

c. Transfer of all STEC consumer accounts to the network of intermediaries

After their regularization at the retail price rate, the accounts of the 45 pseudo-intermediaries discussed in the above paragraph and those of the 634 individual consumers obtaining their supplies directly from STEC, accounting for 4,450 t at a value of DT 510,510 (549 of whom are buying an average of 2.4 t for DT 257 per year...)² should be transferred to the network of intermediaries (parastatal warehousing organizations and private intermediaries). A profitability study of STEC customer accounts would show that the small consumers "are not paying their way," costing more in administrative expenses than they generate, without counting the congestion they cause in the warehouses during peak seasons.

4. Improvement of distribution means

If the assessment of the intermediaries' storage and transport capacities recommended above shows insufficient means³, as one may expect, it would be prudent, before studying the possibility of taking action to encourage the private sector to invest in this

¹During the 12 months ending August 8, 1988.

²	TONS	for	DT
8 customers of 100 t and up bought	1,222		140,600
77 customers of 10 - 99t bought	1,889		228,534
549 customers of less than 10t bought	1,339		141,376

i.e., a total of 634 customers representing..... 4,450 t DT 510,510 in 1987/88 (1).

³Swedfarm (See Bibliography, no. 2, p. 84 and Annex 4, Table 4-10) projected the construction of 50 intermediary warehouses in the north producing an area of 8,375 m², i.e., 6,870 m² of usable area and 9,350 t to 23,350 t of fertilizer with stacks of 10 to 25 bags (AGRER standards, see Bibliography, no. 4 and Annex 4, Table A4-1) for a consumption level of 420,000 t on the 1988 horizon; also see Annex 4, section B.5.d.

realm, to see whether there are other bulk product sectors that may have surplus equipment or that are more complementary to fertilizers than cereals are. In this case we have in mind intermediaries for construction materials who seem particularly interested in fertilizer marketing and whose distribution means are probably more complementary than those in the cereal sector, since the construction season eases up in the autumn, when the fertilizer season peaks.

The study of the distribution of other bulk products such as cement, for example, might contribute further useful information for the study of fertilizers (primarily optimization of rail and road transport.)

Finally, these studies will make it possible to evaluate the short, medium and long-term financing needs of the whole fertilizer marketing sector.

5. Improvement of fertilizer availability

As indicated in chapter I, it would seem that the physical availability of fertilizer should no longer pose a serious problem in the cereal region.

A study of stock flows in the eight STEC warehouses and the 112 sales outlets of the warehousing organization and OMVs would probably confirm this hypothesis, particularly by showing that there have been no significant stock depletions during the past few fertilizer seasons.

- a. Credits for pre-season delivery and establishment of buffer stocks on the farm.

On the other hand, as indicated in Chapter I, section D5, the main constraint governing the availability of fertilizer is probably financial. As estimated in Annex 4¹, credit extended by the warehousing organizations and OMVVM (DT 3.6 m), and STEC cover only about 20% of the total farmers' needs, assessed at DT 23 m in 1987/88.¹

Beyond the measures suggested in Chapter I, the initiation, by SIAPE and SAEPA producers of supplier pre-season delivery credit, as proposed above in Section C.1.b., should improve the situation by allowing fertilizer to be delivered to farmers before the institutional seasonal credits are available. It must be noted that the amount of these credits devoted to fertilizers alone is unknown.

Also, the establishment of buffer stocks (strategic and back-up stocks) by the networks of intermediaries in exchange for payment

¹Annex 4, section B.4.e and Table A4-6.

facilities, the cost of which would be covered by a disaster insurance fund (see Section C.1.b. below) should generate additional credit possibilities. The availability of these additional lines of credit should in turn permit the network of intermediaries to increase the amount of credit extended to farmers and thus to make up the delay each year in the release of seasonal credits.¹

This transfer of credit to the farmer is imperative since at the beginning of the fertilizer sales season warehousing organization storage capacities are filled to capacity with the cereal harvest. Storage on the farmer's land (in addition to STEC warehouses) is therefore the only possible solution at that time of the year and is another reason why supplier credits must be passed on all the way to the farmer.

It is interesting to know that at the beginning of every growing season STEC experiences serious financial difficulties in meeting its suppliers' terms of payment and actually never pays its debts in less than three months.² Consequently, whether they like it or not, SIAPE and SAEPA are already supporting supplier credits without any real compensation.

With the growth in the use of fertilizers, which should probably double between now and the year 2000, the problem at hand of financing beginning-of-season stocks and their transport to the agricultural regions will become more and more crucial. It will probably require additional capital investment in production works, in stocks and warehousing capacity. For these reasons it would be prudent to suggest that manufacturers investigate establishment of pre-season sale terms directly beneficial to farmers and that encourage them to stock the fertilizers on the farm. Farmers' financing needs for building the appropriate storage capacity on the farm must be evaluated.

b. Optimization of rail deliveries

It would be particularly advisable for a commission composed of the manufacturers (SIAPE, SAEPA), the distributor (STEC), transporters (SNCF), intermediaries (primarily OC³, CCGC, COCEBLE, and UTICA ?) to study the possibilities of optimizing rail deliveries, mentioned in Section C.1. above, with the objective of increasing railroad equipment rotation rates by decreasing their time parked in the station, primarily as follows:

¹See Chapter I, Section C.7 and D 5 and Annex 4, Section B.4.e.

²See Annex 4, section B.3.e. and section B.3.f.

³Logistics Administration based at the SNCF station, Tunis PV.

- By putting together more frequent and shorter trains,
- And by using more of the hundred or so destination stations that could serve for fertilizer transport than are used today.

This commission should further function as a monitoring and coordinating unit to ensure the smooth execution of the annual supply program.

f. Product cost reduction

SIAPE and SAEPA review their sale prices to STEC every three months based on their export sales during the preceding quarter.¹ No one outside of these companies, which act as both judge and participant, seems to monitor the parity of these local sale prices with international market rates.

However, as was seen recently in the case of AN, export prices can be clearly higher.² As indicated above, (Section C.1.b.) the profit from import-export transactions benefiting from this situation is now reserved for SAEPA, already in a monopolistic position for AN on the domestic market. If this has no current impact on the farmer due to the system of compensation, this advantage should not be extended beyond the elimination of the subsidies.

It is important for the Public Services to organize to follow international fertilizer prices and to let the farmers benefit from favorable situations. (See Chapter IV below, Role and Responsibilities of the Public Services).

7. Marketing cost reduction

The proposals developed in this paragraph are based on the analysis of gross margins³ for fertilizer marketing in Tunisia in 1987 which appears in Annex 4, Section C and particularly in its Tables A4-12, A4-13, A4-14 and A4-15²⁶⁰. This analysis shows that

¹Annex 4, B.2.b.

²Importing of 20,000 t of AN from Bulgaria at a more advantageous price than the SAEPA's (exports to the EEC).

³This term refers to marketing costs (including distribution costs) + net margins, before amortization and income tax.

²⁶⁰ Table A4-12: Evolution of intermediaries' gross margins from 1985 to 1988;

Table A4-13: STEC and OC total costs and gross margins in 1987;

the gross marketing margin is higher in Tunisia than in the other countries, primarily due to fees and taxes, as well as storage and bagging costs which seem to be higher. Consequently, these higher costs cut down the net margins remunerating both the distributor (STEC) and the intermediary networks, thus making these net margins appear lower than elsewhere.

However, if, in Table A4-13 of Annex 4, we deduct STEC's transport costs from Sfax or Gabès to a station near the places of use (category a), taxes, fees, customs duties (category f) and bagging (category c) from the gross margin, we are left with DT 27 per ton for AN and DT 24 per ton for TSP to cover the other operations (handling, losses, station-to-warehouse transport, financial and overhead expenses) and the net margins for the entire marketing system (STEC and intermediaries).

It is interesting to compare these figures with the data collected in a survey of 13 fertilizer intermediaries (See Annex 6), i.e., DT 5.6 per ton of fertilizer (before taxes and fees). We can conclude from the above that integrating the distributor (STEC) and wholesale intermediary levels would certainly generate considerable savings, which would be reflected by a decrease in the gross margin and consequently in cost to the farmers, if competition is thus established at the STEC level.

To see how these savings can be achieved, in the following pages we will examine successively the marketing costs considered at the importer-distributor (STEC) and intermediary network levels.

a. Minimum transit through the STEC warehouses

As stated several times in the above pages and in the AGRER report, beginning in 1986¹, transit through STEC warehouses should be reduced to a bare minimum, as can be seen clearly in Table A4-11 of Annex 4. We can figure from the data supplied by this table that if no products had transited through STEC warehouses in 1987 and consequently, all the deliveries had been made to the destination station (208,515 t instead of 138,405), STEC, and hence the Public Treasury, would have saved DT 1,155,620, or 25% of STEC's gross margin in 1987. This calculation is obviously subjective as it presumes that STEC could initially have dispensed with its warehouses and their personnel, and thus freed itself of warehous-

Tables A-4-14 and A4-15: Comparison of total costs and gross margins in eight Asiatic countries and Tunisia. (South Korea, India, Indonesia, Malaysia, Nepal, the Philippines, Sri Lanka and Thailand).

¹See Bibliography, no.4.

ing overhead.

b. STEC storage costs

STEC storage costs comprise categories (11) + (12) + (13) + (15) + (17) of Table A4-11 (See Annex 4) less direct personnel costs for fertilizer handling, receiving and delivery (25 jobs at JJ and 34 in the seven warehouses, or a total of 59). Among these categories, personnel costs (maintenance excluded) represent DT 4,428 per ton out of a total of DT 5,506 per ton, i.e., 80% of the total. These figures seem out of line but they are not surprising when we consider that of 203 employees, minus the 59 persons directly involved in fertilizer receiving and delivery of the remaining 144 employees, 60 can still be identified at JJ (13 for SSP production and shipping, 9 for pesticide preparation and shipment, 31 in the support and management sections, 7 in administration) while 84 are engaged in headquarters and sales office support services.

In conclusion, we can assert a priori that some 140 jobs (instead of 203) would amply suffice for the current level of commercial activity, i.e., 80 for the latter (35 in the seven warehouses, 25 at JJ and 20 for commercial, administrative and financial services) and possibly 60 at JJ for production, as explained above.

c. Taxes, fees and customs duties¹

Taxation of fertilizers as calculated for Tunisia in Table A4-11 of Annex 4 includes categories (16) + (21) plus customs duties on inputs for producing AN and TSP plus V.A.T. on rail transport. This obviously does not include income tax, or any tax or imposition downstream from STEC.

This evaluation seems to place Tunisia clearly at the head of the countries in which fertilizers are taxed most heavily when compared with the eight Asiatic countries cited above.² Expressed as a percentage of total product cost, as in Table A4-15 in Annex 4, the Tunisian tax rate of 10.3% for TSP and 13.3% for AN is far ahead of India, Malaysia and South Korea where there is no tax on fertilizers, Indonesia, the Philippines (1987), and Nepal where rates are lower than 1%; Thailand (1.8%) and Sri Lanka (6.7%), but behind the Philippines in 1985/86 (19% in 1985/86 but 0.7% in 1987).

It must be noted, however, that rates will be lower in Tunisia in the future, since the V.A.T. on fertilizers has dropped to 6%

¹See Annex 4, Table A4-13 and -14, category b.

²See Annex 4, Table A4-15, Column and Comment C.

since June 1988 compared to the previous 8% up until then on AN, 13.64% on transportation and 14.4% on TSP, SSP and DAP.

d. Net margins¹

In absolute value expressed in U.S. dollars per ton, the total net margin in Tunisia (STEC and intermediaries combined: \$US 11.84 for AN and \$US 8.55 for TSP) is on the same order as the 1985/86 margin for urea in Malaysia (9.0), Nepal (9.06), South Korea (9.52), India (10.51 for the private sector and 11.32 for the public sector) and Sri Lanka (11.88). It is lower than the 1985/86 level in the Philippines (before the liberalization of imports: \$US 40.0 per ton) and in Thailand (17.88). Only the October 1987 net margins on urea in the Philippines, i.e., 18 months after the liberalization of nitrogen fertilizer imports, are clearly lower (\$US 2.48 per ton) than in Tunisia.

Expressed as a percentage of total product costs², the same total net margin in Tunisia (6.5% for AN and 4.09% for TSP) is in the lower half of the rankings, behind South Korea (18.61%), the Philippines in 1985/86 (12.97%), Indonesia (8.96%), Thailand (7.79%), Sri Lanka (7.39), almost at the same level as Nepal (5.65%), Malaysia (5.19% for the private sector) and in front of India (3.78% to 3.63%) Malaysia (3.61% for the public sector) and the Philippines in October 1987 (1.85%).

The total net margin (STEC + intermediaries) in Tunisia should actually be even lower than it appears in the above tables, because all the costs could not be identified (seven categories of nine are not available in the breakdown of the OC's estimated distribution costs listed in Table A4-13 in Annex 4).

However, as indicated at the beginning of this section, the reduction of certain costs, ranging from DT 24 per ton (TSP) to DT 27 per ton (AN), operating more economically than STEC through the intermediary of several wholesalers, would probably make it possible to improve the net margins in Tunisia.

¹See Annex 4, Tables A4-13 and -14, category j.

²See Annex 4, Table A4-15.

D. CONCLUSION AND RECOMMENDATIONS

1. Conclusions

In conclusion, we can state that the marketing of fertilizers in Tunisia is characterized by the following:

- Commercially lethargic parastatal companies occupying the apex of the pyramid that constitutes the fertilizer marketing networks, be it local manufacturers (SIAPE, SAEPA), importer-distributor STEC or cereal warehousing organizations (OC, CCGC, COCEBLE) acting as wholesalers.

We can attribute the cause of this lack of stimulation to the de facto monopoly SIAPE, SAEPA and STEC enjoy by virtue of a system of compensations in slow payment (12 to 18 months) at the STEC level (import-distribution) discouraging the private sector since the seventies.

With respect to wholesalers (OC, CCGC, COCEBLE) this inertia is due to their insufficient margin which supposedly does not even allow them to cover the costs of the sales network. Furthermore, because their cereal collection activity is much more lucrative than fertilizer distribution, they devote their manpower and the available equipment needed to the former.

- The appearance of a network of private intermediary-retailers (RDPs) and a few Agricultural Service Cooperatives (CSAs) greatly increasing in number and revenues (more than the warehousing organizations), but inequitably distributed geographically, lacking upstream management, and diversified (pesticides, construction materials, hardware, agricultural equipment, spare parts, etc.).
- The absence of fertilizer storage capacity at the beginning of the growing season in the cereal warehousing organizations, (coinciding peak seasons), prohibitive storage costs if the fertilizers constitute the operator's only activity of the operator (cf. STEC buffer warehouses) but, potentially possible on the farmer's land and in certain sectors whose "high season" does not coincide with the fertilizer season (for example, construction materials).
- Lack of financing available to farmers when they need it for purchasing fertilizers.
- A gross marketing margin that is sufficient on the whole but which needs to be redistributed among the different levels (from producer to RDP) primarily at the wholesaler's level and at STEC expense.

2. Recommendations

a. Objectives

With regard to the recommendations formulated in this chapter aiming at improving fertilizer marketing on the technical and economic levels, we can identify two main objectives:

- To strengthen the distribution systems in order to improve the quality of services to the farmer (availability, transport, credit, technical information) for a remuneration that will attract distribution systems;
- To promote the storage of fertilizers wherever it is potentially possible, i.e., on the farmer's land and in certain commercial sectors for bulk goods with complementary seasonal activity (e.g., construction materials) in order to improve their availability during the fertilizing season while reducing distribution costs.

b. Strategy proposed

The strategy suggested in the preceding pages consists in eliminating the de facto monopolies which the local manufacturers, SIAPE and SAEPA, and the importer-distributor STEC enjoy, allowing the unrestricted play of competition at their levels.

Establishment of this competition during the next three years, corresponding to the period provided in the PASA for eliminating fertilizer subsidies, would allow local producers to prepare themselves for foreign competition on the local market as they are already in the habit of doing for exporting.

This gradual evolution will also give STEC time to adapt to the competition that will arise at its level on the local market, especially finding a solution to dispense with its buffer supply warehouses (transfer to a complementary activity); these backup stocks could be maintained by the distribution network in exchange for payment facilities (supported by a disaster insurance fund).

c. Proposed timetable

The actions proposed in this chapter to carry out this strategy are summarized in the following calendar:

- 1989: in the first stage:

- . Create an Inputs Unit (CI), to act as a catalyst for all subsequent actions (See the role and responsibilities of this unit below in Chapter IV);

ACTION: MINAG, DG/PDIA.

- . Create a Consultative Committee on Inputs (CCI) composed of representatives of the Public Services, industry and consumers (See Chapter IV, Section F, below);

ACTION: MINAG, CI.

- . Permit a new class of wholesalers to obtain their supplies directly from producers SIAPE and SAEPA under the same terms as STEC does. For this purpose, to make payments to the latter which will remit them to their distributor-wholesalers, billed at their choice, either FOB works or CAF destination, and to which they will extend payment terms for pre-season delivery. The latter measure should make it possible to establish backup stocks on the farm without having to wait for the late release of seasonal credits.

ACTION: MINAG, CI through the intermediary of all parties concerned (Ministries, Chemical Group, STEC, UTICA, etc.).

- . Create a commission to optimize rail deliveries (COLF) composed of representatives from MINAG (CI and SCIA), SNCFT, producers, STEC, warehousing organizations and other future wholesalers;

ACTION: MINAG, CI by intermediary of SCIA (MINAG, DG/PV).

- . Have STEC enforce two different intermediary rates, namely: "sale price at works" (i.e., CAF destination station) and "sale price at STEC distribution centers," i.e., FOB STEC distribution centers;

ACTION: MINAG, CI by intermediary of CGC.

- . Eliminate consumers profiting unfairly from the STEC intermediary rate.

ACTION: MINAG, CI through intermediary of SCIA (and CRDAs).

- . Transfer to the intermediaries and consumers that obtain their supplies directly at the STEC distribution centers;

ACTION: MINAG, CI through the intermediary of STEC.

Study the rail transport cost policy to be adopted in 1990 (zonal equalization, or liberalization of the costs of rail transport) and follow the evolution of the liberalization of road transports applied to fertilizers;

ACTION: MINAG, CI through the intermediary of COLF.

- 1990: Implement the transport cost policy established in 1989;

ACTION: MINAG, CI through the intermediary of the operators involved (Chemical Group, SNCFT, UTICA, etc.).

. Study the possibility for STEC to withdraw from the buffer supply storage activity;

ACTION: MINAG, CI through the intermediary of the operators involved (STEC, UTICA, etc.).

- 1991/1992: In a third stage, upon the elimination of fertilizer subsidies:

. Eliminate customs duties on fertilizers;

ACTION: MINAG, CI through the intermediary of the ministries involved.

. Bill rail transportation at real costs, if this is not already the case;

ACTION: MINAG, CI through the intermediary of the operators involved (Chemical Group, SNCFT, UTICA, etc.)

. Implement the policy established for STEC to withdraw from the buffer supply storage activities;

ACTION: CI and the operators involved.

d. Additional studies proposed

The list of economic surveys to be conducted outside of the scope of this study, in order to more effectively evaluate the possibilities of improving fertilizer marketing in Tunisia is provided below in the order in which they were suggested above, namely:

- Evaluation of the break-even point for the investments necessary to allow fertilizers to be imported in bulk or on pallets (AN), (see section C.1.a.).
- Evaluation of the break-even point acceptable for intermediary-wholesalers obtaining their supplies directly from the Sfax and Gabès production sources (see Section C.2.b. and Chapter III).
- Evaluation of the break-even point acceptable in each governorate for intermediary-retail activity (see Section C.3 and Chapter III).
- Survey of the storage and transport capacities of the system of intermediaries (see Section C 4 and Annex 6).
- Forecasting of short, medium and long-term private sector financing needs at the year 2000 horizon for intermediaries (wholesalers and retailers) and consumers for the acquisition of storage and transport capacities, including working capital and, at the consumer level, for the construction of small fertilizer warehouses (see Section C4 and C5.a.).
- Evaluation of how attractive the Tunisian market would be for foreign fertilizer producers when imports again become competitive, i.e., theoretically at the 1992 horizon, when fertilizers will no longer be subsidized (See Section C.1.a.)
- Identification of potential wholesalers after defining the selection criteria (human, logistic and financial resources, skills in the area of management, logistics and technical know-how).
- Possibilities for STEC to withdraw from the buffer supply stock business and the transfer of the latter to the private sector (see end of Section C.1.b.)
- Follow-up of the above assessment, in each governorate:
 - . Evaluation of the investments necessary to mitigate the deficiencies found;
 - . Study of measures to be taken to optimize fertilizer distribution.
- Stock flows in the eight STEC warehouses and the 112 sales outlets of the warehousing organizations and OMVs (see Section C 5).
- Possibility of optimizing annual railroad fertilizer delivery schedules (see Section C.5.b.).

e. Follow-up and evaluation of results

After the suggested additional studies are completed, their updating and the follow-up of the actions recommended in this chapter, and evaluation of their expected results as suggested in the timetable proposed above, should be handled by the Inputs Unit (CI) whose role is discussed in Chapter IV.

CHAPTER III

POSSIBILITIES FOR IMPROVING THE PRICE SETTING SYSTEM

A. INTRODUCTION

The purpose of this chapter is to propose a price setting system to allow the private sector to devote its energies to marketing fertilizers at all levels of the distribution networks, i.e., from the manufacturer, whether national or foreign, to the retailer.

This system will be based on the strategy proposed in Chapter II, which consists of stimulating these channels by eliminating the de facto monopolies held by STEC and the local manufacturers. The following steps would accomplish this:

- A new class of wholesalers would be allowed to obtain their supplies directly from the manufacturers under the same terms, although revised, as those available to the STEC;
- Subsidies would be paid to the manufacturers, who would pass them along the distribution channels in the form of price reductions;
- Public Services would be limited to flexible price monitoring, while continuing to set price ceilings for sales to the public.

B. PRICES CHARGED AND THEIR IMPACT ON THE OPERATION OF THE FERTILIZER MARKET

1. Prices charged

As explained in Annex 4¹, a distinction is made among three price levels corresponding to three different phases of the

¹ See Annex 4, paragraphs:

- B.2.b.: Terms of sale local manufacturers extend to STEC
- B.3.e.: Terms of sale STEC extends to intermediaries
- B.4.e.: Terms intermediary-wholesalers extend to consumers
- B.5.e.: Terms intermediary-retailers extend to consumers.

fertilizer marketing channels in the country:

- FOB factory prices
- Intermediary prices
- Public sale prices

a. FOB factory prices

These are the prices domestic fertilizer manufacturers (SAEPA, SIAPE, etc.) invoice STEC. They correspond to the average export prices these producers charge (for each respective producer) for the three preceding months.

b. "Intermediary" prices¹

These prices, which intermediaries pay STEC, incorporate two levels:

- CAF destination station
- FOB STEC warehouse.

These prices are set by the Public Services for each type of fertilizer for at least one year, and are applicable throughout the country. It should be noted again that these prices do not cover all costs borne by the STEC. The difference between these costs and the prices billed to intermediaries are estimated to be DT 47 per ton in 1987/88 and DT 61 per ton in 1988/89 (see Annex 4, Table A4-16).

This difference is covered by subsidies paid to the STEC by the General Compensation Fund. The amount of this subsidy is determined a posteriori by the STEC, i.e., in a residual fashion.

c. Selling Prices Charged the Public

These prices are theoretically uniform throughout the country. Slight differences may exist in practice (see Annex 6, Table A6-1: prices charged by 13 intermediaries participating in a survey conducted during the study).

These differences generally result from variations in the distribution costs (especially charges for transportation between the station or STEC center and the intermediary's warehouse), which are borne by the private intermediaries.

These prices allow the intermediaries a net margin which,

¹ Quotation marks are used because these prices may be billed to major consumers (quantity requested > or equal to 70 tons) or those who pay in cash.

although low, is still positive (see Annex 6, Table A6-5). In this case, it should be pointed out, some intermediaries encountered indicated that in the event of a reduction in their margin they would give up this activity.

The sales prices charged to the public are understood to be FOB at the intermediary's warehouse, the farmer also having to pay the costs of transport to his farm.

It must be emphasized that the mechanisms by which these sales prices are set are not obvious. While they may not be arbitrary, they are, in any event, unknown.

2. Impact of the Current Price Structure on the Operation of the Fertilizer Market

a. Lack of vertical integration within the distribution activities

Among other causes, we may cite the fact that the lack of dependence among the various effective prices as listed above has not allowed the integration of the various links in the fertilizer distribution network described in Annex 4. As a result, this network is instead a juxtaposition of different activities in which the various operators are engaged:

- i) Local fertilizer manufacturers supply a national market at prices determined by the international market. Consequently, these producers have not seen fit to establish a commercial policy (advertising, distribution, payment facilities, etc.) to expand and guide national demand;
- ii) The SNCFT transports fertilizers throughout the country through its relatively dense railroad network, with the exception of the central region (see the map in Annex 4, Figure A4-1). It bills the STEC for its services according to a binomial rate (a fixed term and a variable term), which is thus discriminatory. This rate (see Tables 13 and 14) does not apply specifically to fertilizers;
- iii) STEC has a network of distribution centers always located near a station and intended to supply the country's different agricultural regions according to a program established by mutual agreement with the Ministry of Agriculture and in which SNCFT, STEC, SEPCM, and the warehousing organizations (OC, CCGC, and COCEBLE) participate. STEC's activities stop when the fertilizers are turned over to the "intermediaries" FOB distribution centers or CAF station, at the same level as the CAF station price and DT 2 to 3 per ton lower than the FOB

distribution center price (in other words, STEC never uses the FOB distribution center rate);

- iv) By obtaining their supplies at STEC centers which are regional in scope, fertilizer "intermediaries" can meet the demand occurring in smaller markets (an intermediary generally services an area of under 10 km); in other words, the activity of these "intermediaries" serves to extend STEC activities, which stop at the regional level, to farmers.

It should be recalled that these "intermediaries" may not obtain their supplies from manufacturers, since STEC holds this monopoly. This fact, combined with the low distribution margins allowed for the intermediaries, has determined the manner in which they are spread out over the territory, and, consequently, the size of their relative market shares. Thus, these "intermediaries" are now always located near STEC centers to reduce transport costs between these centers and their warehouses. For example, the absence of private fertilizer "intermediaries" in Kairouan, which is 10 km from the nearest STEC center, is significant in this respect.

Furthermore, the ease with which fertilizer sales authorizations are obtained from the CRDAs has generated a rapid increase in the number of intermediaries set up around the STEC centers. For example, there are 10 private "intermediaries" in the Sfax branch and nearly 15 in the Bou Salem branch.

These data¹ concerning the environment in which these intermediaries operate have led them to sell fertilizer on a relatively reduced scale. Thus, as is shown in Table A6-8 in Annex 6, which attempts to provide a profile of the average "intermediary," the latter's fertilizer sales are estimated to be 1,200 tons per year and account for only 36% of his gross sales volume (averages for 13 intermediaries we met during a survey conducted for the study; see Annex 6).

b. Superficial Knowledge of the Market

The knowledge of input demand is limited to the regional use of various fertilizers (see Chapter I). Within the scope of this study, we must point out the absence:

- of information relating to the distribution of regional demand

¹ To be supplemented by information concerning monthly regional demand and the profitability of other activities competitive with fertilizer sales.

over time, even though it can undoubtedly be calculated using data available at STEC;

- of any econometric study intended to assess these regional demand functions.

In the absence of such data, questions may be considered concerning the significance and the mechanisms that have allowed the sales prices charged the public to be established.

c. Prices Unsuitable to Regional Market Conditions

Time and distance separate the markets; of course, the magnitude of these variables is not identical for the various agricultural regions of the country. Furthermore, the regions may value different fertilizers and thus have different gross demands, depending on the local growing systems used.¹

These regional characteristics of demand should generally allow fertilizer manufacturers and distributors to charge discriminatory prices:

- Over distance, while partially reflecting differences in transportation costs and in gross demands in the regions;
- Over time, to the extent that relative storage costs for each time of the year taken into account in the setting of prices may not be real (absorption of costs and imaginary costs may coexist). This kind of price discrimination over time could, for example, have caused the transfer to farmers of a portion of the stocks held by STEC or the manufacturers.

It should be pointed out that the uniform prices now in effect are more discriminatory, and do not effectively integrate the characteristics of demand described above.

They are the most discriminatory of all the price systems that may be considered, because they do not reflect the differences in transport costs generated by obtaining supplies from different regions or the inherent differences in the storage costs², which vary depending according to demand periods.

Transport cost differences relating to the supply of STEC centers, calculated according to the rate applied by the SNCFT,

¹ Gross demand does not reflect the impact of storage and transport on prices.

² Warehousing cost differences cannot be discussed, because of insufficient data on the distribution the varying regional demand takes on over time.

for example, are approximately DT 2 to 3 per ton (see Tables 13 and 14 pertaining to fertilizer transport costs). These differences would be as high as DT 7 per ton if transport costs within a 100-km radius surrounding the Sfax and Gabès factories were compared (cost of approximately DT 3 per ton) to those in the northern regions (Bou Salem and Mateur, for example).

TABLE 13: SNCF TRANSPORT COSTS FOR SUPPLYING STEC CENTERS WITH FERTILIZERS (EXCLUDING VAT), IN DT/T

DESTINATIONS NAMES	DJEBEL DJELLOUD	MATEUR	BOU SALEM	MEDJEZ EL BAB	SBEITLA	ZAAFRANE	EL AKHOUE
AN	Distances (km)	412	483	548	481	438	598
	Costs (DT/ton)	8,660	10,060	11,110	10,060	9,010	11,810
TSP	Distances (km)	275	346	411	344	301	461
	Costs (DT/ton)	5,668	6,771	7,794	6,771	6,141	8,739
SSP	Distances (km)	0	71	136	70	303	186
	Costs (DT/ton)	0	2,471	3,502	2,439	6,141	4,289
DAP ¹	Distances (km)	412	483	548	481	438	598
	Costs (DT/ton)	8,660	10,060	11,110	10,060	9,010	11,810

¹ Originating in Ghannouch (Gabès).

² Originating in Sfax.

³ Originating in Djebel Djelloud.

TABLE 14: AVERAGE SMCPT TRANSPORT COST PER STEC DISTRIBUTION CENTER
IN DT/TON

	"AMMONITRE"		TSP		DAP		SSP		AVERAGE UNIT PRICE
	UNIT PRICE	TOTAL COST	UNIT PRICE	TOTAL COST	UNIT PRICE	TOTAL COST	UNIT PRICE	TOTAL COST	
DJEBEL DJELLOUD	8,660	135,234	5,668	36,485	8,660	4,321	-	-	7.80
MATEUR	10,060		6.77	28,299	10,060	6,308	2.47	1,210	8.60
BOU SALEM	11.11	20,541	7.79	34,432	11.11	6,444	3.50	3,570	8.52
MEDJEZ EL BAB	10.06	64,686	6.77	28,434	10.06	7,847	2.44	3,660	8.10
SBEITLA	9.01	20,723	6.14	10,291	9.01	3,244	6.14	2,702	7.74
ZAAFRANE	11.81	18,424	8.74	16,956	11.81	5,905	4.29	172	10.26
EL AKHOUE	11.11	39,329	7.79	7,167	11.11	3,333	3.42	137	10.40
TOTALS	-	374,776	-	16,064	-	37,402	-	11,451	8.4

¹ This is both the average transport cost and the full cost recovery.

In addition, it should be indicated that the transport costs billed by the SNCFT are calculated, as indicated above, based on a discriminatory binomial rate. Thus, the differences in transport costs mentioned above should actually be greater than estimated.

In conclusion, if the prices in effect seem to integrate regional demand characteristics ineffectively, their application has created a fertilizer distribution monopoly benefitting the STEC, preserved by subsidies. Production, distribution, and intermediary activities are thus artificially separated through the intermediary of the prices, which are set haphazardly, if not arbitrarily.

For all of these reasons, the prices in effect seem poorly suited to the true conditions of the regional fertilizer markets.

C. NEW PROPOSED PRICE SYSTEM

1. Basic Principles to Be Observed

a. Take regional market characteristics into account

As mentioned above, the regional fertilizer markets are separated simultaneously by space and time, and the price system should take these parameters into account, thereby encouraging the distributors to serve all of the regions.

b. Allow a maximum of market transparency

This transparency is largely determined by the price system used¹ and the extent to which the economic operators are informed about this price structure.

Of course, transparency is desirable, because it identifies "cheaters", i.e., it enforces the price system used and thus makes it operational. It also generates some degree of competition.

c. Adopt a price system which is as close as possible to current business practices

The "efficiency" of a price system depends largely on how quickly it is applied; thus, systems based on simple formulas are preferable to more complicated ones, even if the latter are "fairer" or more justified in economic terms. In addition to the simplicity of its structure, the speed at which a pricing system adjusts depends on the magnitude of the changes in business practices its implementation may generate.

¹ Indeed, prices with parity points allow greater transparency than "free" prices.

Consequently, the proposed pricing system is based on the existing business practices in the country or, if possible, in the sector in question.

2. Determining the Proposed Pricing System

a. General rate structure to be applied

The fundamental design of this structure is largely based on the rate charged by the SNCFT, which can be expressed briefly as follows:

$$y = a + b \cdot x$$

in which:

- y: is the rate to be paid expressed in thousandths per ton transported over distance x,
- a: is a constant that can be interpreted as an "input duty,"
- x: is the distance expressed in km;
- b: is the angular coefficient of the straight line; it corresponds to the marginal increase in the rate per distance unit.

It may be observed that the average transport cost decreased with distance. Indeed, the average cost

$$\frac{y}{x} = \frac{a}{x} + b$$

decreases when distance x increases.

To this base rate y, the SNCFT applies a series of indices ranging from - 15 to + 40 depending on the type of merchandise being transported.

Thus, for example, the index zero is assigned to Ammonitre and DAP, and (-10) to phosphate-based fertilizers.

SNCFT circulates transport rates calculated using the above formula in the form of a booklet. Any economic operator may thus estimate the cost to transport a product over a given distance.

b. Adjustment of the base structure

As a first step, this adjustment will make it possible to take into account the cost of fertilizers out of the factory, plus a margin covering other distribution costs, which is expressed as a percentage of the price for the product, delivered.

More formally stated, this adjustment beginning with rate y will consist of the following:

Defining $F = P + y = P + a + b x$

in which:

F: is the delivered price exclusive of distribution costs other than transport;

P: is the FOB factory price of the fertilizer in question.

and

Calculating $P = F + M = F (1 + k)$

in which:

P: is the delivered price covering all costs;

M: gross distribution margin = $k F$

k: is a coefficient expressed as a percentage.

The application of this discriminatory pricing system requires the assessment of values P and k for each type of fertilizer.

c. Possible subsequent adjustments

As better information becomes available, the proposed rate may be adjusted to take into account regional differences pertaining to storage costs and gross demand.

These adjustments would thus generate to delivered prices F based on distance and time. They would thus be based on a double index to account for these two parameters: F_{st} , in which:

$s = 1, 2, \dots, i, \dots, n$ designates the regions to be identified,

$t = 1, 2, \dots, j, \dots, m$ designates the times of the year when demand in a region is presumed to be uniform.

It should be noted that:

- Regardless of values i and t , $(F_{st} - F_{it})$, must be lower than the transport cost between s and i , in order to avoid arbitrage between these two markets;

- $(F_{st} - F_{sj})$ must be:

lower than the storage cost in order to eliminate arbitrage between markets separated by time;

or

- greater than or equal to this storage cost, in order to move stocks from the distributor to user warehouses.

d. Operators to be involved in implementing the proposed rate

i) Greater commercial role of the manufacturers

By mutual agreement with the Public Services represented by the Inputs Unit described in Chapter IV (and by an organization responsible for implementing and monitoring pricing policy applied to the agricultural sector), producers, each acting with respect to his respective product, would set delivered prices (p) and especially the coefficient k, which would enable them to serve the entire territory.

FOB factory fertilizer sales (P) should be authorized. In other words, the manufacturers would apply two pricing levels: FOB factory and CAF.

ii) Elimination of Monopolies

As discussed in Chapter II, this system would enable retail intermediaries to become wholesalers and would consequently allow some degree of competition to begin in fertilizer distribution. This situation would result in the breakup of STEC's de facto monopoly.

Also as proposed in the preceding chapter, this competition, which would begin as soon as subsidies are eliminated, would allow wholesaler promotion at the importer-distributor level, and would also abolish the current monopoly of the local manufacturers.

iii) Price ceilings from retail intermediary warehouse

Finally, this system would enable the Public Services, in agreement with those involved, to set price ceilings for each region of the country.

iv) Subsidies

It does not fall within the scope of this study to make any judgments on the need to extend the subsidy system for fertilizers. However, as justified in Chapter II, to allow the STEC monopoly to be eliminated, the proposed pricing system involves the payment of subsidies to fertilizer manufacturers, who would pass them on to their wholesalers in the form of price reductions.

TABLE 14 (BIS): LEVELS OF ESTIMATED UNIT SUBSIDIES FOR THE
1987/88 and 1988/89 GROWING SEASONS ¹

	1987/88			1988/89		
	STEC SELLING PRICE	STEC COST PRICE	UNIT SUBSIDY	STEC SELLING PRICE	ESTIMATED STEC COST PRICE	UNIT SUBSIDY
AN	94.760	129,760	35.0	96.900	148.560	51.660
TSP	87.312	162.312	75.0	95.880	182.890	87.010
SSP	40.232	56.232	16.0	44.614	70.000	25.386
DAP	93.304	113.304	20.0	102.460	251.800	149.340

Source: MINAG, DG/PDIA, February 1989

The weighted subsidy per ton of fertilizer may be calculated based on distribution of annual demand. For example, in 1985/86, a fairly typical year, 49% of the tonnage was AN, 37% TSP, 13% SSP and 1% potassium. This breakdown gives the following contributions to the total average subsidy:

	1987/88	1988/89
- AN subsidy	35,000 DT/t x 0.49 = 17,150 DT/t	51,660 DT/t x 0.49 = 25,313 DT/t
- TSP subsidy	75,000 DT/t x 0.37 = 27,750 DT/t	87,010 DT/t x 0.37 = 32,194 DT/t
- SSP subsidy	16,000 DT/t x 0.13 = 2,080 DT/t	25,386 DT/t x 0.13 = 3,300 DT/t
Or a 1987/88 total of:	46,980 DT/t	and for 1988/89: 60,807 DT/t

¹ The level of subsidization calculated in Tables A4-13 and A4-14 applied to the 1987 fiscal year.

D. MINIMUM BREAK-EVEN POINT

The purpose of the following pages is to estimate the FOB factory price level that would provide sufficient profitability to encourage a private investor to enter the fertilizer distribution business.

All calculations are based on a hypothetical situation and operating coefficients approached using available data pertaining either to private intermediaries or STEC.

1. Characteristics of a hypothetical distributor

- Location: - Bou Salem
- Sales: 4,000 tons
- Storage capacity: in m³: 5,000
in dinars: 150,000¹

Operating coefficients and hypotheses used

a. Distribution of volume handled by fertilizer category

The data collected during the survey conducted among private intermediaries in the Bou Salem area (see Annex 6), and the data pertaining to STEC distribution centers in the region have made it possible to divide the 4,000 tons of fertilizers handled into AN, TSP, SSP and DAP. The following Table summarizes these data:

¹ These capacities correspond to a surface area of 1,000 m²: this surface area is estimated based on 1 m² per ton of fertilizer per turnover and an annual stock turnover ratio of 4.

**TABLE 15: RELATIVE VOLUMES OF DIFFERENT
FERTILIZERS IN THE BOU SALEM REGION**

FERTILIZERS	ACCORDING TO SURVEY		ACCORDING TO CDD-STE DATA		ARITH- METIC MEAN (%)
	IN BOU SALEM (%)	IN JENDOUBA (%)	FROM BOU SALEM (%)	FROM ZAAFRANE (%)	
AN	43	50	31	50	44
TSP	19	20	51	33	31
SSP	19	30	12	11	18
DAP	18	0	4	6	7
	100	100	100	100	100

For the purposes of this study, the arithmetic mean of the various categories mentioned above is adopted for the 4,000-ton category. This breakdown is shown in the following table:

TABLE 16: SALES VOLUME FOR DIFFERENT FERTILIZERS

PRODUCT NAME	RELATIVE VOLUMES	
	IN %	IN TONS
AN	44	1,760
TSP	31	1,240
SSP	18	720
DAP	7	280
TOTAL	100	4,000

b. Marketing Cost Estimate

The expenditure levels taken into account derive from the comparison of available data, presented in the following table:

TABLE 17: SELECTED MARKETING COSTS EXPRESSED IN DT/TON

ITEMS	SOURCES	RELATIVE COSTS			SELECTED LEVEL	TOTAL COST (DT)
		To Inter-mediaries ¹	To STEC	To OC		
Overhead/misc. costs		1.4	3.2	-	3.0	12,000
Handling		0.7	1.9	1.1	1.1	4,400
Material losses		0.5	0.2	-	0.5	2,000
Transport ²		1.8	8.8	2.8	1.8	7,000
Taxes and duty		0.3	20.0	-	0.5	2,000
Bagging		-	12.2	-	-	-
TOTALS		-	-	-	6.9	27,600

In addition to these costs, expenditures for transporting fertilizers between the factory and the nearest station (Bou Salem) must be taken into account. These expenses amount to 35,051 dinars, and the breakdown of their assessment is as follows:

TABLE 18: COST OF ANNUAL SNCFT TRANSPORT: GABES-BOU SALEM FOR DAP, SFAX-BOU SALEM FOR TSP, AND TUNIS-BOU SALEM FOR SSP, EXPRESSED IN DT/TON

PRODUCTS	COSTS	UNIT COST (DT/TON)	TOTAL COST (DT)
AN		11,110	19,554
TSP		7,794	9,685
SSP		3,502	2,521
DAP		11,110	3,311
TOTAL		-	35,051

Total marketing costs thus amount to DT 66,651.

¹ The average of the marketing costs gathered during the survey conducted with 11 private intermediaries, covered by Annex 6.

² These costs cover transport between the station and the intermediaries' warehouses.

**TABLE 19: PRICING STRUCTURES FOR FERTILIZERS BEFORE
COMPENSATION IN 1987, EXPRESSED IN DT/TON**

Products	Ammonitre	DAP	TSP
Items			
1. Purchase price	97,257	185,157	110,776
- Supplier invoice			
- Bagging	-	-	5,004
- Bags	-	-	7,229
2. Customs duty	8,274	13,891	6,082
3. Weight or volume loss (%)	0,973	1,852	1,108
4. Transport costs	8,827	10,145	7,780
5. Overhead costs	4,550	4,550	4,550
6. Distribution margin (5% not including overhead)	5,767	10,552	6,899
TOTAL	125,648	226,147	149,428
UNITARY COSTS (1) + (2) USED IN TABLE NO. 20	105,531	199,048	129,091

Source: STEC

c. Fertilizer Cost

The selling prices charged by manufacturers as invoiced to the STEC in 1987 are listed in Table 19. Based on these prices, fertilizer purchase expenditures are estimated to be DT 436,080, as shown in the following Table:

TABLE 20: FERTILIZER COSTS

PRODUCT	NAME	QUANTITIES (IN TONS)	UNIT COST (DT/TON)	TOTAL COST (DT)
AN		1,760	106	186,560
TSP		1,240	129	159,960
SSP		720	47	33,840
DAP		820	199	55,720
TOTALS		4,000	-	436,080

d. Working Capital Assessment

Despite the stock turnover ratio of 4, the amount of working capital was calculated to cover one-third of the value of purchases (instead of one-quarter). The total amount is thus 145,360 dinars.

Given the successive purchase prices reductions to be tested, the value of this capital must be reduced accordingly. As we will see below, its "acceptable" value, corresponding to a 13% rate of return, is 101,752 dinars, a reduction of approximately 30%.

e. Calculation of Revenues

This distributor should charge the sales prices to the public now in effect, which are presumed to be unchanged. On this basis, this distributor's annual revenues are DT 402,200.

TABLE 21: REVENUES EXPRESSED IN DT

PRODUCT NAME	AN	TSP	SSP	DAP	TOTAL
Quantity (tons)	1,760	1,240	720	280	4,000
Unit price (DT/ton)	112	109	52	116	-
Total values (DT)	197,120	135,160	37,440	32,480	402,200

3. Calculating the break-even point

a. Assumptions used

- Project duration: 15 years
- Investment composed exclusively of the warehouse and working capital. The life of the buildings has been estimated to be 30 years. At the end of the project, 50% of the value of these buildings will be returned as salvage value.
- Project financing: The project was assumed to be equity-financed.

b. Base Cash Flow

Cash flow is obtained with no reduction in the fertilizer purchase price. Table 22 below gives this cash flow:

TABLE 22: PROJECT CASH FLOW IN DT

ITEMS	YEARS	1	2	3	4-14	15
Investment		-150,000	0	0	0	+ 75,000
Working capital		-145,360	0	0	0	+145,000
Marketing costs		- 66,651	- 66,651	- 66,651	- 66,651	- 66,651
Costs of products		-436,080	-436,080	-436,080	-436,080	-436,080
Revenues		+402,200	+402,200	+402,200	+402,200	+402,200
Cash Flow		-395,891	-100,531	-100,531	-100,531	+119,469

c. Price reduction rates on Manufacturer Purchases

Successive reductions in manufacturer purchase prices, and consequently in the cost of products have made it possible to identify the reduction which ensures a sufficient rate of return. The most pertinent tests yield domestic rates of return (TRI), summarized as follows:

<u>Reduction rate</u>	<u>Corresponding Domestic Rate of Return</u>
25%	1.52%
30%	13.00%
35%	25.93%

In summary, to obtain a sufficient profitability level (a TRI of approximately 13%), manufacturer sales prices charged to distributors must be 30% lower than current prices. Of course, the same rate of return would be obtained through an increase in prices charged to the public equivalent to a 30% increase in the sales prices manufacturers charge to distributors.

d. Sensitivity of the TRI to changes in revenues

The rate of return corresponding to a 30% price reduction is fairly sensitive to variations in the revenues, as shown in the following table.

TABLE 23: SENSITIVITY ANALYSIS FOR THE DOMESTIC RATE OF RETURN

TESTS	COST +10% ¹	COST +20%	COST -20%	CA +10%	CA -10%
Domestic rate of return	7.95%	3.67	27.71	38.9	0

e. Changes corresponding to pricing structures

Assuming that the 30% reduction in the sales prices charged by the manufacturers are uniformly applied to the four fertilizers considered, the gross marketing margins and the subsidy would be modified as follows:

TABLE 24: GROSS MARKETING MARGINS AND SUBSIDIES RESULTING FROM THE 30% REDUCTION OF THE SALES PRICES CHARGED BY MANUFACTURERS, IN DT/TON

PRODUCT	CATEGORIES	NEW SALES PRICES	SUBSIDIES	GROSS MARGINS
AN		74	32	38
TSP		90	39	19
SSP		33	14	19
DAP		139	60	-23

This table shows that the distribution margin resulting from the price reduction, although sufficient on average², remains negative for DAP. This situation would hinder the marketing and generalized use of this recently-introduced fertilizer.

Obviously, all of the results obtained are determined principally by the selected assumptions, and, in particular, by the composition of sales as a function of the various fertilizers sold, as illustrated in the table above.

¹ Cost is to be interpreted as the sum the investment costs plus all charges, except expenditures related to the purchase of fertilizers.

² While keeping this average unchanged, we can decrease margin for AN in order to increase the margin for DAP. We will thus obtain margins of DT 31 per ton for AN and DT 21 per ton for DAP. Purchase prices will be DT 21 per ton for AN and DT 99 per ton for DAP.

CHAPTER IV

ROLE AND RESPONSIBILITIES OF THE PUBLIC SERVICES

A. OBJECTIVES

The role of Public Services with respect to fertilizers should be to design, initiate, monitor, and assess the results of a policy whose goal is to ensure the harmonious development of the use and marketing of fertilizers under the most advantageous possible terms for farmers, while adequately remunerating the economic operators engaged in this service business.

B. STRATEGY

To achieve these objectives, the recommended strategy is to allow market forces to interact while promoting healthy, sufficient and well-targeted competition in all the country's regions, to keep prices at a stimulating level that generates services for farmers.

The principal means for stimulating healthy, well-targeted competition consist of providing information for constituent economic operators. To this end, a network of feedback on the domestic market must be developed using the operators themselves, Public Services, and farmers as sources. After centralization and processing, and especially to respect source confidentiality, this information must be returned to its providers soon enough to allow its application and to ensure its effectiveness.

C. MEANS

As described in Annex 4, Section D, the only organization within the Public Services which deals directly and exclusively with coordination and administration of agricultural inputs¹ is the Agricultural Inputs Control Service (SCIA) under the General Agricultural Production Administration (DG/PV) of the Ministry of Agriculture.

The role of this organization is to monitor stocks and the execution of legal provisions and ministerial decisions, especially concerning product quality and sales authorizations issued to inputs intermediaries at the national level. SCIA is now drawing up legislation for fertilizers as already exist for pesticides.

It may be imagined that, in a climate characterized by the effective liberalization of imports and by State disengagement from management of inputs marketing in general and fertilizers in particular, the role of Public Services will become more delicate

¹ Of course, excluding INRAT research services, soils laboratories, plant pharmaceutical services, and seeds.

and more difficult to create, and especially to implement. It is thus essential that a group to design, coordinate, follow up, and evaluate inputs policy be established at the Ministry of Agriculture. It should have the capabilities and the authority necessary to act rapidly with the cooperation of executive bodies at all levels of the official hierarchy, both public and parastatal.

Considering its responsibilities, which are proposed in the following paragraph, this group must have ready and regular access to the decision makers.

D. RESPONSIBILITIES OF AN INPUTS UNIT

The list of the main responsibilities of this Inputs Unit (CI) could include:

- On the general level:
- * Preparation of decision making criteria in the area of intensification factors, to facilitate the creation of the national agricultural policy in general, and the policy covering fertilizer use in particular;
- Coordination and liaison among the various institutions involved in the implementation of the inputs policy decided on;
- Concerning fertilizer use, this group could contribute to the following:
- * Identifying and quantifying the problems at different levels: climatic, technical, structural, etc.;
- * Increasing and maintaining the level of knowledge and capabilities of personnel engaged in research, extension, and distribution of inputs;
- * In cooperation with the services or institutions involved, defining techniques for approaching farmers in the use of fertilizers.

This fertilizer policy coordination, follow-up and evaluation unit must always be informed in all aspects of fertilizer marketing, on the domestic Tunisian market, as well as on the international stage. In this latter area, it must keep up to date concerning economic trends and world prices for the raw materials imported to produce fertilizers used in Tunisia at the local level.

On the domestic market, this unit should establish an information gathering system operating among producers,

distribution channels, and consumers, through the intermediary of public organizations that handle imports, CRDA's, etc. This information, which must be returned rapidly and regularly to all economic operators after processing, will primarily include the following:

- On a monthly basis:
 - o Imports in progress and completed, stock levels by type of fertilizer and by region;
 - o Price levels at all stages (production, wholesale, retail, public) and by region, volume, and supplier credit terms;
 - o National demand level broken down by region and assessment of potential needs;
- On an annual basis:
 - o Organization of the profession (manufacturers, importers-distributors, wholesalers, retailers) by region according to number and capacity for storage, transport, and credit; performance (general business activity and fertilizer activity) in terms of tons and revenues;
 - o Organization of related services (transport, banking, credit institutions, APIA, etc.) at the national and regional levels.

In the area of marketing, the Inputs Unit should also identify all needs and propose solutions concerning not only the products themselves, but also financial, technical and trade, personnel training (public and private), and equipment (storage, transport) needs.

As the SCIA is already doing, the Inputs Group should also see to it that all necessary measures are taken concerning quality control for products and packaging, and especially the following:

- Formulating the appropriate legislation and keeping it up to date;
- Overseeing the enforcement of this legislation through existing institutions (fraud elimination service, laboratories for product and packaging analysis);
- Alerting decision makers and suggesting solutions in the event of insufficient monitoring means (laboratories, personnel, transportation means, etc.).

Finally, in terms of price monitoring, this unit should initiate, coordinate and evaluate the results of the implementation

of all measures taken in the past to develop and maintain sufficient, healthy, creative competition in all regions of the country. Its direct contribution in this area should be limited to monitoring manufacturer selling prices and setting the price ceilings for sales to the public (see Chapter III). The former will be set on par with international prices.

During periods of surging prices, the fertilizer unit will have to undertake the conservatory measures needed to mitigate the effects of these surges on the farmers and guarantee availability of supplies to them.

In short, as suggested in Chapter III, the Inputs Unit must ensure that the market is as transparent as possible, especially at the level of the pricing system. Effective business management and the maintenance of healthful, fair competition indeed requires the most extensive possible command of information.

As suggested at the end of Chapter II, after conducting the recommended additional surveys, the updating of the study, the follow-up of recommended actions, and the evaluation of their results must fall within the realm of the Inputs Unit. In addition to public organizations under the MINAG (CRDAs, etc.), the Unit could assign the task of gathering the required information to update and follow up the studies to the managers of the seven domestic STEC warehouses which serve all of the major agricultural regions. Indeed, these managers are underemployed during most of the year, and they know, or should know, their own business environment. Some of this information, such as the assessment of distribution means used by intermediaries and their annual updating, should be gathered when applications are made for fertilizer sales authorizations issued by the CRDAs, and for this purpose, these applications should be renewed annually. They will also make it possible to identify consumers profiting unfairly from the intermediary rate.

E. TRAINING OF INPUTS UNIT PERSONNEL

Theoretically, the manager of the Inputs Unit and his two colleagues, one in charge of fertilizers and the other of pesticides, should complete training sessions:

- At the International Fertilizer Industry Association (IFA) Documentation Department in Paris;
- At the International Fertilizer Development Center (IFDC) Training Division in Muscle Shoals, Alabama.

At the IFA, in addition to the assessment of all existing documentation throughout the world on fertilizers, they can have access to all available information sources, in order to follow the international fertilizer market and thus monitor the commercial

activities of the fertilizer producers on the Tunisian market.

With respect to pesticides, the International Group of Associations of Pesticide Manufacturers and Distributors (GIFAP) in Brussels could perform the same function for pesticides as the IFA does for fertilizers.

At the IFDC, they can primarily learn about training programs IFDC organizes throughout the world for all sectors of the fertilizer industry and Public Service directors. On this subject, STEC has a sizable collection of IFDC audiovisual aids (slides and corresponding texts) suitable for organizing seminars on the principles of fertilizer use and marketing. It also has similar audiovisual materials from the FAO in Rome and all the necessary projection equipment, which are gifts of the EEC.

On the practical level, a training session for the Inputs Unit Director is required at the Fertilizer and Pesticide Authority of the Ministry of Agriculture of the Philippines in Manila, which may be mentioned as an excellent example in all respects for the unit to be created in Tunis.

F. PUBLIC RELATIONS

To coordinate the harmonious development of the use of inputs, the Inputs Unit should be assisted in its duties by an advisory committee composed of representatives from the areas involved within the Public Services (research, agricultural production and extension, Ministries of the Economy and Industry), in the industry (Chemical Group for national producers, STEC, SEPCM, STIPCE, and UTICA for import distribution networks), and farmers (UNA).

ANNEX 1

TERMS OF REFERENCE

(September 16, 1988)

DISTRIBUTION OF FERTILIZERS AND USE ON THE FARM

I. INTRODUCTION

The liberalization of the marketing of inputs, especially including the liberalization of the distribution margin for fertilizers, is an action the Agricultural Structural Adjustment Program recommends.

This activity, which has up to the present been covered by the public sector, must be studied so that it can be transferred gradually to the private sector, while ensuring it the criteria for success.

II. OBJECTIVES

The purpose of this study is to examine ways to increase the technical efficiency of fertilizer distribution and how its ultimate use on farms may be increased, and to study methods to improve the financial and economic efficiency of the fertilizer distribution system.

III. CONTENT OF THE STUDY

The study must principally:

- (i) Provide a brief summary of the distribution network (factories, importers, distribution centers, margins, and prices applied);
- (ii) Conduct analyses and make recommendations on transport costs and basically the equalization system applied in Tunisia;
- Determine the economic failures at the level of the fertilizer distribution system? How should solutions be implemented? How can they be solved? What would be the action plan for correcting these shortcomings?

Calculate real distribution costs (transport, storage, and maintenance). What margins should be allowed to private retailers in order to encourage their activities, and what other incentives could be used to induce them to expand their activities?

- (iii) Analyze and compare fertilizer distribution, both public and private, and make recommendations.
- (iv) Conduct analyses and make recommendations on the way to improve effective use of fertilizers in Tunisian agriculture.

Concerning the farm, what are the most profitable methods to be used to improve the technical efficiency of fertilizer use for the main crops in the different agro-ecological areas? What would be the cost-benefit repercussion of the use of fertilizers? What strategy should be formulated for implementing these recommendations? What role should the fertilizer distributors (public and private) play in more effectively supplying technical information to farmers.

- (v) Conduct analyses and make recommendations pertaining to data concerning fertilizers and the information system.
- Analyze how problems arising from fertilizer distribution are now followed up and propose an early warning system for identifying and solving problems.

IV. PERSONNEL NEEDS

- (i) A fertilizer marketing specialist. This specialist should be capable of evaluating the various distribution networks, transport costs, storage systems, and business policies which would bring private sector participation up against that of the public sector. This person will be mainly responsible for undertaking the analyses and recommendations in Part 1, Objectives (i) and (ii). Length of service: 2-3 months.
- (ii) An expert (economist or agro-economist) in fertilizer use and the pertinent statistics. This person should possess experience in information systems pertaining to fertilizers and their use, the identification of efficiency indicators, and the processing of computerized data bases, to assist in making a rapid selection of the pertinent information. This person will be primarily responsible for undertaking the analyses and recommendations in Part 1, Objectives (iii) and (iv). Tenure: 1 month.
- (iii) An agronomist familiar with the technical standards for fertilizer use and with Tunisian agriculture and capable of constructing efficiency of efficiency and fertilizer use level indicators based on existing data. This person will be primarily responsible for undertaking the analyses and recommendations in Part 1, Objective (iii). Length of service: 1 month.
- (iv) A transportation specialist familiar with transport costs and systems in Tunisia and capable of determining real costs and comparing them with the currently-used transport standardization formulas. This person will be primarily responsible for undertaking the analyses and recommendations in Part 1, Objective (i). Length of service: 3 to 4 months. (This person should be recruited before the Marketing Expert and the

Agro-Economics Specialist arrive, so that the data required for the analytical work can be collected. ABT Associates recommends Mr. Charles J. L. G. Heureux for the Marketing Specialist position. ABT also recommends Mr. Gaston Rondia for the agronomist position.

ANNEX 2

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ANNEX 3

PERSONS AND ORGANIZATIONS VISITED (in chronological order)

Ministry of Agriculture, Tunis, General Administration of Planning, Development, and Agricultural Investment (DG/DPIA)

- Mr. Mohamed Gharbi, Managing Director
- Mr. Abdelhakim Khaldi, Deputy Director for Agricultural Development, Leader of the Agricultural Policy Implementation Project (PMOPA)
- Mr. Abderrahman Chaffai, Head of the Economic Analysis Department
- Mr. Amor Chouchene, Chief Engineer, Head of the Sector- and Region-Based Department
- Mr. Badr Ben Ammar, Director of Planning and Development
- Mr. Rached Akrouf, Deputy Director of the Statistics Sub-Administration
- Mr. Mounir Khalfallah, Research Assistant.

"Model-Making" Working Group

- Mr. Tahar Ghomam, Department Head, Agricultural Surveys
- Mr. Mosbah Belhadj, Department Head, Analyses and Capsule Presentations
- Mrs. Ayda Mechergui, Regional Planning
- Mr. Hamdi, Regional Planning
- Mr. Abdelwahed Trabelsi, Consultant, Professor at the Advanced Management Institute (ISG)
- Mr. Michael Roth, ABT Assoc., Inc. consultant seconded from the University of Wisconsin at Madison, USA.

General Plant Production Administration (DG/PV)

- Mr. Salem Ben Salah, Managing Director, Agricultural Extension Administration
- Mr. Mohamed Ali Boughedir, Head of Agricultural Inputs Monitoring Service (SCIA)
- Mr. Abderrahman Sakka, SCIA (fertilizers/pesticides/seeds)
- Mr. Hassen Mahjoub, SCIA (agricultural equipment)
- Mr. Abdelbaki Bouteraa, Deputy Director of Agricultural Extension (land).

General Financing and Incentives Administration (DG/FE)

- Mr. Ismail Gharbi, Deputy Director, Agricultural Institutions and Cooperatives under the Credit and Incentives Administration.

Ministry of the National Economy

General Commerce Administration, Administration for Prices and

Economic Monitoring D/PCE, Sub-Administration of the Central Compensation Fund, CGC

Mr. Ahmed Mrissa, Deputy Director

Mr. Meftah Dhaoui

Mr. Hadj Said Mechri

Mr. Ridha Touiti, Deputy Director of Quality Control and Elimination of Fraud.

INRAT, Tunisia

Mr. Mustapha Lasram, Director

Mr. Ali Mamouri, Head of the Plant Genetics and Improvement Laboratory

Mr. Taoufik Tnani, Head of the Chemical Laboratory.

Agricultural Investment Promotion Agency, APIA, Tunisia

Mr. Said Robbana, President and Managing Director.

World Bank

Mr. Choeng-Hoy Chung, UC, Washington

Dr. Hans-Henning Andersen, Consultant for Kreditanstalt für Wiederaufbau, Frankfurt.

USAID/Tunisia

Ms. Nancy Tumavick, Deputy Director for Project Management

Dr. Shirley A. Pryor, Project Manager.

Delegation from the Commission of the European Communities in Tunisia

Mr. François Garret, Advisor.

Embassy of Belgium, Tunisia

Mr. Aristide Michel, Head of the Cooperation Section (General Development Cooperation Administration - AGCD).

ABT Associates, Inc.

Dr. Roger D. Montgomery, Resident Advisor, Tunisia

Mr. Salem Mekki, Assistant to the Resident Advisor, Tunisia

Mr. Mohamed Salah Redjeb, ABT Consultant, seconded from the Advanced Institute of Management, ISG, Tunisia

Mr. Mohamed Lahouel, ABT Consultant, seconded from ISG, Tunisia

Ms. Cheri Rassas, Project Manager, Washington.

Dr. Mark D. Newman, Director, Washington

Governorate of Bizerte

Mr. Fredj Ghrib, Regional Commissioner for Agricultural

Development (CRDA)

Mr. Mohamed Kraoua, Arrondissement Head, Vegetable Production (CAPV)

Mr. Rihda El Bez, OC Representative.

Le Kef Governorate

Mr. Said Khlij, CRDA

Mr. Mohamed Salah Khamassi, CA PV.

Jendouba Governorate, CRDA

Mr. Attiq Kharbech, CA PV.

Béjà Governorate, CRDA

Mr. Rachid Jebli, CA PV.

Sfax Governorate

Mr. Habib Sekma, CRDA.

Gabès Governorate, CRDA

Mr. Nouredine Jabeur, CA PV

Mr. Taieb Farah, CA PV.

Pesticide Control and Analysis Laboratory, Tunis

Mr. Abdelaziz Chebil, Laboratory Director

Mr. Marc Hullebroeck, Pesticide Chemist seconded from AGCD (Belgian Cooperation).

Agricultural Chemistry Laboratory, Le Kef Advanced Agricultural School, ESAK, Le Kef

Mr. Azaiez Gharbi, Laboratory Director

Mr. Abderraouf Jenhani, Chemist.

Agricultural Service Laboratory of Béni Khalled, Béni Khalled

Mr. Mustapha Chelbi, Laboratory Director.

Bou Salem Beet Center, Bou Salem

Mr. Naceur Chouikh, Center Director

Mr. Ehrenfried Otto Zillich, Head of the German Mission, seconded by GTZ (West German Cooperation).

Production Systems Project, INRAT/ICARDA/CRDI, Tunis

Mrs. Raoudha Khaldi, Research Attaché

Dr. Thomas C. Stilwell, ICARDA.

Integrated Project for the Development of Medium and Large Companies (DIMGR), Bizerte

Mr. Ali Lahbib, Director
Mr. Marc Mosnier, Co-Director
Mr. Elmi Kouki, Engineer
Mr. Michel Vaucoret, Engineer.

Project for Management and Assistance to Large Operations in the Northwest

Mr. Mohamed Nejib Ouedday, Director
Mr. Luc Deville, Co-Director (AGCD)
Mr. Lazer Labidi, Machine Operation Engineer
Mr. Philippe Denolf, Plant Technology Engineer (AGCD)
Mr. Bruno Bodarwe, Rural Engineering Engineer (AGCD).

INPUTS IMPORTER-DISTRIBUTORS

The Tunisian Fertilizer and Chemicals Company (import/production/distribution of fertilizers/pesticides

Mr. Taoufik Reguig, President and Managing Director, a.i., Tunis
Mr. Hassen Kammoun, Technical Managing Director, Djebel Djelloud, Tunis
Mr. Ali Hamami, Commercial Managing Director, Tunis (distribution center head)
Mr. Skander Naji, Director of Finance and Administration, Tunis
Mr. Abdelkarim Khelifi, General Accounting Chief, Tunis
Mr. Ammar Denguezli, Head of Analytical Accounting, Djebel Djelloud
Mr. Raouf Neffati, Data Processing Chief
Mr. Hedi Houissa, Head of Delivery and Maintenance Services, Djebel Djelloud
Mr. Jelaleddine Zine, Head of Sales Division, Tunis
Mr. Adel Oumezzine, Head of Mateur Distribution Center
Mr. Mohamed Temimi, Head of Medjez El Bab Distribution Center
Mr. Mongi Cheffi, Head of Zaafrane Distribution Center
Mr. Ali Oujani, Head of Bou Salem Distribution Center.

The Fertilizers and Chemical Company of Megrine - SEPCM (import/production/ formulation/ distribution of fertilizers/ pesticides and agricultural materials), Megrine

Mr. Moncef Doghri, President and Managing Director
Mr. Ridha Doghri, Deputy Managing Director
Mr. Rachid Doghri, Technical Director.

Tunisian Industrial Chemical and Fertilizer Company - STIPC
(import/ production/ formulation/ distribution of fertilizers,
pesticides and industrial chemicals, Megrine

Mr. Abdelhakim Zakhama, Commercial Director.

North African Commercial and Industrial (NACI), Tunis (im-
port/distribution of pesticides and industrial chemicals)

Mr. Fethi Sakka, President and Managing Director
Mr. Khaled Ben Romdane, Managing Director
Mr. Jean Taieb, Director.

Bio-Protection (pesticides importation), Tunis

Mr. Mohamed Habib Aounallah, President and Managing Director.

Tunisian Inputs and Agricultural Materials Company (STIMA)
(import and distribution of BASF pesticides)

Mr. J. E. Kallel, Managing Director.

Palliser SA, Tunis

Mr. Chedly Bel Falah, Department Head.

Shell of Tunisia (import and distribution of petroleum products)

Mr. Mohamed M'Barek, Assistant Director of the Finance Department.

FERTILIZER MANUFACTURERS

Arab Phosphate- and Nitrogen-Based Fertilizer Company (SAEPA)
and Gabès Fertilizer Company (SEG)
(Chemical Fertilizer Production)

Mr. Bennoury Ben Youssef, Deputy General Manager, Tunis.

Industrial Phosphoric Acid and Fertilizer Company (SIAPB)
Gafsa Chemical Industries (ICG)

Mr. Mohamed Ali Zaouali, Department Head, Main Sales Division,
Tunis

Mr. Hichem Debbabi, Department Head, Sales Division, Tunis
Mrs. Faïda Aloulou, Documentation Director.

International Fertilizer Industry Association, Ltd (IFA), Paris

Mr. L. M. Maene, Managing Secretary General
Mr. Pierre L. Louis, Executive Secretary, International Produc-

tion and Commerce

Mr. K. F. Isherwood, Head, Information and Market Research Service.

Norsk Hydro, a.s. (Norway)

Agricultural Group, Overseas Operations, Brussels

Mr. Jack C. Bakker, Deputy Export Manager

Mr. Ronald Thielen, Regional Sales Manager (Africa).

Potash and Nitrogen Trading Company (SCPA), International Division, Paris

Mr. Paul Sasportes, Director, Africa and Middle East Department.

French Nitrogen Syndicate (CFA), Paris

Mr. de Tourbet.

PARASTATAL FERTILIZER INTERMEDIARIES

Cereals Office (OC), Tunis

Mr. Mohamed Lassaad Mouaffak, Deputy General Manager

Mr. Ahmed Sellami, Director of Production Improvement

Mr. Abdelmajid Hassaine, Director of Logistics

Mr. Nouredine Koubaa, Director of Growing Season Preparation

Mr. Ammar Ghoul, Assistant Director of Growing Season Preparation

Central Major Crop Cooperative, CCGC, Tunis

Mr. Mohamed Ettriki, Deputy General Manager

Mr. Mohamed Ali Ben Hassine, Commercial Director.

COCEBLE, Tunis

Mr. Khaled Mourali, Procurement Director for Coceble, Member of the Executive Board, Director of Regional Organizations and National Federations of the National Farmers' Union (UNA), Chairman of the Major Crop Monitoring Committee, and farmer.

Central Seed and Selected Plant Cooperative, CCSPS, Tunis¹

Mr. Allala Ghodhbane, General Manager.

¹ They are interested, but not yet engaged in fertilizer intermediary activities.

Office for the Development of the Medjerda Valley, OMVVM, Tunis

Mr. Ridha Harzallah, General Manager
Mr. Ezzeddine Mellakh, Director of Production Assistance and
Coordination (DCAP).

**Office of Forestry/Pastoral Development of the Northwest (ODESY-
PANO), Beja**

Mr. Mohsen Zouari, Procurement, Credit and Marketing Director.

Kairouan Development Office (OMIVAK), Kairouan

Mr. Mohamed Rahmouni, Assistant Director.

PRIVATE INTERMEDIARIES

Mr. fertilizers and construction materials, Mateur
Mr. Midini, fertilizers, pesticides, vegetable crop seeds,
construction materials, Borj El Aifa (intersection of Neceur road
between Le Kef and Le Krib).
Mr. Youssef Jaouadi, fertilizers, pesticides, automotive
equipment, insurance, Le Krib.

Agriculture and Services, SARL: fertilizers, pesticides, seeds,
agricultural materials and services.

Mr. Fadhel Ayadi, Manager and shareholder, Bou Salem and Jendouba
Mr. , fertilizers, pesticides, and vegetable crop seeds,
Bou Salem
Mr. Ammar Maiza, fertilizers, construction materials (General
Syndicate of Beni Khalled) and citrus grower, Beni Khalled.

11 private retailer-intermediaries established in Ghannouch
(Gabès), Jara (Gabès), Sfax (2), Medjez El Bab (2), Bou Sal-
em/Jendouba, Béjà, Kelibia, and Menzel Temime.

Korba Agricultural Service Cooperative.

Consumers (benefitting from the intermediary rate)

El Mardja Agricultural Development Company, SMADEA, El Mardja

Mr. Hedi Bouchellegat, Director of Livestock
Mr. Habib Mnasri, Agriculture (beets)
Mr. Ezzeddine Mraidi, Equipment Division.

ZAMA-Bouزيد Agricultural Development Company, Jendouba

Mr. Abdelaziz Alayet, President and General Manager.

ANNEX 4

CURRENT SITUATION OF THE MARKETING OF FERTILIZERS IN TUNISIA

A. INTRODUCTION

The purpose of the following pages is to analyze the current status of fertilizer marketing in Tunisia, to set out an assessment of the opportunities for its improvement in the framework of the Agricultural Structural Adjustment Program (PASA). This evaluation is stated in Chapter II: Possibilities for Improving Fertilizer Marketing.

B. DISTRIBUTION NETWORK

1. General remarks

Companies engaged in the marketing of chemical fertilizers in Tunisia may be classified in four categories:

- local producers
- importer/distributors
- wholesalers, or "warehousing organizations"
- retailers.

There is no legislation regulating these activities, as is already the case for companies engaged in pesticide marketing¹. However, in addition to their business license, private intermediaries must apply for authorization to sell fertilizers from the Regional Agricultural Development Commissioner (CRDA) in their governorate. This document enables them to obtain fertilizer from the Tunisian Chemical Fertilizer Company² at the intermediary's price.

2. Supply sources

Tunisian agriculture has the enormous advantage of a local industry at its disposal to provide it with a wide range of simple and complete fertilizers. However, care must be taken to ensure that this industry is not protected to the detriment of the individual farmer. Only potash, which is consumed in relatively insignificant quantities, is imported.

¹ However, draft law relating to the organization of control of fertilizer substances and soil and substrate fertilization is being prepared at the DG/PV.

² Parastatal company holding a de facto monopoly for the marketing of fertilizers manufactured in Tunisia (see B.3 below).

a. Local Production

Chemical fertilizers, 85% of which are exported, are produced locally by enterprises in the Chemicals Group located in Sfax, Gabès, and Gafsa, most of which are parastatal. The range of products they manufacture is listed below:

* Phosphate Fertilizers

- Superphosphate 16 (also known as "super 16" or "single superphosphate" or "SSP"), composed of 16% soluble P₂ O₅, is manufactured by the Tunisian Chemical Fertilizers Company (STEC) in Djebel Djelloud. Annual consumption, which still amounted to 54,000 tons in 1980, has stabilized at 30,000 to 33,000 tons since 1985, because this product has been replaced gradually by TSP (or superphosphate 45), which is more economical to use.
- Superphosphate 45 (also known as "super 45," "triple superphosphate" or "TSP"), containing 45% P₂ O₅, is produced in Sfax by the Industrial Phosphoric Acid and Fertilizer Company (SIAPE), which has a capacity of 570,000 tons per year. Most of the fertilizer produced is exported. A new unit producing 400,000 tons/year and belonging to Chemical Industries of Gafsa (ICG), has also been in operation since 1985.
- Diammonium phosphate ("DAP") containing 46% of P₂ O₅ and 18% nitrogen is manufactured in Gabès by the Arab Phosphate and Nitrogen Fertilizer Company (SAEPA), which can produce 300,000 tons per year, and by the Fertilizer Company of Gabès.
- Other phosphate fertilizers manufactured in Tunisia are exported exclusively, and not used locally. These include:
 - Super phosphate 39% manufactured by ICM in Gabès, with a capacity of 100,000 tons per year.
 - Granular phosphate 26% made by GRANUPHOS in Sfax, having a capacity of 60,000 tons per year.
 - Monoammonium phosphate (MAP) containing 55% P₂ O₅ and 10.5% nitrogen, produced by the Fertilizer Company of Gabès at a rate of 100,000 tons per year.

* Nitrogen fertilizers

Only ammonium nitrate (otherwise known as "ammonitre" or "AN") containing 33.5% N is used in Tunisia. SAEPA in Gabès has been manufacturing it since 1983 and can produce 300,000 tons per year.

* Potassium Fertilizers

These are represented in Tunisia by nitrate, chloride, and primarily potassium sulfate, all of which are imported. A Southern Chemical Industries Company (SICS) project involving annual production of 100,000 tons of potash beginning in 1988 by processing brine available in Zarzia now seems to have been abandoned.

b. Terms of sale manufacturers extend to the STEC

The selling prices SIAPE (producing TSP) and SAEPA (manufacturing AN) charge STEC, exclusive distributor for these companies, are understood to be loaded on rail car (50-kg bags) and ex works (Sfax or Gabès).

These prices change on a quarterly basis and represent the average FOB price of the exports shipped by these firms during the three preceding months. To this price is added customs duties on inputs which have been imported to produce these fertilizers (basically sulfur and liquid ammonia), and which are thus allocated for consumption.

All deliveries from SIAPE and SAEPA to the eight STEC warehouses or its major intermediaries (20-ton minimum) are shipped by rail.

SAEPA supposedly gives STEC 90-day credit terms (the same terms as it extends its export customers), while SIAPE gives STEC only 30 days for the amount STEC bills its customers, and 90 days for the amount it collects subsequently as compensation paid by the Ministry of National Economy (MEN) General Compensation Fund (CGC)¹

3. Importer-Distributors

a. History

During the period from 1970 to 1980, SIAPE handled its own marketing for its product (TSP) locally through wholesalers and retailers. At that time, the Tunisian Chemical Fertilizers Company (STEC), a parastatal for-profit trading company, distributed its SSP production and a portion of the TSP manufactured by SIAPE in the same way, also importing AN.

During the same period, AN was also imported, primarily from the National Industrial Nitrogen Office (ONIA) in France by two

¹ See Paragraph e below: "Terms of Sale Extended to Intermediaries."

private firms, Fertilizer and Chemical Company of Megrine (SEPCM), which during that period was already the exclusive importer of products from the Potassium and Nitrogen Trading Company (SCPA), which has since become the Absace Potash Company, and Tunisian Industrial Chemical and Fertilizer Company (STIPCE). However, these two private firms were forced to leave this business, apparently because of the long periods CGC required to pay them (in these dealings, compensation was intended to offset their cost prices, which were greater than the sales prices set by the Ministry of National Economy, to which the CGC belongs). Consequently, since the early 1980's, STEC has enjoyed a de facto monopoly for the distribution of the local AN production by SAEPA in Gabès (since it began production in 1984), and TSP manufactured by SIAPE in Sfax, in addition to its own production of SSP and two complete fertilizer formulas, physical mixtures it produces in Djebel Djelloud (Tunis). This de facto monopoly was confirmed in May 1981 by a decision of the Ministry of Mines and Energy (the Ministry that supervises fertilizer-producing companies belonging to the Chemical Group).

It must be emphasized that, until the beginning of this decade, CGC paid subsidies directly to SIAPE for local TSP production.

SEPCM is now limited to the annual importation of several thousand tons of unsubsidized potassium fertilizers from SCPA. It distributes the latter itself, plus small quantities of complete fertilizers, physical mixtures that it formulates in Megrine (Tunis) using this potassium, plus TSP and AN bought from STEC at the intermediary price of 510 tons for DT 30,610 in 1987/88).¹ SEPCM also owns a unit to produce complete fertilizers using phosphates from its tripolyphosphate factory in Gabès in which ICM, Unilever and UBCI have holdings. Operations at this plant in Megrine, built in 1975 by Austrian firm VEOST Alpin (a DT 750,000 investment), were shut down in 1984.

STIPCE now operates as an STEC intermediary (467 tons for DT 38,535 cash in 1987-88).² Palliser, a pesticide importer, also serves as an intermediary for STEC fertilizers (1,711 tons for DT 125,880, 68% of which was sold on credit in 1987/88).⁴ STEC, SEPCM and STIPCE are also pesticide importers and producers. SEPCM also distributes light agricultural equipment, mainly sprayers, in Tunisia under a licence from Berthoud (France). In 1984¹, STEC was the market leader in plant health products, with a 41% share and revenues of DT 2.9 m, ahead of the SEPCM, whose share was estimated at 20% (DT 1.4 m), and ten other firms, including STIPCE, all of

¹ 12 months ending August 31, 1988.

² 12 months ending August 31, 1988.

which are private.¹

Consequently, given this monopolistic situation, the following fertilizer marketing analyses at the importer/distributor level will focus on STEC alone.

b. Business Organization of the STEC

Three departments are under the direct authority of STEC's President and Managing Director (PDG): the General Technical Administration (DGT) in Djebel Djelloud (JJ) (a southern suburb of Tunis), the General Commercial Administration (DGC) and the Administrative and Finance Department (DAF) (under the authority of the Secretary General). The PDG, DGC and DAF are headquartered at rue Khartoum in Tunis.

The DGT manages the JJ fertilizer warehouse in addition to its industrial activity (production of SSP, a mixture of complete fertilizers, and formulation of pesticides). It has overseen the construction of seven warehouses in the interior of the country and still supervises maintenance for these warehouses.

DGC has two administrations, the Pesticides Administration (DP) and the Fertilizer Administration (currently vacant), as well as the sales office (BDV) located on avenue de Carthage in the heart of Tunis. The DGC is also responsible for managing the seven warehouses in the interior.

The analytical accounting division is located in JJ.

Thirty-five of the 203 permanent positions within the firm are involved in fertilizer distribution:

- 9 (7 managers and 2 workers) are based in the seven domestic warehouses;²
- 25 (7 managers and employees plus 18 workers) are engaged in fertilizer distribution at the JJ warehouse³, except SSP⁴ and

¹ For the 1987 fiscal period, STEC's revenues for pesticides reached DT 6.0 m for DT 34.8 m of fertilizers, generating a cash flow of DT 0.582 m (9.7% of pesticides revenues) and DT 0.936 m (2.7% of fertilizer revenues), respectively.

² 45,228 tons in 1987.

³ 24,823 tons in 1987.

complete fertilizers¹ manufactured at the same site;

1 supervisor for the seven warehouses in the country's interior is posted at the DGC in Tunis. Furthermore, in 1987, more than 23 man-years were used in the six interior warehouses in the form of occasional workers (48,810 hours of work at the rate of 2,080 hours per worker per year).

c. STEC Distribution Means

Until 1984, STEC distribution resources were limited to a warehouse in Djebel Djelloud (Tunis) at the same site as its plant producing SSP and complete fertilizer mixture.

In 1982, the Ministry of National Economy (MEN) assigned STEC the task of setting up a fertilizer and pesticide warehousing and distribution network throughout the country to compensate the fertilizer supply problems farmers were experiencing at cereal planting time (October/November). To carry out this project, STEC obtained a DT 3.3-m loan from the European Investment Bank (BEI)², allowing it to increase its storage capacity in Djebel Djelloud and to build seven new warehouses in the North (6 warehouses)³ and center (1 warehouse)⁴ between 1984 and 1987 (see map A 4-1 below).

According to the study conducted in 1985/86 by AGRER SA, NV (Brussels) on behalf of STEC and paid for by a gift from Commission of the European Communities (CCE) (see Bibliography, item 4), depending on the height of the stacking arrangement used, the overall capacity of the eight STEC warehouses may range from 24,000 tons (10 layers of 50 kg bags) to 64,000 tons (23 to 25 layers of bags and filled traffic aisles) per turnover.⁵

⁴ 33,461 tons in 1987, employing 10 man-years for production and 3 man-years for bagging and delivery.

¹ 1,836 tons in 1987.

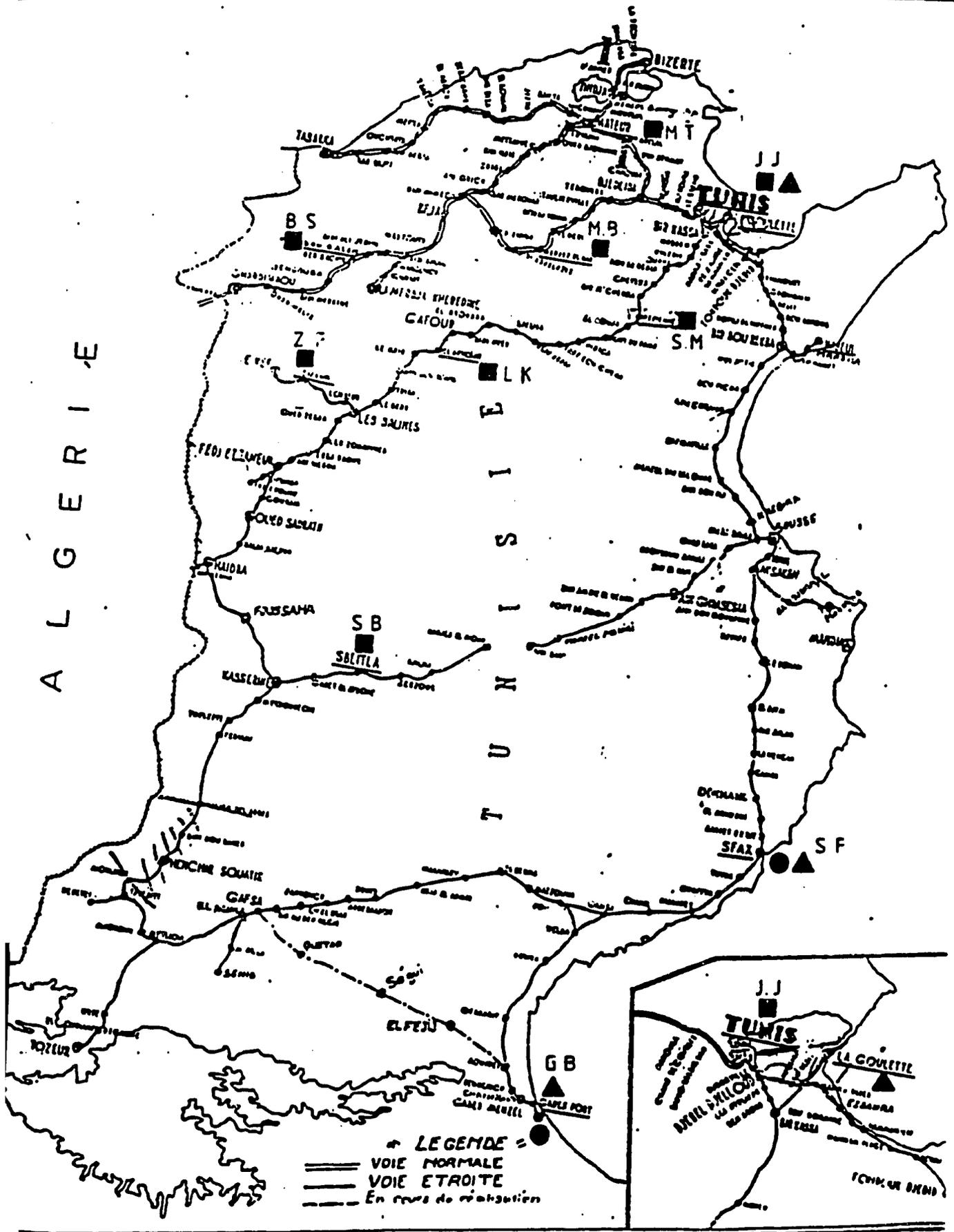
² Repayable in 12 years (November 1987 to May 1999 after a three-year grace period, for a total of DT 5.94 m (principal and interest) (see Bibliography, No. 4).

³ Mateur, Medjez-el-Bab, Lakhouat, Bou Salem, Zaafrane, and Sminja.

⁴ Sbeitla.

⁵ Under summer climate conditions in Tunisia, ten layers of bags should not be exceeded if fertilizers are stored for more than three months (consolidation of AN, deterioration of the plastic bags).

FIGURE A4-1: LOCATION OF STEC WAREHOUSES (8) AND SALES OUTLETS (2) ON THE SNCFT RAILROAD NETWORK (WIDE AND NARROW GAUGE)
 (See following page for abbreviations)



STEC Distribution Center
 STEC sales outlet
 Fertilizer Plant

**TABLE A 4-1: FERTILIZER STORAGE LOCATIONS AND CAPACITIES
BY TURNOVER AT THE EIGHT STEC WAREHOUSES**

LOCATIONS (GOVERNORATES)	SURFACE AREAS (M ²)		CAPACITIES (TONS)
	TOTAL	USEFUL	
Djebel Djelloud (Tunis)	3,400	3,090	4,600 to 10,440
Lakhouat (Siliana)	2,150	1,750	2,360 to 6,680
Mateur (Bizerte)	3,200	2,550	4,080 to 10,240
Medjez-el-Bab (Béjà)	2,720	2,095	2,880 to 8,580
Bou Salem (Jendouba)	2,690	2,140	2,940 to 8,480
Zaafrane (El Kef)	2,260	1,810	2,480 to 6,920
Smindja (Zaghouan) ¹	2,690	2,140	2,940 to 8,480
Sbeitla (Kasserine)	1,455	1,185	1,680 to 4,440
TOTALS	20,565	16,760	23,960 to 64,2601
% m ² of total surface area	100	81	
Capacity per m ² of total surface area:			1.2 to 3.0 tons
Capacity per m ² of useful surface area:			1.4 to 3.8 tons

Source: AGRER Study (See Bibliography, no. 4)

The locations of these warehouses are shown in Figure A 4-1 above.

STEC also has two more sales outlets (PDV) in the southern part of the country at the plants of Granuphos in Sfax, and SAEPA in Gabès.

N.B.: The following abbreviations are used on map A 4-1 to designate STEC warehouses and sales outlets in the SNCFT network.

BS = Bou Salem
cdd = Distribution center = STEC warehouse
JJ = Djebel Djelloud
GB = Gabès
LK = Lakhouat

¹ The figures given for Sminja are estimates, since this warehouse had not yet been built at the time of the AGRER study.

MB = Medjez el Bab
MT = Mateur
SB = Sbeitla
SF = Sfax
SM = Sminja
ZF = Zaafrane

Furthermore, fertilizer storage capacities in private companies, which, according to the agricultural inputs supply master plan prepared in March 1984 by SWEDFARM¹, amounted to 4,000 m² for 12,000 tons of fertilizer in Megrine² (SEPCM), and 2,000 m², also in Megrine (STIPCE), are now used for other activities, but could be partially recovered if needed.

d. STEC Trade Policy

Despite its eight warehouses in the North and central parts of the Tunisian Republic and its two sales outlets in the South, STEC's commercial activity is centralized at its sales office (bdv) on avenue de Carthage in the center of Tunis. All customers must go there to place orders, whether this involves pick-up at the Djebel Djelloud warehouse or at the seven interior warehouses (credit sales), or delivery to the destination station. The orders are then sent to STEC headquarters on rue Khartoum in Tunis where they are telexed to suppliers (SIAPE/Granuphos in Sfax and SAEPA in Gabès). Interior warehouses and sales outlets can still fill cash sales orders (at the same price level as free destination station sales).

STEC also bypasses its own intermediary network by delivering directly to approximately 700 public, parastatal³, and private consumers representing nearly 23,000 tons and generating revenues of nearly DT 1.5 m⁴ for the twelve months ending August 31, 1988. Intermediaries receive no direct compensation (e.g., commissions) for these direct sales, and are thus injured.

STEC sales policy makes no provisions for attracting new customers, even though, as a result of the company's compensation

¹ See Bibliography, no. 2.

² At the beginning of the 1970's, SEPCM was importing about 20,000 tons of AN per year from ONIA (France), and national annual demand was approximately 60,000 tons per year.

³ In addition to these 700 consumer accounts, there are 66 consumers who profit wrongfully from intermediary status, including OEP, OTD, ONH, and UCPs.

⁴ Or nearly 7% of its revenues during this period.

system (the operating deficit is offset by compensations paid by the Public Treasury through CGC), STEC obviously stands to gain by increasing its sales, since this would primarily allow it to cover its amortizations. Indeed, warehouse managers do not seem to have any commercial responsibilities in the regions they serve. Thus, they do not canvass their potential customers, any more than do the commercial departments under the authority of the headquarters (including the sales office); the latter limit their activities to visiting the public organizations in Tunis when invitations to bid are issued (almost exclusively for pesticides). Two technical and trade managers assigned to the Tunis sales office travel outside the capital to see pesticide customers, since STEC does not hold a monopoly in this sector as it does for fertilizers. However, they may answer questions regarding the use of fertilizers.

STEC does not organize or sponsor training programs on management, product information, fertilizer use or storage techniques for intermediaries marketing its product line (fertilizers or pesticides). However, it does have considerable audio-visual materials on the subject, supplied by IDFC, FAO and CCE.

Furthermore, STEC, SIAPE and SAEPA have no agricultural departments to instruct farmers and prescribers (CRDAs, CTVs, OMVs, etc.) in the use of fertilizers in general and the use of their products in particular.

No systematic relations seem to exist between STEC, SIAPE and SAEPA on the one hand, and the public fertilizer use research organizations (INRAT, INAT, and soil analysis laboratories) or those involved in agricultural extension (MINAG CTVs, OMVs, etc.). For example, STEC does not appear to be involved in the creation or follow-up of demonstration and information workshop program OC and CRDAs organize for farmers each year. This program includes several hundred demonstration plots (varieties, fertilizers use, chemical weed killing, etc.) located on the farms in all the cereal-producing governorates in the country.

However, AGRER, SA¹ established a promotional strategy in 1986 to expand STEC's commercial activity. None of the recommendations established during this period appear to have been adopted, whether regarding demand monitoring and market information, firm organization and methods reform (trade promotion, warehouse and intermediary network personnel training and support), commercial strategy, optimization of storage capacity use, personnel policy, or the follow-up and evaluation of results. At that time, objectives for the expansion of fertilizer and pesticide sales were

¹ See Bibliography, no. 4, Vol. II, pp. 277 to 416, as well as Appendix 5 below, which summarizes these recommendations.

proposed to make this promotional strategy profitable, while allowing Tunisian agricultural production to benefit from an increased use of inputs in general, and of chemical fertilizers in particular.¹

e. Terms of Sale SETC Extends to Intermediaries.

Rates

The price schedule for fertilizers SETC markets now includes three levels:

- An intermediary price (wholesalers and retailers) delivered free on rail cars at the customer's destination station, known as the "works selling price," for quantities of at least 20 tons and for multiples of 20 tons (capacity of a rail car compartment);
- An intermediary price (wholesalers and retailers) loaded on the client's road vehicle at an SETC warehouse, known as the "SETC distribution center selling price," which includes the costs of transfer to the warehouse.

However, SETC applies the Free destination station price indifferently to all of its customers who enjoy the intermediary price even for pick-ups at its warehouses and deliveries to customers at the Sfax and Gabès outlets.

Credit

The payment terms SETC extends to its customers range from 60 to 90 days interest free; of course, the costs of bank notes are reflected. These terms are extended according to the customer's payment history in prior transactions. For example, OC enjoys 90-day credit terms for all of its purchases, while CCGC, SETC's second largest customer, receives virtually no credit (DT 35,140 out of DT 1,433,989 worth of annual purchases as of August 31, 1988, or 2.4%), and its number three customer, COCEBLE, receives no credit at all (see Table A4-3). The same applies to its two largest private retailer-intermediaries (RDP), respectively paying 99% and 98% of their total fertilizer purchases in cash, amounting to 410,660 (4,120 tons) and DT 360,462 (3,670 tons) in 17/88¹.

¹ 12 months ending on August 31, 1988.

**TABLE A 4-2: BREAKDOWN OF STEC FERTILIZER SALES
ON CREDIT DURING THE TWELVE MONTHS ENDING ON AUGUST 31, 1988**

STEC CUSTOMER CATEGORIES	STEC SALES		% ¹	PERCENTAGE	
	TOTAL (DT)	ON CREDIT (DT)		OF TOTAL SALES (%)	OF CREDIT SALES (%)
Warehousing Organizations ²	7,713,120	5,323,911	69	36	78
OMVs ³	1,146,692	223,331	19	5	3
RDPs ⁴	9,222,543	957,942	10	43	14
CSAs ⁵	1,668,060	117,898	7	8	2
State and Parastatal Consumers ⁶	964,539	78,699	8	6	1
Private Consumers	510,508	106,198	21	2	2
TOTALS	21,225,462	6,807,979	100	100	100
% OF TOTAL STEC SALES	100%	32%		CH. JH - 11/21/88	

Sources: Prepared using data supplied by STEC.
(See the detailed analysis of these sales in Table A4-3.)

¹ % of sales on credit compared to total sales.

² OC, CCGC, COCEBLE

³ OMVVM, OMVPI, OMIVAN, and OMIVA.

⁴ Private retail intermediaries and SEPCM.

⁵ Agricultural Service Cooperatives.

⁶ OEP, OTD, ONH, UCP, and CRDA.

According to this table, in 1987/88¹, 32% of the STEC fertilizer revenues were credit sales and 78% of these sales went to warehousing organizations (OC in particular), accounting for only 36% of its sales. Private intermediary-retailers (RDP), which make up the most sizeable category of STEC customers (43% of its sales), obtained only 14% of the total credit extended by the STEC.

Delivery

STEC does not deliver its products. Customers must pick them up from the rail car at the destination station, or loaded on road vehicles (belonging to the customer or transport company) from STEC warehouses.

f. STEC Financing Needs

STEC's short-term ongoing financing needs are approximately DT 16 million.

For the 1987 fiscal year, for a sales volume of DT 40,877 m, DT 34,861 m of which were for fertilizers (including SSP and complete fertilizers)², the company's assets as reflected on December 31, 1987 balance sheet included:

DT 5,992,640 of inventory (including raw materials and packaging);

DT 11,322,838 in third-party accounts, including DT 5 m in customer accounts and over DT 6 m outstanding from the State (taxes and fees to be reimbursed amounting to DT 2.33 m and compensation in arrears owed by the CGC, for a total of DT 3.7 m).

¹ Twelve months ending on August 31, 1988.

²

	<u>m DT</u>
The balance consisted of pesticides formulated in JJ	4,589
pesticides imported and resold as is	1,427
Total pesticides	<u>6,016</u>

TABLE A4-3: SUMMARY TABLE OF FERTILIZER SALES TO 1,116 STEC CUSTOMER ACCOUNTS
IN TONNAGES AND REVENUES, IN CASH AND ON CREDIT, FROM
SEPTEMBER 1, 1987 to AUGUST 31, 1988

CLIENTS	SALES FOR CASH		SALES ON ACCOUNT		TOTALS	
	QUANTITIES (t)	AMOUNTS (DT)	QUANTITIES (t)	AMOUNTS (DT)	QUANTITIES (T)	AMOUNTS (DT)
Cereals Office	100	10,200	51,417	5,288,771	51,517	5,298,971
CCGC	13,378	1,398,849	340	35,140	13,718	1,433,989
COCEBLE	9,420	980,160	0	0	9,420	980,160
OEP	1,857	190,749	0	0	1,857	190,749
OTD	5,075	576,984	366	37,694	5,441	614,678
OMVVM	3,035	311,785	1,185	168,141	4,220	479,926
OMVPI	1,976	202,962	355	40,570	2,331	243,532
OMIVAM	890	91,320	0	0	890	91,320
SEPCM	0	0	510	30,610	30,610	30,610
ONH	0	0	378	39,274	378	39,274
OMIVA	2,873	313,174	0	0	2,873	313,174
OMIVA	40	4,120	129	14,620	169	18,740
CSA	17,370	1,550,163	1,276	117,898	18,646	1,668,060
UCP	1,099	118,108	0	0	1,099	118,108
Intermediaries	89,203	8,264,600	9,954	927,332	99,157	9,191,933
CRDA	0	0	7	1,731	7	1,731
CUSTOMERS	13,413	404,309	796	106,198	14,209	510,508
<hr/>						
TOTAL QUANTITIES	t.	159,729	66,713		226,442	
	%	70	30		100	
<hr/>						
TOTAL AMOUNTS	DT	14,417,433		6,807,979		21,225,462
	%		68	32		100

Source: STEC

TABLE A4-3 (BIS) CHANGE IN STEC SALES OF INPUTS (FERTILIZERS AND PESTICIDES) BY CATEGORY OF CLIENT FROM 1984 TO 1987/88 (SEPTEMBER 1, 1987 TO AUGUST 31, 1988), IN THOUSANDS OF DTS AND IN PERCENTAGE OF TOTAL ANNUAL SALES

	1984 *		1985 *		1986 *		1987/88 *		Fert. 87/88 (6)		Pest. 87/88	
	'000 DT	%	'000 DT	%	'000 DT	%	'000 DT	%	'000 DT	%	'000 DT	%
(2) Parastatal Warehousing Org.	not avail.		not avail.		not avail.		9,091	34.8	7,713	36.3	1,378	28.2
(2) Parastatal Agencies and Customers	not avail.		not avail.		not avail.		3,147	12.0	2,111	9.9	1,036	21.2
(1) and (2)	8,650	70.1	12,492	68.5	14,519	65.7	(12,238)	(46.9)	(9,824)	(46.2)	(2,414)	(49.4)
(3) Agric. Services Coops.	643	5.2	1,153	6.3	1,318	6.0	1,928	7.4	1,668	7.9	260	5.3
(4) Private Intermediaries	2,393	19.4	3,912	21.5	5,518	25.0	11,081	42.4	9,223	43.5	1,858	38.0
(5) Private Customers	652	5.3	679	3.7	709	3.2	864	3.3	510	2.4	354	7.3
TOTALS	12,338	100.0	16,236	100.0	22,112	100.0	26,111	100.0	21,225	100.0	4,886	100.0

Sources: Based on STEC data.

* Including fertilizers and pesticides

(1) Including OC, CCGC, and COCEBLE

(2) Including OEP, ONH, ONVs, OTD, UCPs, CRDAs, and Agricultural Development Associations

(4) Including sales to SEPCM for manufacture of complete fertilizers

(6) If, for fertilizers in 1987/88, ONVs are removed from heading (2), "Parastatal Agencies and Customers," and public and private customers are combined under (5), these customers account for about 25,000 t. or 1.5 m DT, which is 7% of the STEC sales volume (see Paragraph B.3.d.)

4. Intermediary-Wholesalers

a. Analysis of STEC Intermediary Accounts

The number of STEC customers profiting from the intermediary rate increased from 336 in September 1985¹ to 482 in August 1988 out of a total of 1,116 customer accounts². Analysis of these 482 intermediary accounts shows that 3 are intermediary-wholesalers (OC, CCGC and COCEBLE), 433 are intermediary-retailers and 46 are "stowaways" (parastatal consumers, such as the 28 OTD agricultural cooperatives, 15 UCPs and three agricultural development companies, wrongfully profiting from the intermediary rate). Out of the 443 probably real intermediary-retailers, 77 are likely to be cooperatives (CSAs and similar organizations) and 337, private intermediaries. A study conducted by STEC in May 1987 listed 10 development offices (OMVs), 53 CSAs, and 325 private organizations. However, as indicated by the fertilizer price schedule mentioned in the preceding paragraph, Tunisia makes no distinction between the wholesale and retail marketing levels. Thus, STEC's largest customer, the Cereals Office (OC), which purchased 51,517 tons of fertilizer from the STEC in 1987/88³ for a total of DT 5.3 m, paid the same unit price (intermediary) as the OTD of El Ittizaz, which during the same period picked up 2 tons of fertilizer at a price of DT 205³, or Mr. Hassan Bel Haj Yahia, who bought a half-ton for DT 57,500, still in 1987/88.³

It is obvious that organizations such as OC, CCGC⁴, COCEBLE and some development offices such as the OMVVM⁵ should be considered wholesalers and thus enjoy a more favorable rate because of the volumes handled (the first three) or of their method of distribution using sales outlets (all four). STEC's small customers, which are given the same intermediary rate, are actually retailers.

¹ See AGRER, SA Study, Bibliography, no. 4, Table 83, p. 384.

² The difference, i.e., 634 customers, is made up of private or parastatal customers (57% of the number of customer accounts), although they represent only 2.4% of the fertilizer revenues and 6.3% of the tonnage (see table A4-3).

³ Source: STEC, fertilizer sales by customer from September 1, 1987 to August 31, 1988.

⁴ Central Major Crop Cooperative.

⁵ Medjerda Valley OMV.

b. Intermediary-Wholesaler Commercial Organization

OC, CCGC, and COCEBLE resell fertilizers to their members through their regional branch offices, which thus act as sales outlets. Table A4-4 shows that in the cereal-producing areas in the north of the country, they have 112 sales outlets when the 27 sales outlets managed by the OMVVM are added.

These three organizations do not have specialized departments to manage and expand the use of inputs among their members. At OC, for example, the supply of inputs falls within the scope of Growing Season Preparation Administration.

On the other hand, OMVVM has a specialized organization that handles its accounting independently, the Supply and Credit Sub-Administration, which manages its 27 sales outlets in five governorates and markets more than 200 products (fertilizers, pesticides, seeds, livestock feed, and small agricultural tools and equipment). The Office intends to transform this sub-administration into a subsidiary with the participation of the farmers who can profit from investment bank credits and the benefits provided by the Agricultural Investment Promotion Office (APIA).

Other parastatal organizations also have intermediary resale networks, such as, for example, the Office for Forestry and Pastoral Development of the Northwest (ODESYANO), whose headquarters is located in Béjà, and whose 30 action centers primarily have an inputs sales warehouse. One agent handles the activities of 2 or 3 centers, and is under the authority of one of the Office branches. The inputs activity is placed under the authority of the Supply, Credit, and Marketing Administration.

c. Intermediary-Wholesaler Distribution Means

As mentioned above, 85 branches belonging to the three cereals warehousing organizations (see Table A4-4) have warehouses for storing cereals. The latter may theoretically also be used for fertilizers after the cereals are removed, i.e., generally not before September or October, while fertilizer storage should begin in June-July at the latest, so TSP spreading can begin in August.

Since 1984, the OC has used BIRD credits to build 14 warehouses with 500 and 1,000-ton capacities (125 m² and 250 m² respectively) representing an overall capacity of 12,000 tons intended for fertilizers. Unfortunately, they are probably being used as described above. OC could theoretically store approximately 40,000 tons of fertilizers in the northern cereal-producing region beginning in September-October, i.e., too late to beat the congestion in the railroads and to meet the needs for peak fertilizer sales (40% of the annual tonnage from September to November; see Table A4-5 and Figure A4-2), i.e., more than 100,000

tons annually. This congestion results principally from rail cars parked too long in the station in order to remove the cereal harvest, which coincides with the peak fertilizer supply.

However, at the request of the Ministry of Agriculture (MINAG), the OC establishes a 20,000-ton reserve fertilizer supply at the end of each growing season, composed of 50% AN and 50% TSP, to guarantee the start-up of the subsequent season. In practice, this inventory carry-over probably ranges from 3,000 tons to 40,000 tons (21,700 tons as of June 3, 1988), and required OC to move 4,000 tons of rotting fertilizers, the remains of previous growing seasons, at half price.

Citing a survey conducted in 1982 by the MINAG D/PV, SWEDFARM¹ counted 56 warehouses in northern Tunisia for OC, 11 for CCGC (now 13), and 12 for COCEBLE (now 16).

OC still has 31 collection centers in the central and southern parts of the country (63 in 1982 according to SWEDFARM) yielding a total theoretical fertilizer capacity of 1,440 tons; however, no fertilizers are habitually stored there.

However, it may be stated that even though the cereals warehousing organizations do not generally possess storage capacities intended exclusively for the storage of fertilizers, they do on the other hand have access to land in generally good locations (near rail stations, for example) where warehouses could be built.

As is the case for their storage sheds, the warehousing organizations use their vehicles² for fertilizers only if they are not used for cereals. They generally hire local transport services to replenish their sales outlets with fertilizers from SNCFT stations. Similarly, the warehousing organizations do not deliver fertilizers; farmers must pick them up at the sales outlets where they buy the fertilizers loaded on vehicles.

It must be emphasized that in cases where the private sector might be interested in taking over the fertilizer distribution business from parastatal warehousing organizations, the latter could not transfer their warehousing capacities without giving up their cereals-collection activity as well.

¹ See Bibliography, no. 2.

² The CCGC, for example, owns 11 semi-trailer trucks having a capacity of 185 tons (5 twenty-five-ton trucks and 6 ten-ton trucks) and 10 rail cars having a total capacity of 180 tons.

TABLE A4-4. KNOWN FERTILIZER WAREHOUSING CAPACITIES AND LOCATIONS (THEORETICAL)
OF THE PARASTATAL "WAREHOUSING ORGANIZATIONS" (INTERMEDIARY-WHOLESALEERS)

	OC		CCGC		COCEBLE		OMVVM		TOTALS	
	Number	t	Number	t	Number	t	Number	t	Number	t
BIZERTE	6	4,700	1	not avail.	2	not avail.	8	not avail.	17	4,700
TUNIS, ARIANA BEN AROUS	-	-	-	-	1	not avail.	10	not avail.	11	
NABEUL	9	6,900	-	-	-	-	-	-	9	
ZAGHOUAN	5	1,900 (1)	2	not avail.	2	not avail.	5	not avail.	13	
TOTAL NORTHEAST	20	13,500	3	not avail.	5	not avail.	23	not avail.	51	13,500
BEJA	9	7,000 (2)	4	not avail.	3	not avail.	4	not avail.	20	
JENDOUBA	8	3,000 (3)	2	not avail.	3	not avail.	-	-	13	
SILIANA	9	3,900 (4)	3	not avail.	3	not avail.	-	-	15	
LE KEF	10	12,900 (5)	1	not avail.	2	not avail.	-	-	13	
TOTAL NORTHWEST	36	26,800	10		11		4	not avail.	61	26,800
TOTAL NORTH	56	40,300	13	not avail.	16	not avail.	27	not avail.	112	40,300

Sources: Data furnished by OC, CCGC, COCEBLE, and OMVVM.

(1) of which 1 fertilizer warehouse was built with BIRD credit	1	-	, or 500 tons of capacity.
(2) of which 3 fertilizer warehouses were built with BIRD credit	2	2	, or 2,500 tons of capacity.
(3) of which 2 fertilizer warehouses were built with BIRD credit	1	1	, or 1,500 tons of capacity.
(4) of which 2 fertilizer warehouses were built with BIRD credit	1	1	, or 1,500 tons of capacity.
(5) of which 6 fertilizer warehouses were built with BIRD credit	-	6	, or 6,000 tons of capacity.
TOTAL: 14 fertilizer warehouses were built with BIRD credit	4	10	, or 12,000 tons of capacity.

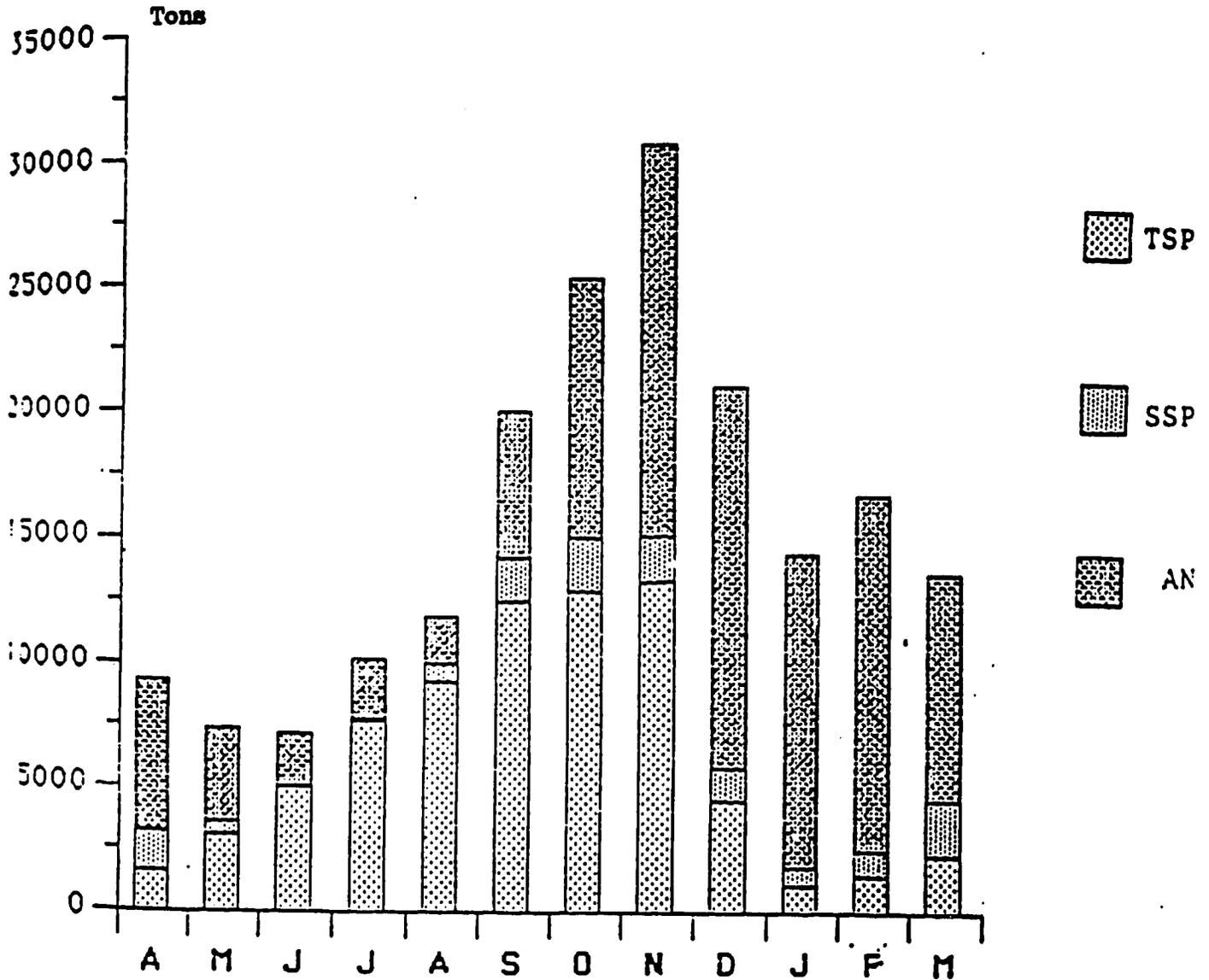
TABLE A4-5: 1980-85 MONTHLY FERTILIZER SALES (AN AND PHOSPHATE FERTILIZERS IN EQUIVALENT OF TSP), IN TONS PER YEAR AND MONTHLY AVERAGE 1980-85 (IN TONS AND PERCENT)

	80	81	82	83	84	85	1980-85 AVERAGES	
							t	%
J	5,682	6,298	8,004	12,150	26,358	28,122	14,435	7.7
F	10,019	16,205	19,532	8,710	22,575	22,876	16,653	8.9
M	11,198	15,762	15,049	17,452	11,259	10,976	13,616	7.3
A	8,326	15,428	6,443	8,509	7,406	9,779	9,315	5.0
M	10,937	8,293	9,003	5,476	5,615	4,888	7,369	3.9
J	6,517	9,037	10,318	6,529	5,561	4,995	7,159	3.8
J	6,651	11,569	6,683	6,545	19,958	9,599	10,167	5.4
A	5,758	11,452	12,744	6,485	18,759	14,712	11,652	6.2
S	14,861	16,862	21,382	18,111	18,377	30,153	19,958	10.6
O	12,099	23,460	21,874	37,084	20,695	36,695	25,318	13.5
N	22,527	21,335	32,240	35,028	36,345	37,000	30,746	16.4
D	21,441	15,883	25,661	11,898	24,015	27,351	21,041	11.2
TOTALS	136,016	171,585	188,933	173,977	216,923	237,146	187,430	100.0

Source: AGRER, SA Study, 1986 (see Bibliography, no. 4, p. 66)

CH JH/June 8, 1987

FIGURE A4-2: BREAKDOWN OF AVERAGE MONTHLY FERTILIZER SALES (AN, TSP, and SSP) FROM 1980 TO 1985, IN TONS (TSP AND SSP IN EQUIVALENT TSP TONS) (see detail in TABLE A4-5).



SOURCE: AGRER, SA, STUDY, 1986
(see Bibliography, no. 4, p. 67)

CH JH/June 8, 1986

d. Commercial Policy of the Intermediary-Wholesalers

Warehousing organizations view the sale of fertilizers and other inputs as a service they must render their members to enable them to increase production. However, they complain about the narrow distribution margin (DT 7.000 /ton for TSP and DAP, and DT 9.720/ton for AN), which allegedly does not allow them to cover their sales outlet costs (handling, finance costs for inventory and payment terms extended to their members) growing regularly with the price of fertilizers, while margins remain constant in absolute terms (see Table A4-12). Expressed as a percentage of the purchase price from STEC, margins fell between 1985/86 and 1988/89 from 14 to 9.5% for AN, from 12.6 to 6.9% for TSP and from 12.6 to 8.4% for SSP (see Table A4-12).

Consequently, OC's policy appears to be to withdraw from fertilizer distribution when private intermediaries or service cooperatives are organized effectively enough to take over this activity. It has implemented this policy in the Cap Bon region, where it no longer markets fertilizers and may soon do the same in the governorate of Bizerte, where STEC has a warehouse in Mateur and where the private sector appears to be especially active.

As another result of this apparent lack of profitability, warehousing organizations have adopted a static position. They limit themselves to meeting member demands, and have no sales organization strictly speaking, as mentioned above.

Sales Promotion

As mentioned above, each year, as it has for 20 years in conjunction with the MINAG Regional Agricultural Development Commissionerships, the OC Production Improvement Administration organizes workshops for farmers on 200 demonstration plots, particularly involving intensification factors influencing cereal growing. As indicated above, these tests and demonstrations do not appear to interest fertilizer suppliers (SIAPE, SAEPA and especially STEC), which could come away with important information for their commercial policy. Their participation in these activities would contribute to the promotion of their products, not only among farmers but also at the level of public (CRDAs, CTVs) and parastatal (OMV) services. They could sustain this knowledge through their network of intermediaries (CSAs, RDPs, etc.). This network should, of course, be informed in advance and constantly updated on fertilization needs for their regional crops, application methods, the choice of spreading equipment, the most effective types of fertilizers, etc.

Suppliers should also provide them and their intermediaries extension services with full technical information about their products, their performance in Tunisia and other countries to which they are exported, as well as documentation on the economical use

of the fertilizers under Tunisian agricultural conditions. For example, no agricultural/technical information appears to have been furnished by STEC or SAEPA for the promotion of DAP, which was recently launched on the Tunisian market.

Among the four intermediary-wholesale organizations cited, only the OMVVM appears to train its sales outlet personnel, for which it is trying to improve management. A multidisciplinary central training and recycling team (three engineers) under the authority of its extension service (more than 70 agents) is trying to remedy the insufficiency of baseline data in the area of fertilizer use.

e. Terms of Sale Intermediary-Wholesalers extend to Consumers

The distribution margins of the intermediaries have been liberalized as the result of a decision by the interministerial council of August 14, 1987, which the Ministry of Industry and Commerce made official during its August 25, 1987 meeting. However, the minutes of this meeting specify that "to avoid a slide in prices because of an improper interpretation relating to the liberalization of margins, it has been agreed...to maintain the absolute value of the distribution margins practiced...by the government organizations (OC, COCEBLE, etc.)....since private distributors are not affected by this measure to preserve the margins" (see Table A4-12).

While this measure may have had the effect of establishing a price ceiling in certain disadvantaged areas, prices charged by private intermediaries are still 1 to 2 DT/ton lower than those charged by the warehousing organizations, as observed in Mateur, Jendouba, Bou Salem and El Kef, for example, i.e., wherever demand is sufficient to attract several competitors. This trend was also observed during the survey conducted under the study of 13 intermediaries (see Annex 6, Table A6-1).

These findings, if applicable in general, need to be confirmed and followed up systematically through the "status quo survey" conducted annually by the MINAG General Agricultural Planning, Investment and Development Administration (DG/PDIA).

On the other hand, warehousing organizations extend significant payment facilities to their membership to remedy the lack of members' financial resources indicated above (Chapter I, Paragraph D. 5)¹, facilities that private intermediaries cannot afford to extend to their clients for more than several weeks.

¹ Chapter I: "Use, D: Future Outlook; 5: Some Related Measures."

As shown in Table A4-6, it is estimated that the four organizations mentioned above, which account for a total of about 38% (DT 8,869 m) of the value and 35% of the tonnage (78,875 tons) of national demand in 1987/88¹ (226,442 tons for demand estimated at DT 23.0 m at the intermediary level)², have made 40% of their credit sales payable at harvest time (or DT 3.6 m out of estimated revenues of DT 8.869 m)³. These DT 3.6 m represent about 16% of the credit needs for the 1987/88 growing season (estimated at DT 23.0 m).³

It is important to note that OC, which purchased more than DT 5 m worth of fertilizers on credit (90 days) from STEC in 1987/88 (see Table A4-3), is passing on only about DT 2 m (in a longer term, it is true) to farmers (see Table A4-6). On the other hand, CCGC and COCEBLE extend relatively sizable credits (DT 0.6 m and DT 0.95 m, respectively), although they receive almost none from the STEC.

The several weeks of credit some private intermediaries extend are probably granted to the 11% of private farmers³ who have access to institutional seasonal credit (BNT), a part of which should generally have been released after a delay of several weeks. As indicated in Table A4-3, private intermediary purchases from the STEC (DT 9.192 m of STEC's revenues, or 99,157 tons) may be estimated at approximately DT 9.95 m of revenues at the intermediary level², for which they obtained DT 0.927 m of credit (60 to 90 days) from STEC.

¹ September 1, 1987 to August 31, 1988.

² STEC revenues (DT 21.225 m; see Table A4-3) plus the gross weighted average margin for intermediaries, estimated at 8.26% based on 1985/86 STEC sales (tonnage), composed of AN (49%), TSP (37%), SSP (13%) and potash and the current intermediary margins recorded in the N.B. in A4-12.

³ 11% of the cereal-producing surface areas sown by the private sector not including to government agricultural companies (OTD's, UCP's, etc.).

TABLE A4-6: PAYMENT FACILITIES EXTENDED BY WAREHOUSING ORGANIZATIONS AND OMVVM TO THEIR MEMBERS

	Discounts for cash payment	SALES INVOLVING PAYMENT FACILITIES						
		annual total amount (m DT)	benefitting members	terms	% of the invoice cash	payment period	annual interest rate	
OC	not avail. (1)	2.0	35% of members (2) or 35% of sales (5)	- delivery of harvest (3) - no bank credits	25%	75%	harvest (4)	0
CCGC	- 2.5 DT/t	0.6 (5)	or 40% of sales				4 months	subsidized bank agricultural rate
COCEBLE	not avail. (1)	0.95 (5)	or 90% of sales	- delivery of harvest (3)	50%	50%	harvest (4)	subsidized bank agricultural rate
OMVVM	0	0.05 (5)	or 80% of farmers or 10% of sales				harvest (4)	6%
TOTALS		3.60 m DT or 40% of sales or 15.6 M of national demand						

N.B.: 50% of cereals is collected by OC, 30% by CCGC and 20% by COCEBLE.

- (1) "Not available."
- (2) Members holding the "customer card" (30% of members).
- (3) Those benefitting from favorable payment terms must deliver their harvests to the organization concerned, and, in the case of OC, must not have obtained bank credit.
- (4) The amount sold on credit is recovered from the harvest.
- (5) Calculated based on 1987/88 STEC sales (see Table A4-3) plus a weighted margin of 8.26% (see (6) below), or estimated revenues of DT 5.736 m for OC, DT 1.552 m for CCGC, DT 1.061 m for COCEBLE and DT 0.520 m for OMVVM, thus giving total revenues of DT 8.869 m for these four organizations out of domestic demand estimated at DT 23.0 m at the intermediary level (DT 21.225 m for STEC).
- (6) Calculation of the weighted margin per ton of fertilizer based on 1985/86 demands:
AN = 49% of the annual tonnage with a margin of 9.4%, or a contribution of 4.630% to the total average margin.
TSP = 37% of the annual tonnage with a margin of 6.86%, or a contribution of 2.538% to the total average margin.
SSP = 13% of the annual tonnage with a margin of 8.4%, or a contribution of 1.092% to the total average margin.

or 8.260% of the total average margin.

Sources: Prepared using OC, CCGC, COCEBLE and OMVVM data.

This DT 0.927 m made it possible in 1987/88 to cover only 4% of the demand for credit¹ to be added to the 16% furnished by the warehousing organizations. The DT 0.106 m of credit sales (60-90 days) granted by STEC for direct sales to consumers, or 0.5% of demand¹, i.e., a total of about 20% of fertilizer credit needs in 1987/88, must also be taken into account.

The size of the supervised credits² granted in kind to non-bankable farmers³ is unknown for fertilizers. APMANE, FIDA and CCCE project funds (DT 2.1 m in 1987/88) undoubtedly would have made it possible to cover needs for 7,400 farmers representing 80,000 hectares. An increase of DT 4.0 m in the USAID counterpart fund for the APMANE project should make it possible in 1988/89 to cover the short-term credit needs of 10,000 farmers cultivating 11,000 hectares. The ODESYPANO Project will participate in the financing of 2,600 tons of fertilizer⁴ in 1988/89, including 1,900 tons for farmers in the Northwest.⁵

¹ DT 23.0 m at the intermediary level (see note (3) on the preceding page.

² In particular, ARMANE/USAID (Northeast), FIDA (Le Kef, Siliana), CCCE, France (Jendouba), and ODESYPANO/BIRD (Northwest) Projects.

³ Because they are insolvent, and especially because they have no guaranties such as deeds, or because the latter are incomplete (apparently 75% of the time).

⁴ Purchased directly from STEC at the intermediary price, 50% in cash and 50% on 45- to 90-day credit terms.

⁵ The remaining 700 tons are intended for the forestry (200 tons) and rangeland (500 tons) components.

5. Intermediary-Retailers

a. Number and importance

As observed at the beginning of the preceding paragraph (B.4.a), the number of private intermediary-retailers (RDPs) that are STEC customers (fertilizers and pesticides) has probably grown from 325 (May 1987) to 337 (August 1988). The number of service cooperatives and similar organizations grew from 53 to 77 units during the same period. In addition, 46 customer-consumers (particularly agricultural complexes, UCPs, and agricultural development associations) that benefit unfairly from the intermediary rate, must be counted.

Table A4-3 (A) shows clearly that the size of the RDPs and, to some extent, of the agricultural service cooperatives (CSAs), has done nothing but increase in recent years. In fact, in just over three years (from 1984 to 1987/88), their shares of STEC input sales (fertilizers and pesticides) expressed in terms of revenues have grown from 19.4 to 42.4% and from 5.2 to 7.4%, respectively. For the twelve months of fertilizer sales ending August 31, 1988, RDPs constitute STEC's largest customer category (since 1985)¹, with 43.5% of sales, expressed in terms of revenues, compared to 36.3% for warehousing organizations, 9.9% for authorities (OMVs, OMVPIs, OEP, ONH, etc.) and other parastatal consumers (OTDs and UCPs), 7.9% for CSAs, and 2.4% for direct sales to private consumers (see Table A 403 (A)).²

During the same period (1987/88), fertilizer purchases by the largest RDPs amounted to revenues of DT 0.36 to 0.41 m for 3,670 to 4,120 tons, i.e., nearly the same level as for OMVVM (DT 0.48 m for 4,220 tons). Figures for the largest CSAs range from DT 0.10 m to 0.20 for 1,435 to 2,530 tons. The classification of intermediary-retailers by size, as provided in Table A4-7, demonstrates that while the leading RDPs are larger than CSAs, the companies that make up these two groups are comparable in size, on the average. Indeed, as listed in Table A4-7, intermediaries marketing more than 1,000 tons per year include:

- 4 CSAs representing a total of 7,677 tons for DT 0.616 m³, or an average of 1,920 tons DT 0.154 m in revenues³ per CSA marketing more than 1,000 tons;

¹ See AGRER study, Bibliography, no. 4, pp. 379 to 384.

² If the OMVs are removed from the "consumers" heading and if public and private consumers are combined, yielding DT 1.5 m or 7% of STEC's revenues, as reported in Paragraph B.3.d.

³ Purchase price from STEC.

- 29 RDPs representing a total of 52,813 tons for DT 4,856 m, or an average of 1,821 tons and DT 0.167 m in revenues² per RDP marketing more than 1,000 tons;

For intermediary-retailers marketing less than 1,000 tons per year, still with respect to Table no. A 4-7:

- Average tonnages marketed per intermediary are 150 tons by the 75 CSAs, yielding an overall figure of 10,969 tons, as for the 308 RDPs that account for a total of 46,344 tons;

- Average revenues¹ amount to DT 0.014 m per CSA (DT 1,052 m for 73 CSAs) and per RDP (DT 4,336 m for 308 RDPs);

- The 77 CSAs plus comparable organizations and the 337 RDPs combined amount to 284 tons and DT 0.026 m in revenues¹ per intermediary.

When these figures are compared to those of various Asian countries (see Table A4-8) taken from a study conducted by FADINAP², Bangkok and cited by Chemonics International, Washington in Philippines Fertilizer Sector Study, March 1988³ the following observations can be made:

- Average tonnage distributed by Tunisian RDPs (294 tons) falls far behind that of countries such as Malaysia (740 tons), Pakistan (590 tons), is close to that of the Philippines (373 tons) and is larger than that of India (140 tons) and Sri Lanka (29 tons);

- Average volumes distributed by the Tunisian CSAs (242 tons) is low in comparison to Malaysian cooperatives (665 tons), is ahead of India (140 tons) and far exceeds Sri Lanka (11 tons).

It may further be observed that the average tonnages distributed by warehousing organization intermediary centers (878 tons) is higher than that of similar organizations in Malaysia (701 tons), but is especially higher than Sri Lanka (80 tons). It may perhaps be concluded that the regional distribution of CSAs and RDPs is probably adequate (should a study of their economic viability confirm this fact), while the distribution of warehousing organizations is probably too sparse. Even then, an investigation should obviously be carried out to determine whether the geographical coverage of sales outlets of these intermediary-wholesalers is adequate.

¹ Price of purchase from STEC.

² Fertilizer Advisory Development and Information Network for Asia and the Pacific.

³ See Bibliography, no. 9.

**TABLE A4-7: BREAKDOWN OF INTERMEDIARY-RETAILERS BY TONNAGE
MARKETED AND REVENUES (STEC PURCHASE PRICE LEVEL)
DURING THE 12 MONTHS ENDING ON AUGUST 31, 1988**

VOLUME (TONS/YR)	CSAs AND COMPARABLE ORGANIZATIONS ²					RDPs ¹				
	Nb ³	VOLUMES tons	%	REVENUES m DT	%	Nb	VOLUMES tons	%	REVENUES m DT	%
>4,000	0	0				1	4,120		0.411	
2,901 to 4,000	0	0				1	3,671		0.360	
1,901 to 2,900	2	4,973		0.390		8	19,543		1,852	
1,000 to 1,900	2	2,704		0.226		19	25,479		2,233	
Ss tot. > 1,000	4	7,677	41	0.616	37	29	52,813	53	4,856	53
Ss tot. < 1,000	73	10,969	59	1,052	63	309	46,344	47	4,336	47
TOTALS	77	18,646	100	1,668	100	337	99,167	100	9,192	100
Averages per CSA		242		0.022						
Averages per RDP ⁴							294		0.027	

Average per
CSA + RDP = 284 tons and 0.026 m DT Ch. J. H. 11/20/1988

Source: Prepared based on data furnished by the STEC.

¹ RDPs = private intermediary-retailers.

² CSAs and comparable organizations: agricultural service cooperatives and similar cooperatives (e.g. wine-producing cooperatives, but excluding UCPs).

³ Nb = number.

⁴ Or 414 CSAs and RDPs accounting for a volume of 117,803 tons and an STEC purchase price of DT 10.86 m.

**TABLE A4-8: COMPARISON OF THE AVERAGE TONNAGES
OF FERTILIZERS DISTRIBUTED ANNUALLY IN VARIOUS ASIAN COUNTRIES
AND IN TUNISIA BY INTERMEDIARY-RETAILERS**

	NUMBER OF INTERMEDIARIES	VOLUME DISTRIB. (tons)	VOL. DISTRIBUTED BY INTERMEDIARY (tons)
Malaysia 1981/82			
Government Organizations	559	393,000	701
Cooperatives	218	145,000	665
Private	500	370,000	740
	<u>1,277</u>	<u>907,000</u>	<u>710 [sic]</u>
% of total sales (1,037,000 tons)		87%	
India 1986/87			
Cooperatives	54,510		
Private	101,230		
	<u>151,740 [sic]</u>	<u>21,593,400</u>	<u>140</u>
% of total sales		100%	
Pakistan 1986/87			
Private	2,400	1,400,000	590
% of total sales		100%	
Philippines 86/87			
Private	2,562	956,350	373
% of total sales		100%	
Sri Lanka 1979			
Government organizations	380	28,700	80
Cooperatives	4,500	48,900	11
Private	500	79,700	145
	<u>5,410</u>	<u>157,300</u>	<u>29 [sic]</u>
% of total sales		100%	
TOTALS	167,391	25,014,050	149

**TABLE A4-8: COMPARISON BETWEEN AVERAGE TONNAGES OF
FERTILIZERS IN VARIOUS ASIAN COUNTRIES AND IN TUNISIA
BY INTERMEDIARY-RETAILERS (continued)**

<hr/> <u>Tunisia 1987/88¹</u>			
Warehousing organizations ²	85	74,655	878
CSAs and comparable organizations ³	77	18,646	242
RDPs ⁴	377	99,157	294
	<hr/> 499	<hr/> 192,458	<hr/> 385
% of total sales (226,442 tons)		85%	

Sources: Prepared based on data furnished by FADINAP, Bangkok and cited by Chemonics International, Washington, in Philippine Fertilizer Sector Study, March 1988 (see Bibliography, entry 9).

b. Geographic Distribution of Intermediary-Retailers

The regional distribution of the 482 STEC customer accounts benefitting from the intermediary rate as of August 31, 1988, and among these, the 337 RDPs and 77 CSAs and similar organizations was not assessed in 1988. Distribution figures for September 1985 and May 1987, compared in Table A4-9, show that the number of intermediary-retailers grew most spectacularly in the central and southern portions of the country (from 74 to 110). This increase of 36 units appears to be due almost exclusively to private sector credit efforts. The majority of this is reportedly composed of intermediaries that handle pesticides for vegetable crops and tree farming, also distributing fertilizers. These affirmations, which come from STEC, should be verified by a statistical study.

¹ 12 months ending August 31, 1988.

² 85 OC, CCGC, and COCEBLE sales outlets.

³ Agricultural Services Cooperatives and similar organizations (e.g. wine-producing cooperatives), but not including UCPs.

⁴ Private intermediary-retailers.

**TABLE A4-9: CHANGE BETWEEN SEPTEMBER 1985 AND MAY 1987
IN THE GEOGRAPHICAL DISTRIBUTION OF STEC CUSTOMER ACCOUNTS
(PESTICIDES AND FERTILIZERS)
BENEFITTING FROM THE INTERMEDIARY RATE**

GOVERNORATES	SEPT. 1985			MAY 1987			
	Nb	%	%	OMV _S Nb	CSA _S Nb	RDP _S Nb	TOTALS Nb % %
TUNIS PLUS							
ARIANA AND							
BEN AROUS	83			0	3	81	84
NABEUL	96			1	14	80	95
ZAGHOUAN	2			0	1	0	1
BIZERTE	52			0	6	54	60
NORTHEAST	233			1	24	215	240
		69					62
BEJA	7			0	1	10	11
JENDOUBA	13			0	0	21	21
SILIANA	6			1	1	2	4
LE KEF	3			0	0	2	2
NORTHWEST	29			1	2	35	38
		9					10
NORTH	262			2	26	250	272
		78					72
CENTER AND							
SOUTH	74			8	27	75	110
		22					28
TUNISIA	336			10	53	325	388
		100					100

Source: September 1985: AGRER Study¹, May 1987, prepared based on data provided by STEC.

CH. J. H. 11/21/88

¹ See AGRER Study, Bibliography, no. 4, Table 83, p. 384.

c. Principal Activities of intermediary-retailers

While the activities of the CSAs are well-known, those of the RDPs are not. It would seem, however, that virtually no one engages solely in fertilizer distribution. Those who market only inputs are in the minority, and are generally established on the irrigated perimeters and the mixed-farming regions. As in many countries, fertilizer distribution seems to expand in Tunisia as a complement to other bulk product activities because of its seasonal nature and low profitability. Thus, RDPs can most generally be described as construction materials intermediaries that also sell fertilizers. Among fertilizer intermediaries, we also find a good deal of merchants whose main activities are in hardware, spare parts, equipment, tools (agricultural or otherwise), petroleum products, etc.

Of course, these assumptions need to be confirmed and quantified.

d. Retailer-intermediary means of distribution

Little is known about fertilizer storage capacity at the intermediary-retailer level. In 1984, SWEDFARM¹ estimated that, of a projected demand of 420,000 tons in 1988², (STEC delivered 226,442 tons during the 12 months ending August 31, 1988), the storage capacity at the intermediary level needed to be as much as 133,000 tons³, distributed among 99 warehouses yet to be built (see Table A4-10). As listed in Table A4-4, only 14 of these warehouses, having an overall capacity of 12,000 tons, have been built in OC collection centers. Using these norms, approximately 80,000 tons of storage capacity requiring DT 3 m in investment

¹ See Bibliography, no. 2.

² i.e.,

AN	190,000 tons	
TSP	176,000 tons	> 366,000 tons
Potash	54,000 tons	
	<hr/>	
	420,000 tons	

³ Or 77 warehouses having surface areas of 125 m², each capable of handling 1,100 tons of fertilizer annually, i.e., 84,700 tons, and 22 warehouses having surface areas of 250 m² that can handle 2,200 tons each, i.e., 48,400 tons, amounting to an annual total of 133,100 tons.

should now be available.¹

¹ According to the SWEDFARM norms (see Table A4-10), storage of 250 m²/1000 tons of fertilizer must be allowed, or 20,000 m² of warehouse space for 80,000 tons of fertilizer per year, at an investment rate of DT 150 per m² (see Chapter III, Paragraph D.1 and D.3.b).

**TABLE A4-10: GEOGRAPHIC DISTRIBUTION OF STORAGE CAPACITIES
TO BE BUILT FOR FERTILIZER AT THE INTERMEDIARY LEVEL,
AS RECOMMENDED BY SWEDFARM IN 1984**

GOVERNORATES	NUMBER OF CENTERS			TOTALS		
	125 m ² (500 t)	250 m ² (1,000 t)	MOBILE (3 t)	NUMBER OF CENTERS	WARE- HOUSES IN M ²	MOBILE CENTERS IN TONS
TUNIS + ARIANA + BEN AROUS	2	0	0	2	250	0
NABEUL	5	1	0	6	875	0
ZAGHOUAN	1	3	0	4	875	0
BIZERTE	4	3	0	7	1,250	0
NORTHEAST	12	7	0	19	3,250	0
BEJA	6	3	0	9	1,500	0
JENDOUBA	7	0	0	7	875	
SILIANA	3	5	1	8	1,625	3
LE KEF	5	2	1	7	1,125	3
NORTHWEST	21	10	2	31	5,125	6
NORTH	33	17	2	50	8,375	6
SOUSSE	3	0	1	3	375	3
MONASTIR	3	0	0	3	375	0
MAHDIA	7	0	0	7	875	0
SFAX	4	1	0	5	750	0
KAIROUAN	5	1	2	6	875	6
KASSERINE	5	1	1	6	875	3
SIDI BOUZID	7	0	0	7	875	0
CENTRAL	34	3	4	37	5,000	12
GABES	2	0	1	2	250	3
GAFSA	4	1	1	5	750	3
KEBILI	1	0	1	1	125	3
MEDENINE	1	0	1	1	125	3
TATAOUINE	2	1	1	3	500	3
TOZEUR	0	0	1	0	0	3
SOUTH	10	2	6	12	1,750	18

**TABLE A4-10: GEOGRAPHICAL DISTRIBUTION OF STORAGE CAPACITIES TO
BE BUILT FOR FERTILIZER AT THE INTERMEDIARY LEVEL
AS RECOMMENDED BY SWEDFARM IN 1984 (continued)**

CENTER AND SOUTH	44	5	10	49	6,750	30
TUNISIA	77	22	12	99	15,125	36

Ch. J. H 11/21/88

Source: Prepared based on data from SWEDFARM, Bibliography, no. 2, p. 84.

Transport capacities available to intermediary-retailers were not assessed. However, it is probable that, while they are virtually non-existent in the CSAs, they are sizable with respect to RDPs, especially those whose main activity is the distribution of construction materials. In this case, fertilizer is a complementary activity that makes their businesses, especially their transportation equipment, more profitable.

Some RDPs have several sales outlets, generally located in towns that are smaller, but in which competition is less intense than it is where they opened their first sales outlets. A more in-depth study of this sector may shed more light on these trends.

e. Intermediary-Retailer commercial policy

No assessment was conducted to prepare the latest profiles of RDPs, and commercial policy at this level of fertilizer distribution cannot be described based on just a few interviews with several of them.¹ According to these RDPs, however, we can generally say that they probably have less of a wait-and-see attitude than the warehousing organizations, in the sense that they call on their largest customers and give some of them price breaks, deliver products, and take the risk of extending credit without securing guaranties on the harvest.

The greatest concentrations of RDPs have grown up in the richest and most active agricultural regions (the vicinities of Tunis, Cap Bon, Mateur, Medjez-el-Bab, Beja and Bou Salem, for example). However, decentralization may already be taking place, as has been happening since the 1970's in the Cap Bon region (see Table A4-9): some RDPs are even setting up new sales outlets in promising areas and/or where competition is less intense and prices are thus higher. This strategy also enables some to increase the

¹ See Annex No. 6.

profitability of their delivery vehicles.¹

In some remote areas, we would presumably find small merchants who own vehicles and supplement their return cargo with fertilizers when they go to an area that has a fertilizer sales outlet.

It should further be noted that RDPs that market pesticides are not exclusive customers of the STEC; they also distribute pesticides from other importers. The same situation exists for fertilizers where SEPCM markets its potash and the complete fertilizers it mixes in Megrine (mainly Cap Bon and vegetable growing areas).

f. Intermediary-Retailer terms of sale

As reported, the liberalization of intermediary distribution margins (see Paragraph B.4.e)² has not led to an increase in the price of fertilizers to the public as had been feared. On the contrary, it would seem that RDPs often charge ex warehouse prices DT 1 to 2 per ton lower than those of the warehousing organizations. On the other hand, although some RDPs extend several weeks of credit to their customers, they still cannot compete in this area with the payment facilities cereal warehousing organizations can extend to their members at harvest time. As indicated above (see Paragraph B.4.e)², supplier credits (60 to 90 days) obtained by RDPs during the 12 months ending August 31, 1988 covered only 10% of their purchases (DT 0.927 m compared to STEC's revenues of DT 9.92 m). In turn, this DT 0.927 m represents only 9.3% of the estimated revenues of the RDPs³ and consequently of the needs in terms of their customer credit needs. As pointed out in Paragraph B.4.e², supplier credit STEC extended to some of them in this capacity to cover part of their purchases is probably passed on to the 11% of the farmers waiting for institutional seasonal

¹ For example, an intermediary in Cap Bon who bought nearly 3,700 tons of fertilizer from STEC during the 12 months ending August 31, 1988 has a 120-ton convoy (eight 5.5 to 25-ton vehicles) for his own construction materials business, which he can use to deliver fertilizer (permit from the Ministry of Mines on production of a business license from the Ministry of Finance and authorization to sell fertilizer from MINAG and CRDA).

² Paragraph B.4.e. "Terms of Sale Intermediary-Wholesalers Extend to Consumers."

³ Or DT 9.95 m if the average weighted gross margin for intermediaries is estimated at 8.26% (see NB in Table A4-12).

credit from BNT.¹

C. MARKETING COSTS AND MARGINS

The following analysis of fertilizer marketing gross margins (costs and net margin) in Tunisia in general, and of gross distribution margins in particular, is based on data obtained for 1987:

- From STEC for the distributor/importer level;
- From the warehousing organizations (OC, COCEBLE and CCGC) for wholesalers and retailers, which, as observed, are lumped together in Tunisia.

Marketing costs and margins in Tunisia will subsequently be compared to those of the Asian countries cited in a study conducted by FADINAP in 1985/86 and updated by Chemonics at the end of 1987.²

First of all, it must be explained that the fertilizer selling price schedule is established every year by the General Compensation Fund (CGC), a Sub-Administration of the Ministry of National Economy (MEN), the Ministry of Finance and the Ministry of the Plan. They also forecast STEC's marketing cost price. Since this price is greater than the prices on the schedule, CGC, responsible for national management, advances STEC funds equal to the difference between the forecasted costs (calculated based on this cost price forecast times the tonnage sold) and the forecasted amounts to be billed by STEC. At the end of the fiscal period, CGC pays STEC the balance of its real deficit upon production of supporting documents (supplier, transport and other service invoices).

Fertilizers are still indirectly subsidized downstream from STEC at the level of the OC, whose losses are also covered by the central government, if, as the warehousing organizations claim, the gross distribution margin they are allowed is insufficient and should be as high as 15% of the purchase price to cover their distribution costs³, which have remained constant in absolute value since 1985/86 (see Table A4-12) [sic]. These assertions could not be verified because none of the warehousing organizations keep real analytical accounting records.

¹ 11% of the cereal-producing surface areas sown by the private sector outside of the agricultural public sector (OTDs, UCPs, etc.).

² Bibliography, no. 9.

³ Or nearly twice the current weighted average margin of 8.6% (see Table A4-12).

Distribution costs downstream from STEC are thus unreliable and had to be estimated, since they are difficult to identify because of the wide variety of activities these organizations pursue. For example, the OC handles the collection, warehousing, transport and importing of cereals, production of cereal seeds, importing and distribution of various seeds, supply of inputs, agricultural tests and demonstrations, etc.

a. Importer/Distributor Gross Margin (STEC)

The analysis of STEC's operating accounts during the 1987 fiscal period, summarized in Table A4-11, reveals that the gross margin per ton of fertilizer (marketing costs plus net margin) was DT 22,263 per ton before income tax, DT 11,655 per ton before all taxes and fees, and DT 7,644 per ton before all taxes, fees and amortizations for the 208,515 tons¹ of fertilizer STEC sold in 1987. These amortizations are a particularly heavy burden (DT 4,011 per ton) because of the high level of investment STEC approved for the construction of the seven warehouses intended for storing reserve stocks.

Indeed, if these costs and margins are broken down among the delivery methods used by STEC, as provided in Table A4-11, we observe that it cost the following:

- DT 16,722 (before income tax) in 1987 to sell one ton of fertilizer delivered to the customer free to destination station with no transit through other warehouses (138,499 tons in 1987);
- In comparison with DT 23,830 if delivered from the old Djebel Djelloud center (JJ) in Tunis (24,820 tons) in 1987;
- DT 38,311 if transited (45,300 tons in 1987) through one of the seven new warehouses in the country's interior.

Or an average of DT 22,263 per ton for the 208.515 tons STEC sold in 1987 as mentioned above. Before all taxes, fees and amortization, it cost STEC respectively DT 5,925; DT 14,466 and DT 9,156 in 1987 to sell one ton of fertilizer using these three delivery methods (with DT 7,644 per ton as the weighted average, as mentioned above).

b. Comparison of the Tunisian gross margin with those of other countries

STEC's gross margins for fertilizer marketing (costs plus net margin) (distributor level) and OC's (estimated) (intermediary

¹ Not including SSP, complete and potassium fertilizers.

level) are provided in Table A4-13 for AN and TSP. Converted into dollars, these margins are compared to those of different Asian countries, as prepared by FADINAP and updated by Chemonics¹ (Tables A4-14 and A4-15).

This comparison shows that the gross margin is higher in Tunisia than in most of the other countries (except in the Philippines in 1985/86).

The high taxes, fees and customs duties collected in Tunisia, as in the Philippines in 1985/86, are largely responsible for this high margin (see Table A4-15). Exclusive of taxes and fees (\$US 58.21 per for AN and \$US 53.65 per ton for TSP), they fall in line with the gross margins of the other countries in which the duties and taxes are generally non-existent or much lower (except in the Philippines in 1985/86).

Storage and bagging costs are also higher in Tunisia than everywhere else.

Because of these higher costs, the net margins appear to be smaller in Tunisia than in most of the other countries.

¹ See Bibliography, no. 9.

TABLE 24-11: GROSS MARKETING MARGIN (3) ON FERTILISER DELIVERED BY STFC IN 1987 FROM THE DJEBEL DJELLOUD WAREHOUSE (JJ) AND SEVEN NEW RURAL WAREHOUSES, FREE DESTINATION STATION, INCLUDING SUCPT TRANSPORT AND BEFORE TAXES ON PROFITS

(4) DELIVERY METHODS	EX JJ WAREHOUSE		EX 7 RURAL WAREHOUSES		EXCLUDING TRANSIT TO WAREHOUSE		TOTALS		
	DT	DT/T	DT	DT	DT	DT/T	DT	DT/T	DT/T
(5) TONNAGES	24,823		45,288		138,404		208,515		
(6) TOTALS BEFORE TAXES AND DUTIES	592,786	23.830	1,735,051	38.311	2,314,363	16.722	4,642,200	22.263	26.86
(7) TOTALS BEFORE TAXES AND DUTIES	359,090	14.466	1,226,011	27.071	845,105	6.106	2,430,206	11.655	14.86
(8) TOTALS BEFORE TAXES, DUTIES, AND AMORTIZATIONS	359,090	14.466	416,641	9.156	820,385	5.925	1,593,036	7.644	9.22
(9) PACKAGING USED	7,068	0.284	10,700	0.236	-	-	17,776	0.085	0.10
(10) SPARE PARTS AND EXPENDABLE MATERIALS	1,685	0.068	1,835	0.040	-	-	3,520	0.017	0.02
(11) LABOUR, SUPPLIES AND EXTREMAL SERVICES	6,680	0.349	4,920	0.109	95,242	0.680	108,050	0.522	0.63
(12) TRANSPORT AND TRAVEL	639	0.026	1,412	0.031	15,223	0.110	17,274	0.083	0.10
(13) MISC.: OFFICE SUPPLIES AND UTILITIES	465	0.029	1,410	0.025	97,230	0.703	98,943	0.474	0.57
(14) OPERATING FINANCE COSTS: (NOT INTEREST FOR FINANCING OF INVENTORY)	66,471	2.672	110,606	2.619	332,000	2.406	510,085	2.485	3.00
(15) PERSONNEL (SALARIES, SOCIAL SECURITY)	211,513	8.905	99,360	2.194	602,420	4.353	923,301	4.420	5.34
(16) INDIRECT TAXES AND DUTIES	213,156	8.570	471,040	10.401	1,390,176	10.102	2,002,412	9.987	12.05
(17) MISC. OVERHEAD	-	-	-	-	47,940	0.346	47,940	0.230	0.28
(18) (CASH FLOW)	(164,061)	(6.595)	(391,322)	(8.641)	(286,558)	(2.070)	(841,941)	(4.030)	(4.87)
(19) AMORTIZATIONS	-	-	246,319	5.439	25,000	0.180	271,319	1.301	1.57
(20) FINANCE COSTS (INVESTMENT INTEREST)	-	-	565,051	12.477	-	-	565,051	2.710	3.29
(21) DIRECT TAXES AND DUTIES	-	0.024	30,000	0.639	71,002	0.514	129,502	0.621	0.75
(22) HEADQUARTERS EXPENSES	52,561	2.113	176,652	3.901	-372,066	-2.681	-141,053	-0.680	-0.82
(6) TOTALS BEFORE TAXES AND PROFITS	592,786	23.830	1,735,051	38.311	2,314,363		4,642,200	22.263	26.86

Source: Prepared using the STFC Profit and Loss Account for the 1987 fiscal year. Analytical breakdown of costs and results.

CH.J.H. November 9, 1988

- (1) 1987 exchange rate used: \$US DT @ 0.026 or DT @ \$
- (2) SUCPT transport costs (0.027 DT/ton excluding VAT for AN and 7.700 DT/t for TSP) are listed in Tables 24-13 and 24-14 under heading (a) "transport," while the transport VAT is listed under (f) "taxes and customs duties," at a rate of 13.64% (it has fallen to 6% since June 1988).
- (3) Gross marketing margin = marketing cost plus net margin.
- (4) Marketing costs for the three STFC delivery methods:
 - AN + TSP + DAP business activity from Djebel Djelloud Center (Tunis),
 - AN + TSP + DAP business activity from the seven new interior warehouses,
 - Free destination station = AN + TSP + DAP headquarters and sales office (avenue de Carthage) business activity from Gabès and Sfax works with delivery on railroad cars at destination station.
- (5) Tonnares of AN, TSP and DAP.

- (6) Total costs and margins before taxes of profits.
- (7) Total costs and margins before taxes on profits and direct and indirect taxes and duties.
- (8) Item 7, before amortizations and financial costs on investments (BRI/BMO) loan for construction of the seven rural warehouses.
- (9) STFC rebagging at the eight warehouses (including JJ) of deliveries of 70,111 tons (JJ = 24,823 tons and the seven other warehouses = 45,288 tons), or 0.254 DT/t instead of 0.085 DT/t, as indicated by the total.
- (10) Taxes on production, revenues, and VAT since July 1, 1988.
- (11) Attendance tokens, contributions and gifts.
- (12) Amortizations on seven new interior warehouses.
- (13) Municipal taxes on industrial and commercial buildings.
- (14) Management and commercial, financial, and administrative departments.

TABLE A4-12: EVOLUTION FROM 1985 TO 1988 OF GROSS MARGINS FOR FERTILIZER DISTRIBUTION AT THE INTERMEDIARY LEVEL, EXPRESSED IN DT/TON AND IN PERCENTAGE OF THE PURCHASE PRICE CHARGED BY STEC

	1985/86	1986/87	1987/88 1988/89
AN			
PUBLIC SELLING PRICE	78,550	84,055	112,730
PURCHASE PRICE AT STEC	68,820	74,325	103,000
INTERMEDIARY'S MARGIN			
MARGIN	9,730	9,730	9,730
MARGIN IN % OF PURCHASE PRICE	14.13%	13.09%	9.45%
TSP			
PUBLIC SELLING PRICE	62,400	73,480	109,000
PURCHASE PRICE AT STEC	55,400	66,480	102,000
INTERMEDIARY'S MARGIN			
MARGIN	7,000	7,000	7,000
MARGIN IN % OF PURCHASE PRICE	12.63%	10.5%	6.86%
SSP			
PUBLIC SELLING PRICE	35,220	41,470	50,950
PURCHASE PRICE AT STEC	31,270	37,524	47,000
INTERMEDIARY'S MARGIN			
MARGIN	3,950	3,946	3,950
MARGIN IN % OF PURCHASE PRICE	12.63%	10.5%	8.4%
DAP			
PUBLIC SELLING PRICE			116,000
PURCHASE PRICE AT STEC			109,000
INTERMEDIARY'S MARGIN			
MARGIN			7,000
MARGIN IN % OF PURCHASE PRICE			6.42%

NB: The weighted margin per ton of fertilizer can be calculated based on the distribution of annual demand, for example, in 1985/86, a reasonably typical year: 49% of the annual tonnage was composed of AN; 37%, TSP; 13%, SSP; and 1% potash, making the following contributions to the total average margin:

Margin for AN:

$$9.45\% \times 0.49t = 4,630\% \text{ or } DT 9,730/t \times 0.49t = DT 4,768$$

Margin for TSP:

$$6.86\% \times 0.37 t = 2.538\% \text{ or } DT 7,000/t \times 0.37t = DT 2,590$$

Margin for SSP:

$$8.40\% \times 0.13t = 1.092\% \text{ or } DT 3,950/t \times 0.13t = DT 0.513$$

i.e., a total of 8.26% of the purchase price or DT 7,871 per weighted ton of fertilizer in 1985/86.

Ch.J.H/11/15/88

D. ORGANIZATION OF PUBLIC SERVICES

If we exclude the parastatal companies in the Chemical Group engaged in fertilizer production and marketing, the only public organization directly and exclusively handling agricultural input coordination and administration is the Agricultural Input Control Service (SCIA) which is under the authority of the General Agricultural Production Administration (DG/PV) of MINAG.¹

SCIA's current responsibilities include coordination of input consumption forecasts, following up their application and monitoring inventory levels while the growing season is in progress. SCIA is also in charge of the coordination of input quality and marketing control. In this area, it is now developing legislation covering fertilizers similar to the laws in existence for pesticides, for example, and is coordinating the issuance of input sales authorizations.

DG/PV arrondissement chiefs are responsible for the execution

¹ Of course, with the exception of INRAT research departments, soils, plant health and seeds laboratories. SCIA is composed of two sections, one dealing with fertilizers, pesticides and seeds, and the other with agricultural equipment. Its personnel is based in Tunis at MINAG headquarters on rue Alain Savary.

of the tasks in the field (especially weekly stock checks in the warehousing organizations and fertilizer sales authorizations).

TABLE 14-13: 1987 STYC AND OC TOTAL COSTS AND GROSS MARKETING MARGINS FOR
AN AND TSP, IN DT/T AND US DOLLARS (DT @ US\$ 1.266)

	AN				TSP			
	STYC	OC	TOTALS		STYC	OC	TOTALS	
	DT/T	DT/T	DT/T	US\$/T	DT/T	DT/T	DT/T	US\$/T
TOTAL COSTS								
1. Product cost	82.799		82.799	99.88	110.776		110.776	133.63
2. Gross marketing margins	58.567	9.730	68.297	82.38	55.320	7.000	62.320	75.18
3. Total cost			151.096	182.26			173.104	208.81
4. Public prices	112.730		112.730	135.98	109.000		109.000	131.88
5. Subsidies (3 - 4)			38.366	46.28			64.104	77.33
BREAKDOWN OF GROSS MARKETING MARGINS								
a. transport	8.827	2.050	11.677	14.09	7.700	2.050	10.630	12.82
b. warehousing	5.506	n/a	5.506	6.4	5.506	n/a	5.506	6.66
c. bagging	12.233	n/a	12.233	14.76	12.233	n/a	12.233	14.76
d. handling	1.941	1.100	3.041	3.67	1.941	1.100	3.041	3.67
e. material losses	0.228	n/a	0.228	0.27	0.228	n/a	0.228	0.27
f. taxes and customs duties	20.040	n/a	20.040	24.17	17.840	n/a	17.840	21.53
g. inventory finance costs	2.405	-	2.405	3.00	2.405	n/a	2.405	3.00
h. advertising and sales promotion	-	n/a	-	-	-	n/a	-	-
i. miscellaneous	3.269	n/a	3.269	3.94	3.269	n/a	3.269	3.94
j. net marketing margins:			(9.818)	(11.88)			(7.088)	(8.55)
- importer-distributors	4.038		4.038	4.87	4.038		4.038	4.87
- wholesalers		5.700	5.700	6.97		3.050	3.050	3.68
- retailers								
2. GROSS MARKETING MARGINS	58.567	9.730	68.297	82.38	55.320	7.000	62.320	75.18

Source: Prepared based on OC and STYC data (see Table 14-11).

STYC COSTS

1. STYC purchase price from SIAPK (TSP) and SARP8 (AN) ex plants (Sfax and Gabès), excluding taxes and customs duties.
2. Gross margin = marketing costs and net margin
 - a. Transport: see "1987 Compensated Merchandise Price Schedule" (STYC document)
 - b. Warehousing: see Table 14-11, items (11), (12), (13) and (17) minus (d) handling, below = DT 108,850 + 17,274 + 98,943 + 921,301 + 47,955 - 48,187 = DT 1,148,146 for 218,515 tons = 5.506 DT/ton.
 - c. Bagging: see Table 14-11 for TSP: bagging and cost of bags = DT/t 5.000 + 7.229 = 12.233 DT/t, including costs of bags (0.361 DT/t).
 - d. Handling: see November 3, 1988 interviews at JJ with Mr. Amar Dequenzi. In 1987, 38,488 hours for reception and deliveries of fertilizer at 1.200 DT/hour = 46,185 DT + 2,001 DT (38,488 hours x 0.52 DT per HR) = 48,186 DT for 24,823 tons (JJ sales of TSP, AN and OAP), or 1.941 DT/t.
 - e. Losses: see November 3, 1988 interview with Mr. Dequenzi: packaging used for an amount of DT 7,868 (JJ) + 18,708 (6 distribution centers) = 17,776 DT corresponding to delivered tons 24,823 (JJ) + 45,288 (7 distribution centers) = 70,111 tons, or 0.254 DT/t (plus 3.73% of tonnage) + 0.864 DT/t of OC losses reimbursed by STYC = 0.228 DT/t.
 - f. Taxes, levies and customs duties: see Table 14-11, items (16) and (21), indirect taxes and duties at 9,987 DT/t + direct taxes and duties at 0.621 DT/t = 10,608 DT/t plus customs duties (see 1987 Compensated Merchandise Price Schedule) at 0.274 DT/t for AN and 0.041 DT/t for TSP + VAT at 1.158 DT/t on SUCFY shipments, giving a total of 20.860 DT/t for AN and 17.840 DT/t for TSP.

OC COSTS

- g. Finance costs: see Table 14-11, item (14), "Operating Finance Costs" of 2.405 DT/t.
- j. Marketing margins: see Table 14-11, item (18), "Cash Flow."
- k. Miscellaneous: see Table 14-11, item (22): "Headquarters Expenses" calculated at JJ and seven distribution centers for management and sales department costs, or DT 52,561 for 24,823 tons (JJ) and DT 176,652 for 45,288 tons (7 distribution centers), giving a total of DT 229,213 for 70,111 tons = 3.268 DT/t.
- a and d. Transport and handling: see October 19, 1988 interviews with Messrs. H. Koonbaa and A. Ghoul: transport at 2,050 DT/t over 30 km and handling = 1,100 DT/t.
- e. Losses: see November 7, 1988 interview with Mrs. Touari of STYC: SUCFY losses billed by OC to STYC, which deducts them from its average annual revenues: AN from 1981 to 1986 = 71.36 tons, giving 4,949 DT; TSP for the 1986/87 season = 57.78 tons, amounting to 3,966 DT; Average annual total = 8,915 DT for 129.86 tons out of 138.985 tons delivered in 1987, ex station = 0.862 DT/t.
- g. Inventory finance costs: supposedly have interest-free line of credit for cereals and fertilizers.
- j. Wholesaler and retailer margins = difference between public prices (4) and intermediary prices (see Table 14-12), minus the preceding items (a) "transport" (2.050 DT/t), (b), (c), (d) "handling" (1,100 DT/t), (e), (f), (g), (h) and (i), were they available (n/a).

TABLE 14-14: COMPARISON OF FERTILIZER TOTAL COSTS AND GROSS MARKETING MARGINS IN DIFFERENT ASIAN COUNTRIES (URSA IN 1985/86 AND IN 1987) AND IN TUNISIA (AP AND SEP IN 1987), IN US\$ PER TON

	PHILIPPINES		NEPAL	SOUTH KOREA	SAUDI ARABIA	THAILAND	INDIA		INDONESIA		MALAYSIA	TUNISIA	
	PRIVATE SECTOR 1985/86	PUBLIC SECTOR OCT. 1987	PUBLIC SECTOR	PRIVATE SECTOR	PUBLIC SECTOR	PRIVATE SECTOR	PRIVATE SECTOR	AP	SEP				
TOTAL COSTS													
1. PRODUCT COST (CIF IMPORTS)	170.12	97.29	95.00		115.00	170.00							
2. PRODUCT COST (FOB LOCAL PRODUCT)				262.10			256.53	232.52	90.77	130.00	120.00	99.00	133.63
3. GROSS MARKETING MARGINS	130.10	39.10	65.30	51.15	43.32	59.52	55.43	51.29	64.93	36.35	65.35	82.30	75.10
4. TOTAL COSTS	300.30	136.47	160.30	313.25	158.32	229.52	311.96	283.81	155.70	166.35	173.35	182.26	208.81
5. PUBLIC PRICES	250.00	136.47	107.32	279.94	109.72	229.52	190.13	190.13	111.91	0.00	166.00	135.90	131.40
6. SUBSIDIES (3-4)	50.30	0.00	0.00	33.31	50.00	0.00	121.83	93.68	43.79	166.35	0.00	46.20	77.33
MARGINS OF GROSS MARKETING MARGIN													
a. Domestic transport	7.50	10.50	29.00/a1	11.64	5.70	6.67	22.25	10.93	29.31	4.00	10.00	14.09	12.02
b. Warehousing	1.71	1.46/b1	0.75	4.04	0.92	3.40	2.75	2.75	3.19	2.50	3.50	6.64	6.64
c. Bagging	0.00	13.90/c1	0.00	0.12	0.00	0.52	7.69	7.69	0.00	0.00	0.00	14.76	14.76
d. Handling	2.00	1.00	0.00	2.07	0.63	7.01	1.94	1.94	5.30	0.96	0.96	3.67	3.67
e. Material losses	2.70	0.00	0.65	0.06	0.67	1.70	1.54	1.54	0.00	1.20	1.20	0.27	0.27
f. Taxes, levies and customs duties	50.67	0.92	1.20/f1	0.00	10.63	0.25	/f2	/f2	0.70	0.00	0.00	21.17	21.53
g. Inventory finance costs	15.60	4.70/g1	7.60	22.10	0.04	1.42	2.02	2.02	12.12	12.90	12.69	3.00/g2	3.00/g2
h. Advertising and sales promotion	0.00	0.00	0.00	0.00	0.15	n/a	0.00	0.00	0.00	0.00	0.00	0.00	0.00
i. Miscellaneous costs	2.00	4.14/i1	7.04/i2	0.00	4.70	7.00/i3	5.91	5.91	0.20	0.00	0.00	3.94/i4	3.94/i4
j. Net margins (40.00)	(40.00)	(2.40)	(9.06)	(9.52)	(11.00)	(17.00)	(11.32)	(10.51)	(13.95)	(6.00)	(9.00)	(11.01)	(8.55)
- Importer-distr.	15.00		0.00	0.00	6.00	1.37	0.00	0.00	0.00	0.00	5.00	4.07	4.07
- Wholesalers	15.00	2.40	0.00	1.30	0.00	6.95	0.00	0.00	7.60	6.00	2.00	6.97	3.60
- Retailers	10.00		9.06	7.62	5.00	9.56	11.32	10.51	5.37	0.00	2.00		
GROSS MARKETING MARGINS	130.10	39.10	65.30	51.15	43.32	59.52	55.43	51.29	64.93	36.35	65.35	82.30	75.10
EXCESSIVE RATE	211.00	20.15	102.30	100.00	102.30	102.30	102.30	102.30	102.30	102.30	102.30	102.30	102.30

/a1 Also including shipping and unloading costs.
 /b1 Including only storage costs at coastal warehouses.
 /c1 Also including cost of bags.
 /f1 Documentary credit opening cost.
 /f2 Only payment of local taxes, which range from 2.7% to 5%, is required for fertilizers.
 /g1 Including all bank costs.
 /g2 Exclusive of amortisations and finance costs.
 /i1 Administrative and sales costs.
 /i2 Administrative costs.
 /i3 Also including documentary credit opening costs.
 /i4 STFC headquarters expenses (management and sales department).
 /j Gross marketing margin.

Sources: FADIRAP, Bangkok, July 1987 for 1985/86 data.
 FFA, Manila, and Bibliography, no. 9 for October 1987 data on the Philippines.
 Costs in Tunisia were determined using STFC data and were taken from Table A4-13.

TABLE A4-15: COMPARISON OF FERTILIZER TOTAL COSTS AND GROSS MARKETING MARGINS IN DIFFERENT ASIAN COUNTRIES (INDIA IN 1985/86 AND 1987) AND IN TUNISIA (AM AND TSP IN 1987), IN US DOLLARS PER TON AND IN PERCENT.

COUNTRY	SECTORS (sectors)	PRODUCT COSTS		MARKETING COSTS US\$/t	NET MARKETING MARGINS/a US\$/t	GROSS MARKETING TOTAL COSTS		PERCENTAGE OF TOTAL PRODUCT COSTS				
		CIF IN-PORTS US\$/t	LOCAL PRODUCTION (FOB) US\$/t			US\$/t	US\$/t	COST OF MARKETING (%)	NET MARKETING MARGINS a/ (%)	GROSS MARKETING MARGINS b/ (%)	(%)	(%)
INDIA	Public		256.53	46.11	31.32	55.43	311.96	16.14	-	3.63	11	17.77
	Private		212.52	40.70	10.51	52.29	263.81	14.37	-	3.78	10	16.07
INDONESIA	Public		90.77	50.90	13.95	64.93	155.70	32.37	(1.05)	0.96	3	41.70
MALAYSIA	Public		130.00	30.35	6.00	36.35	166.35	18.24	-	3.61	12	21.05
	Private	120.00		36.35	9.00	45.35	173.35	20.97	-	5.19	8	26.16
NEPAL	Public	95.00		56.32	9.06	65.38	160.38	35.12	(0.75)	5.65	7	40.77
PHILIPPINES	Private	170.12		90.10	40.00	130.10	300.20	29.25	(19.0)	12.97	2	42.23
	Private	97.29		34.06	2.40	36.46	133.83	25.45	(0.7)	1.05	13	27.30
SOUTH KOREA	Public		262.20	41.63	9.52	51.15	51.15	81.39	-	10.61	1	16.30
SET LANKA	Public	115.40		33.44	11.00	45.32	160.72	20.81	(6.7)	7.39	5	20.20
THAILAND	Private	170.00		41.64	17.00	59.52	229.52	18.14	(1.0)	7.79	4	25.30
TUNISIA	Public AM		99.00	70.64	11.04	82.30	182.26	30.70	(13.3)	6.50	6	45.20
	TSP		133.63	66.63	0.55	75.10	200.81	31.90	(10.3)	4.09	9	36.00

Ch. 38/November 14, 1988

a/ Cumulative net margins (importer-distributors, wholesalers and retailers).

b/ Gross margins = costs + net margins = sums of the two preceding columns.

c/ Taxes, levies and customs duties as percentage of total costs.

Sources: FARINAP, Bangkok, July 1987 (excluding the Philippines in Oct. 1987 and Tunisia).

FPA, Manila, and Bibliography, no. 9 for October 1987 data on the Philippines.

Tunisian costs were determined based on STDC data already cited in Tables A4-13 and A4-14.

ANNEX 5

**Summary of the Recommendations of the Technical Assistance
Project from CCE, AGRER, SA to STEC
to improve its management and expand its sales of inputs
(fertilizers and pesticides), August 1985-September 1986
(see Bibliography, no. 4, pp. X and XI and 16-20).**

**LIST OF ABBREVIATION USED IN THE FOLLOWING PAGES
OF THE AGRER, SA REPORT**

(AN)	"Ammonitre" (33.5% ammonium nitrate)
(BNT)	National Bank of Tunisia
(CA)	Revenues
(CCE)	Commission of European Communities
(CDC)	Tunisian-Belgian Project to Consolidate Crop Protection
(CDD)	Distribution Center (STEC)
(CEE)	European Economic Community [EEC]
(CH CDD)	CDD Chief
(CTV)	MINAG, D/PV Territorial Extension Unit
(DAF)	Department of Administration and Finance (STEC)
(DAF) [sic]	Diammonium phosphate
(DE)	Fertilizer Administration (STEC)
(DGC)	General Commercial Administration (STEC)
(DGT)	General Technical Administration (STEC)
(DP)	STEC Pesticides Administration
(D/PSAE)	Planning Administration (of Statistics and Economic Analysis (Ministry of Agriculture)
(D/PV)	Plant Production Administration (Ministry of Agriculture)
(DT)	Tunisian dinar
(EPB)	EEC/AGRER Pilot Study for the Governorate of Bizerte
(G CDD)	Distribution Center Administrator (STEC)
(JJ)	Djebel Djelloud (Tunis) where the main STEC facilities are located
(MINAG)	Ministry of Agriculture
(OC)	Cereals Office
(OMV)	Development Office
(SA/F)	Agricultural Department/Fertilizer Section (STEC)
(SA/P)	Agricultural Department/Pesticides Section (STEC)
(SSP)	Single superphosphate, 16% P2 O5
(STEC)	Tunisian Chemical Fertilizers Company
(TSP)	Triple superphosphate 45% P2 O5

8. PROMOTIONAL STRATEGY FOR THE EXPANSION OF FERTILIZER AND PESTICIDE CONSUMPTION

8.1. Updating and Continuation of Market Studies

The studies of the fertilizer and pesticide markets covered in Chapter 3.1 must:

- Be updated systematically;
- Be based on data collected by the STEC Fertilizer Administration (DE), the STEC Pesticides Administration (DP), distribution center heads, the Commercial Office under the authority of the Agricultural Department/Fertilizer Section (SA/F) and the Agricultural Department/Pesticides Section (SA/P) of the STEC;
- Be broken down by Distribution Center activity zones, patterned after the method developed during the EEC/AGRER pilot study for the governorate of Bizerte (EPB);
- Serve as a basis for the systematic adaptation of the promotional strategy aiming to increase the use of agricultural inputs and to optimize STEC's profitability.

(See Paragraph 3.1.3.)

8.2. Proposed Reforms of Methods and Organizations

Methods for ensuring the development and continuous formation of the network must be implemented immediately (See paragraph 3.3.1.1.)

To carry out its role as sales promoter, the General Trade Administration must (DGC):

- Receive administrative, operational, and agro-technical support from the other departments at headquarters (see Paragraph 3.3.1.1.);
- Be relieved of the responsibility of operating the STEC distribution centers, which must be assigned to the General Technical Administration (DGT) (See Paragraph 3.3.2.1.);
- Be assisted by a sales department (moving the Trade Office to Djebel Djelloud (JJ) (See Paragraphs 3.3.2.2. and 3.3.2.3.);
- Be supported by an agricultural department (See Paragraph 3.3.2.6.).

The functional relations between the General Commercial Administration (DGC) and the General Technical Administration (DGT) must be focused on a sales forecasting program formulated in March and updated periodically by the General Commercial Administration (DGC).

The General Technical Administration (DGT) will use this program as a basis for preparing and implementing plans for reserve stocks in the distribution centers and their supply schedule. It will still make deliveries.

The operation of Distribution Centers by the General Technical Administration (DGT) is still justified because of the following facts:

- The experience acquired in stock management in Djebel Djelloud (JJ);
- The decentralization of distribution from Djebel Djelloud (JJ) to the Distribution Centers and the ultimate elimination of the manufacture of single superphosphate 16% P₂O₅ (SSP) production, which should free up a sizable work force within the General Technical Administration (DGT);
- The numerous technical constraints to be removed in the Distribution Centers (see Paragraphs 2.1 and 2.2).

Functional relations between the General Commercial Administration (DGC) and the Department of Administration and Finance (DAF):

- The sales forecasting program prepared by the General Commercial Administration (DGC) will facilitate the financial management of the Department of Administration and Finance (DAF) (budget, treasury forecasts) (see Paragraph 3.3.2.5);
- The creation of analytical accounting will primarily make it possible to define actual business conditions and to make decisions on the elimination of certain products, or, on the contrary, on the advantage of "promoting" others. It will also, and especially, make it possible to estimate the anticipated costs of the proposed promotional strategy, set priorities, monitor the strategy and correct it by systematically evaluating results (See Paragraph 3.5).

8.3. Proposed Commercial Strategy (See Paragraph 3.3.3)

The various components of this strategy include:

- A progressive decentralization of sales to new Distribution Centers based on the "management-by-objectives" method (See Paragraph 3.3.3.1);
- A policy of distribution through a network of intermediaries (See Paragraph 3.3.3.2), with the following consequences:
 - . Knowledge of the intermediaries making up the current network;
 - . Effective selection of a network of exclusive intermediaries, based on financial, agro-technical, logistic and commercial criteria (See Paragraph 3.3.3.2);
 - . Development, information and training (see narrated slide shows from the International Fertilizer Development Center, Alabama (See Paragraph 3.3.3.2.4);
 - . Appropriate remuneration based on an "attractive" income (adapted price schedule, adequate-sized activity territory, invoicing only to intermediaries (See Paragraph 3.3.3.2.2);
- "Pre-season" staggering of deliveries based on a policy of extending credit to the intermediary network:
 - . Through a line of credit at the subsidized agricultural rate (6.75%) BNT gives STEC, the benefit of which STEC would extend to its parastatal intermediaries, interest being covered by a corresponding surcharge on fertilizer (1.7%) (See Paragraph 3.3.3.3);
 - . With the support of a guaranty fund USAID could finance to encourage the extension of supplier credit to private-sector intermediaries (see Paragraph 3.3.3.3);
- A strategy to optimize the use of buffer stocks, limited to a single annual turnover, by making full use of the SNCFT rail system (delivery to users paid for by the intermediaries, the cement industry's delivery policy) (See Paragraph 3.3.3.5) and by re-establishing the 3-level price schedule (middle level = intermediary price, ex distribution center); this strategy could be supplemented by assigning reserve inventory quotas to the intermediaries at each Distribution Center.

8.4. Proposed Agro-Technical Promotional Strategy

An economic study must precede the development proposals listed in Paragraphs 3.1.1.4, 3.1.1.5 (fertilizer), 3.1.2.5. and 3.1.2.6 (pesticides); summarized as follows:

- Goal no. 1: Expanded use of DAP and Illoxan on cereal crops in Northwest (See Paragraph 3.1.2.5.1);
- Goal no. 2: Same as Goal 1, but in the northeastern governorates;
- Goal no. 3: Promotion of DAP for all crops having considerable N and P2 O5 deficits;
- Goal no. 4: Promotion of herbicides for all crops where economic studies show that it is financially advantageous.

At the same time, STEC should:

- Streamline its pesticides line (35 products accounting for 35% of the pesticides revenues);
- Look for cereal seed disinfection products, herbicides, fungicides, and possibly a nematicide, to supplement its product line;
- Gain a better position in vegetable farming and herbicides in general (more effective EPTEC operation).

To reach these goals, STEC will have to depend on the existing public service organizations (MINAG D/PV, Tunisian-Belgian Project for Consolidating Crop Protection (CDC), and parastatal entities (OC, OMVs, etc.) which organize several hundred demonstration plots and just as many workshops for farmers every year. It can reach farmers through extension organizations (CTVs, OMVs and the OC) by participating in their training and distributing promotional materials (slides, technical newsletters, brochures, etc.).

8.5. Public Relations Campaign designed to make the rural world aware of its new fertilizer distribution policy (strategic and reserve buffer stocks) (see Paragraph 3.3.5).

8.6. The promotional strategy paid for by:

- Reestablishment of the 3-level fertilizer price schedule (ex works intermediary, ex distribution center intermediary, retail) or, better still:
- Replacement of the current system (based on commissions) with a purchase and resale system in which compensation

would no longer vary from one invoice to another, but would be established throughout the entire growing season, as would the maximum intermediary price (ex distribution center) and the retail price (see Paragraph 3.4).

- 8.7. An economic study should be carried out to calculate the break-even point for the National Economy of the increase of agricultural production, through the increase in compensation derived from fertilizer and its extension to pesticides cereal herbicides.
- 8.8. Subject to more accurate calculations by the Department of Administration and Finance (DAF) when the gross margins and distribution costs have been determined, the proposed promotional strategy could generate the following remunerations:
 - DT 800,000 in surplus commission in 5 years (in 1986 Tunisian dinars), estimating that fertilizer consumption will rise 50% during the same period;
 - From DT 30,000 in the first year to DT 300,000 in the fifth year in additional gross margins on pesticides for a market expanding at a rate of 5% and for an STEC market share of total demand growing from 40% in 1983 to 60% in 1991.
- 8.9. The results of the proposed promotional strategy cannot be assessed without appropriate analytical accounting, which must be implemented immediately so that the points of departure can be identified (See Paragraph 3.5).
- 8.10. The economic studies proposed above could be included in a much broader economic study to examine the measures to be taken should STEC be privatized. This study would primarily make it possible to assess the cost of development work for which STEC is being asked to pay, and for which a private company would not normally be held responsible (See Paragraph 3.5).

ANNEX 6

RESULTS OF THE SURVEY OF THIRTEEN FERTILIZER INTERMEDIARIES

A. INTRODUCTION

This survey, conducted in December 1988, involved 13 STEC fertilizer intermediaries based in all of the country's major agro-ecological areas. This sample was composed of:

- 11 private intermediary-retailers (RDPs);
- 1 development office, OMIVA in Kairouan listed under no. 9 in Tables A6-1 to A6-7;
- 1 agricultural services cooperative, CSA in Korba, listed under no. 12 in Tables A6-1 to A6-7

Among these 13 intermediaries:

- 2 are located in the South (Nos. 1 and 2 in Tables A6-1 to A6-7);
- 3 are in the Central Region (Nos. 3, 4 and 9 in the Tables);
- 5 in the Northwest (Nos. 5, 6, 7, 8 and 10);
- 3 in the Northeast (Nos. 11, 12 and 13).

Fertilizer revenues for these thirteen intermediaries (see Table A6-6) represent approximately 9% of the revenues estimated for total fertilizer demand during the twelve months ending August 31, 1988¹. Among the latter, the 11 RDPs represent approximately 15% of total RDP revenues¹, the Korba CSA accounts for 10% of CSA revenues¹, and OMIVAK, 28% of the OLV revenues¹.

B. PROFILE OF THE AVERAGE INTERMEDIARY

The profile of the average intermediary, which can be drawn based on the intermediaries (see Tables A6-1 and A6-3) encountered during the survey, is as follows:

¹ Corresponding to total STEC revenues of DT 21.226 m, including sales of DT 9.192 m to RDPs, DT 1.668 m to CSAs and DT 1.147 m to OMV's (see Annex 4, Table A4-3). A gross margin of 8.26% is added to these revenues, yielding intermediary revenues (see Annex 4, Table A4-12, NB), coming to a total sales volume of DT 23.0 m at this level, composed of DT 9.96 m for RDPs, DT 1.8 m for CSAs, and DT 1.2 m for OMVs.

1. Fertilizer sales (see Tables A6-6 and A6-3)

-	In dinars	156,000
-	As a % of total revenues	36
-	In tons of fertilizer ¹	1,316
-	In dinars per ton of fertilizer	2

2. Credit sales² (see Table A6-6)

-	In dinars	58,289
-	As a % of fertilizer revenues	3.5
-	Length of credit term in average sales month of DT 12,650	4.6

3. Fixed assets (see Table A6-7)

a. Storage capacity

-	In m ²	3,274
-	In dinars	33,000

b. Storage capacity reserved for fertilizer

-	In m ³	264
-	As a % of total capacity	8
-	In dinars	2,640
-	As a % of fertilizer revenues	2

c. Total transport capacity

-	In tons	13
-	In dinars	92,600

d. Transport capacity reserved for fertilizer

-	In tons	4.3
-	In dinars	30,558
-	As a % of total capacities	33
-	As a % of fertilizer	

¹ Excluding OMIVAK, for which tonnages sold are not available, i.e., DT 1,678,672 in revenues for 12 intermediaries for 15,793 tons of fertilizers.

² For 12 intermediaries (the amount of credit extended by intermediary 6 is unknown), i.e., DT 699,474 in credit for revenues of DT 1,821,987 corresponding to these 12 intermediaries.

revenues

20

4. Profitability

. Gross margins (see Table A6-2)

- In DT/ton 7.4
- As a % of fertilizer revenues 6.8

b. Marketing costs (see Table A6-4)

- In DT/ton 5.8
- As a % of fertilizer revenues 5.3

c. Net margins (a - b above)

- In DT/t 1.6
- As a % of fertilizer revenues² 1.47

**TABLE A6-1: PURCHASE AND SELLING PRICES CHARGED BY INTERMEDIARIES
SURVEYED, IN DT/t**

NO.	PRICE LOCATION	AMMONIURE (AN)		SUPER 45 (TSP)		SUPER 16 (SSP)		DAP		POTASSIUM SULFATE (SK)	
		BUY (1)	SELL (2)	BUY (1)	SELL (2)	BUY (1)	SELL (2)	BUY (1)	SELL (2)	BUY (1)	SELL (2)
1	Ghannouch (Gabès)	103	110	102	110			109	114	290	335
2	Jara (Gabès)	103	113	102	109					290	320
3	Sfax	103	110	102	109					290	320
4	Sfax	103	109	102	100					290	320
5	Medjez El Bab	103	111.73	102	108	47	51	109	116		
6	Medjez El Bab	103	112.76	102	108	47	50.5	109	115	265	275
7	Bou Salem/ Jendouba	103	110	102	108	47	52	109	115	296	300
8	Béja	103	112.726	102	109	47	50.95	109	116	295	320
9	Kairouan OMVA	103	115	103	116				120	328.6	360
10	Jendouba	103	112.75	102	109	47	50	109			
11	Kélibia	103	108	102	106	47	50	109	114	336	361
12	Korba CSA	103	112	102	109	47	50.95	109	116	336	366
13	Menzel Temine	103	113	102	109	47	53	109	116	290	320

Source: Abt Assoc., Inc. survey

- (1) Purchase price from STEC
- (2) Selling price to farmers, FOB intermediary warehouse
- (3) Official Free destination station prices
- (4) Official selling prices to farmers fixed by MEN for parastatal organizations (OMVs)

TABLE A6-2: GROSS MARGINS EARNED BY INTERMEDIARIES SURVEYED,
BY FERTILIZER TYPE, IN DT/t

NUMBER	LOCATION	AN	TSP	SSP	DAP	SK	AVERAGE
1	GHAHOUGH (GABES)	7	8		5	45	8.3
2	JARA (GABES)	7	7			30	8.1
3	SPAY	7	7			30	8.4
4	SPAY	6	6			30	9.4
5	MEDJET EL BAB	9	6	4	7		7.4
6	MEDJET EL BAB	10	6	4	4	10	6.2
7	BOU SALEH	7	6	5	6	10	6.5
8	BEJA	10	7	4	7	25	8.4
9	KAIROUAN OHIVA	13	13		11	31	
10	JENDOUBA	10	7	3			7.3
11	KELIBIA	5	4	3	5	25	7.1
12	KORBA CSA	9	7	4	7	30	6.7
13	MENZEL YEMINE	10	7	6	7	30	8.4
AVERAGE		8.5	6.3	4	6.4	22.4	7.4

Source: Abt Assoc., Inc. Survey
SK = Potassium sulfate

MSB/January 26, 1989

**TABLE A6-3: SALES BY THE INTERMEDIARIES SURVEYED,
BY FERTILIZER TYPE AND IN TONS**

NUMBER	LOCATION	AM	TSP	SSP	DAP	SK	AVERAGE
1	GHANNOUCH (GABES)	500	200		20	2	722
2	JARA (GABES)	100	100			10	210
3	SPAX	100	60			10	170
4	SPAX	60	30			15	105
5	MEDJEZ EL BAB	1,000	500	250	100	20	1,070
6	MEDJEZ EL BAB	700	400	1,175	120	41	2,436
7	BOU SALEM	700	300	300	200	100	1,600
8	BEJA	1,700	1,500	50	500	20	3,770
9	KAIROUAN OHIVA	not avail.	not avail.	not avail.	not avail.	not avail.	not avail.
10	JENDOUDA	200	80	120		2	402
11	KELIBIA	800	600	200	40	250	1,890
12	KORBA CSA	750	324	870	114	20	2,070
13	MENZEL TRIMIR	200	200	70	60	10	540
TOTALS		6,810	4,294	3,035	1,154	500	15,793
AVERAGES		524	330	233	89	30	1,316

Source: Abt Assoc., Inc. Survey
SK = Potassium sulfate

TABLE 26-4: MARKETING COSTS FOR FERTILIZERS DISTRIBUTED BY INTERMEDIARIES SURVEYED, IN DT/t

NO.	COST ITEM LOCATION	FINANCE COST	RENT	HANDLING	OVERHEAD	LOSSES	TRANSPORT
1	GAMHOUGH (GABES)	0.80	0.40	0.500		0.50	9.25-2.5 (1)
2	JARA (GABES)		1.60	1.400	0.300		2.9
3	SPAX	1.80	0.90	1.500	0.500		2
4	SPAX	1.80	1.10		1.700	1.40	15-25(1)
5	MEDJEZ EL BAB	1.60	0.10	0.596	0.120	0.90	1.4
6	BOU SALKH	1.04	1.80		1.110	1.11	0.5
7	BEJA	2.20		1.500	0.230	0.90	0.6
8	KAIROUAN OHIVA	4.80	1.30	1.200	1.600	3.90	16.7
9	JENDOUBA	2.80	1.00	0.800	0.110		1.9
10	KELIBIA	1.60	0.26	0.800	0.400		3
11	KORBA	0.80	0.50	0.400			2.5
12	MUSSEL TMINH	2.22	0.70	0.400	0.700	1.00	2.5
	AVERAGE	1.40	0.70	0.700	0.400	0.50	1.8

Source: Abt Assoc., Inc. Survey

- (1) Transport costs of 9.25 DT/t represent shipment of Super 16 and potassium sulfate.
Costs of 2.5 DT/t represent transport from station to warehouse.
- (2) Marketing costs at Kairouan OHIVA are not included.

TABLE A6-5: NET MARKETING MARGINS EARNED BY INTERMEDIARIES SURVEYED, IN DT/t

NUMBER	LOCATION	GROSS MARGINS	DISTRIBUTION COSTS	NET MARGINS
1	GHANHOUC (GABES)	8.4	5.07	3.33
2	JARA (GABES)	8.1	6.50	1.60
3	SFAX	8.40	6.70	1.70
4	SFAX	9.40	8.50	0.90
5	MEDJET EL BAB	7.40	6.00	0.60
6	MEDJET EL BAB	6.2	-	-
7	BOU SALEM	6.50	5.50	1.00
8	BEJA	8.40	6.50	1.90
9	KAIROUAN OHIVA			
10	JERDOUBA	7.30	6.20	1.10
11	KELIBIA	7.10	6.30	0.80
12	KORBA CSA	6.70	4.20	2.50
13	MEZZEL TENINE	8.4	7.70	0.70

SOURCE: Abt Assoc., Inc. Survey

TABLE AG-6: CREDIT EXTENDED FOR FERTILIZER SALES

NO.	LOCATION	FERTILIZER REVENUES		CREDIT		CREDIT TERM (months)
		in DT	in % Total Revenues	in DT	in % of Fertilizer Revenues	
1	GHANNOUCH (GABES)	80,470	-	56,329	70	3
2	JARA (GABES)	25,100	25	5,020	20	not avail.
3	SPAX	20,740	30	14,510	70	6
4	SPAX	14,580	35	0,740	60	2
5	MEDJEZ EL BAB	195,300	60	156,304	80	4
6	MEDJEZ EL BAB	206,903	26	not avail.	not avail.	not avail.
7	BOW SALEN	170,000	50	35,600	20	2
8	BEJA	422,072	30	126,622	30	not avail.
9	KAIROUAN OHIVA	350,210	65	175,109	50	6
10	JENDOUDA	30,410	30	15,364	40	5
11	KELIBIA	254,560	15	12,720	5	1
12	KORBA CSA	104,107	5	55,256	30	not avail.
13	HERSEL TENINE	50,270	65	37,076	40	3
TOTALS EXCLUDING						
	NUMBER 6:	2,020,890		699,474		
	AVERAGE	156,000	36			3.5
	AVERAGE EXCLUDING					
	NUMBER 6:	151,032		50,209	30	

SOURCE: Abt Assoc., Inc.

MSD/January 26, 1969

**TABLE 16-7: MEANS OF TRANSPORT AND WAREHOUSING CAPACITIES
OF INTERMEDIARIES SURVEYED**

NUMBER	MEANS OF TRANSPORT			WAREHOUSING CAPACITY		
	TYPE	VALUE	% USE FOR FERTILIZER	IN M3	VALUE	% USE FOR FERTILIZER
1	1 3.5-TON TRUCK		50%	430		15%
2	1 1.5-TON TRUCK		30%	1,175		20%
3	1 1-TON ISUZU			1,560		5%
4	1 1-TON TRUCK (404)			120		10%
5	1 6.5-TON TRUCK		50% - 20%	326		20%
6	2 TRUCKS (7 T)					
	1 1-TON VAN		40%	500		
7	2 TRUCKS (7 T)		20%	945		15%
8	4 TRUCKS (16.5 T)		20%	1,076		10%
9	9 TRUCKS (30 T)		30%	2,696		50% (1)
10	1 6.5-TON TRUCK		60%	110		30%
11	4 TRUCKS (30 TONS)		40%	24,000		5%
12	5 TRUCKS (60 T)		20%	4,000		10%
13	1 6.5-TON TRUCK			1,548		20%
	1 1-TON 404 VAN		40%			
AVERAGE						
	(fertilizer, 13 t)	DT 92,600	33%	3,274	DT 33,000	0%

SOURCE: Abt Assoc., Inc. Survey

NSB January 26, 1989

(1) Not used to calculate average.

ANNEX 7

From Ch. J. Heureux
Abt. Ass. Inc. Consultant
APIP Project, Tunis

To: Mr. A. Khaldi
Assistant Director of Agricultural Development
Ministry of Agriculture, Tunis

Object: Withdrawal of public organizations from fertilizer
marketing
(Preliminary memorandum)

cc: Copy: Dr. R. Montgomery
Abt Ass. Inc, Tunis

WITHDRAWAL OF PUBLIC ORGANIZATIONS
FROM FERTILIZER MARKETING

I. INTRODUCTION

The conditions which must be fulfilled in each governorate to allow public companies (Cereals Office (OC) and Development Offices (OMVs)) to withdraw from the fertilizer marketing business, leaving this activity to the private sector, are the responsibility both of the latter and the public services.

The first will depend basically on logistic, financial and technical capacities of the economic operators, while the second will depend on the public sector's willingness to create an environment favorable to the profitability of the fertilizer marketing business.

As will be developed in the following pages, even though the conditions favoring profitability are put in place, on the other hand, before the Offices (OC and the OMVs) withdraw from a region, cumulative sales of the other operators (private intermediaries and cooperatives) must already be increasing steadily over the years until they constitute a substantial share of fertilizer demand. This share may be fixed empirically at 75%, and this period of steady growth set at 3 or 4 years above the 50% level. Furthermore, the operators involved must have the logistic and financial means to cover all needs.

According to the available statistics, private intermediary-retailers (RDPs) are most densely-concentrated in the northwestern part of the country.¹ The first surveys should thus be carried out to assess whether the conditions mentioned above and explained below have been met, and if OC can withdraw from governorates other than Nabeul.

Regions	% of fertilizer demand in STEC revenues	% of the number of STEC inter- mediaries
Northeast	44	62
Northwest	45	10
Central and South	11	28
TOTALS	100	100

¹ According to the AGRER SA Study (1986) and the APIP fertilizer study (1989).

Governorates having major irrigated areas should also be covered by the first surveys. Indeed, had they been given the opportunity in recent years, private economic operators would have preferred to turn towards these mixed-farming regions, also where negative climatic conditions are the least pronounced.

2. RESPONSIBILITIES OF PUBLIC SERVICES

If it is to become attractive, the fertilizer marketing business must be at least as profitable for private investors as other economic activities. If this is the case in a region, whether or not fertilizer marketing exists in a symbiotic or complementary relationship with other activities, it will attract enough economic operators to generate considerable competition, guaranteeing the farmer both an acceptable level of service quality and competitive prices.

2.1. Reorganizing the distribution networks

The following measures aiming to reorganize the distribution networks should be taken to make the fertilizer market more accessible and attractive to the private sector, thus making it possible to optimize competition in each governorate. These measures all fall within the competence of the members of the current de facto monopoly composed of SIAPE and SAEPA for fertilizer production, and STEC, which handles distribution to the intermediary-retailer level (RD).

2.1.1. Elimination of monopolies

The largest intermediaries - parastatal (CCGC, COCEBLE and CSAs) and private (primarily SEPCM and STIPCE) should be allowed to obtain their supplies directly from fertilizer manufacturers (SIAPE, SAEPA (and why not) ICM and Engrais de Gabès [Gabès Fertilizers]) under the same terms as STEC. However, these conditions should first be reviewed. Indeed, the manufacturers should absorb a portion of the costs STEC now covers, and receive directly from CGC the compensation composed of the difference between cost price and sales price charged to distributors. These primarily include the following:

- All customs duties, fees and taxes, especially on inputs used to produce fertilizers and bags;
- TSP bagging;
- Losses on rail transportation costs, if applicable, should their standardization be maintained, which does not appear to be necessary since the differences in transportation costs are approximately 2 to 3% of the public prices between the Northwest and the Northeast.

a. Manufacturer Terms of Sale

Their terms of sale should include two prices:

- FOB plant in Sfax or Gabès and CAF (free destination station); they (or their insurers) cover transportation.
- Special conditions for pre-season pick-up, i.e., payment on September 30 for deliveries in May, June and July (orders placed in August and September would be paid in cash).

Furthermore, manufacturer selling prices to intermediary-wholesalers should be set at a level to allow the latter a gross marketing margin to cover their costs and an acceptable net margin, plus those of their intermediary-retailers.

This gross margin would be as follows, calculated on the basis of the STEC cost price during the 1987 fiscal period¹:

	<u>AN</u>	<u>DAP</u>	<u>TSP</u>
- Storage	5,500	5,500	5,500
- Handling	1,950	1,950	1,950
- Losses	0,250	0,250	0,250
- Finance costs ²	2,500	2,500	2,500
- Overhead costs	3,300	3,300	3,300
- Net margins ³	5,770	10,550	6,900
- Gross margins RD	9,730	7,000	7,000
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	29,000	31,050	27,400

Thus, for the 1988/89 season, CAF destination station prices charged intermediary-wholesalers would be lower than the public prices of DT 29,000 per ton for TSP, i.e.:

- DT 83,730 per ton for AN
- DT 84,950 per ton for DAP
- DT 81,600 per ton for TSP.

For factory pick-up (FOB Sfax or Gabès), producers would give discounts equivalent to the SNCFT transport cost (which is not presently the case). On the basis of the average SNCFT

¹ See APIP fertilizer study, 1989.

² 15% per year.

³ To be determined by a study of the minimum acceptable break-even point.

transportation charges billed to STEC in 1987 (DT 8.823 per ton for AN, DT 10,145 per ton for DAP and DT 7,780 per ton for TSP), these FOB prices would be on the order of:

- DT 74,900 per ton for AN, from Gabès
- DT 74,800 per ton for AN and DAP from Gabès
- DT 73,800 per ton for AN and TSP from Sfax.

Wholesalers would be free to resell their fertilizers to the intermediary-retailers of their choice, and the current intermediary prices (free destination station and FOB STEC or wholesaler warehouse) would become the price ceilings for all wholesalers, including public and parastatal organizations that currently cannot sell their fertilizers below the price charged the public.

b. Wholesalers terms of sale

2.1.2. Elimination of privileges

Other reorganization measures proposed at the STEC level are discussed below in the paragraph covering the method for evaluating the optimum number of fertilizer intermediary-retailers per governorate. These measures concern the elimination of privileges STEC unjustly gives some of its customers.

2.1.3. Means of Action for the public services

To coordinate the actions proposed above, an inputs unit must be established in the Ministry of Agriculture. This unit must have ready access to the decision makers, having the task of creating, initiating, following, monitoring and evaluating the results of a policy having the goal of ensuring the harmonious development of the use and marketing of fertilizers. The role, responsibilities and means of action of this unit are discussed in the 1989 APIP fertilizer study.

3. PRIVATE SECTOR OPPORTUNITIES

A number of surveys will be required in each governorate in order to determine whether the conditions are present for the Offices to withdraw. The tasks include:

- Determining the minimum break-even point acceptable for intermediary-retailers (RDs);
- Assessment of RDPs and CSAs: location, resources (storage, transport, working capital), fertilizer revenues, and all data available from STEC;
- Assessment of the resources of the Offices actually used (storage, transport), their customers (revenues, credit), and

storage facilities that can be transferred to RDPs and CSAs;

- Assessment of RDP and CSA needs in terms of financing (inventories, transport, credit, working capital); and in terms of training (management, logistics, fertilizer use);
- Assessment of institutional credit available for fertilizer;
- Competitive level of fertilizer resale profitability in relation to other activities proposed to potential fertilizer intermediaries;
- Evaluation of the consequences of the OC's withdrawal from the Nabeul and Tunisian Central governorates on fertilizer marketing, and lessons to be learned to carry out the same operation in other regions of the country.

4. DETERMINING THE OPTIMAL NUMBER OF INTERMEDIARIES

To determine the minimum number of intermediary-retailers required to provide adequate fertilizer distribution service, the current demand for fertilizer and the estimated potential needs in each region must first be known. The former information may be obtained from the STEC, and the latter is included in the AGRER SA study.¹ We can estimate that the potential demand growth evaluated in this study will be reached by the horizon year 2000. These two variables expressed in terms of revenues will be compared in the following formula according to the minimum acceptable break-even point determined for RDs in the region using the method proposed during the fertilizer sector study conducted by the APIP project.²

If:

x = fertilizer demand (year 1)
a x = potential needs by the horizon year 2000 (year 10)
y = minimum acceptable break-even point for RDs
Nb1 = maximum number of RDs, year 1
Nb10 = maximum number of RDs, year 10
nb1 = minimum number of RDs, year 1
nb10 = minimum number of RDs, year 10,

¹ RT, STEC, CCE, AGRER: Final Report of the Project for Technical Assistance Provided to STEC, 1986.

² RT, MINAG, DG/PDIA, ABT Ass. Inc: Opportunities for Improvement of the Marketing of Chemical Fertilizers and Their Use on the Farm, 1989.

- The minimum required number of RD's will fall between

$$nbl = \frac{x}{y} \quad \text{and} \quad nb10 = \frac{ax}{y}$$

- The maximum number of RDs will fall between

$$Nbl = \frac{x}{1.5y} \quad \text{and} \quad Nb10 = \frac{ax}{1.5y}$$

Steps must also be taken to ensure that the cumulative revenues of the RDs (RDPs and CSAs) + CCGC and COCEBLE are at least equivalent to 75% of demand. In other words, the Offices' share must be less than 25% of demand, which is already the case for the OC at the national level. It must further be determined whether this situation exists in each governorate.

To ensure that the cumulative share of RDs, CCGC and COCEBLE amounts to 75% of fertilizer demand in each governorate, the following conditions must exist:

- Customers who wrongfully benefit from the intermediary price (45 STEC customer accounts in 1987/88)¹ must be billed at the consumer rate (public price) as the result of action taken by the CRDAs (elimination of sales authorizations issued to "pseudo-intermediaries") on the instructions of the Inputs Control Service (SCIA) of the DG/PV [sic] must, of course, send the STEC Sales Office¹ a list of sales authorizations that have been revoked;
- STEC should strictly limit its sales to intermediaries, and stop all deliveries to customers, sending them systematically to its intermediaries. Indeed, the 634 customer accounts and the 45 "pseudo-intermediaries" cited above would represent DT 510,510 in 1987/88^{2 3};
- STEC should spread out its credit sales more equitably among its intermediaries; indeed, in 1987/88,^{4 5} 77.7% of the STEC "forward sales" were extended to OC (90 days without interest), which, however, represented only 25% of its

¹ 12 months ending August 31, 1988; see AGRER fertilizer study, 1989.

² Avenue de Carthage in Tunis.

³ 12 months ending August 31, 1988.

⁴ 12 months ending August 31, 1988.

⁵ See APIP fertilizer study, 1989.

fertilizer revenues (or 99.8% of OC's fertilizer purchases), as against only 14% during the same period extended to RDPs, although they accounted for 43% of STEC's fertilizer revenues. These statistics also reveal that OC made 99.8% of its fertilizer purchases on credit, compared to only 10% for the RDPs.¹

¹ See the APIP fertilizer study, Table A4-2.